

MAY 1988 95p

AQUARIST

AND PONDKEEPER

SPECIAL FEATURES ON
POND AND WATERGARDEN
EQUIPMENT

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Ctenops
Spawning

HUMANE
DISPOSAL
(views from hobbyists
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Gourami
Communities

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MAY 1988

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COVER STORY

Photograph: Arend van den Nieuwenhuizen

Bristle-nosed Catfish species of the genus *Ancistrus* share the dubious honour with "Plecos" of being almost impossible to identify accurately without detailed anatomical investigation and locality information. Again, like "Plecos", Bristle-noses belong to the family Loricariidae, many of which show marked male/female differences (sexual dimorphism). In the case of male *Ancistrus*, as our cover photograph spectacularly shows, this difference consists of an impressive array of "bristles" surrounding the head and mouth, including, of course, the "nose" area. Should any A & P reader be able to identify the species in question from our photograph — please drop us a line with full details.

COMPETITIONS

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Seaview

by Gordon Kay



Above left, the *Plotosus* "kittens" are in a floating trap at the moment — being eyed by other hungry-looking tankmates. Above right, this may look like a shoal of Black Molly fry — or tadpoles — but it is not. These are just some of the *Plotosus* fry (including the two-headed "monster" at the bottom of the glass) hatched out by Ian Eary and Trevor Herbert at Underwater World.

Plotosus "Kittens" produced for the first time

We had a call here recently from Underwater World of Sorevenage in Hertfordshire saying that they had a pair of Saltwater Catfishes (*Plotosus anguillarum*) which had spawned. Naturally, I was on the phone the very next day to find out a little more. Trevor Herbert, one of the proprietors, was delighted to tell me the story.

It seems that a customer had a pair of adult cats which not only looked dull and boring — compared to the juveniles he had bought a couple of years previously — but were doing all sorts of unsociable things, like digging up the sand and re-arranging the rockwork. The shop runs an exchange scheme for its regular customers and so the cats were traded in. They were put into a tank, with a Trigger and a Bird-mouth Wrasse and forgotten, save for feeding, of course.

Trevor said that, after a while, one of the cats started to get very fat. He and his partner could not agree on the cause of this condition and so they did nothing except watch. Well, the "fat cat" went thin overnight and a search of the aquarium revealed a cluster of eggs in a hole in the sand (the shop

has a centralised filtration system and the excavator had gone right down to the glass, on which the eggs were laid). The eggs started to go "furry" after a while and it was assumed that they were not fertile, but then they started to go clear and tails began popping out all over the place. One or two of the fry have been lost, but at the time of writing (three weeks or so after hatching) there were 20 or so 1/2-inch long black fry. Trevor likened them to baby Mollies but assured me they were not! Having no experience of raising the fry of saltwater cats, the lads were feeling their way somewhat, but they seem to be on the right track. The fry are temporarily housed in a breeding trap, seemingly thriving on Liquifry Livebearer food. In fact, one has two heads, both of which are feeding!

For the more technically minded, salinity is 1.023, pH 8.3, nitrite and ammonia are nil, but nitrate is well over 50 ppm, which is, apparently, the reading of the stuff that comes out of the taps in the Lea Valley!

I shall keep you abreast of the situation with regard to the Saltwater Kittens but, meanwhile, I would love to hear from anyone who has experience of breeding(!).

Filtration — the algal way to success

Those of you who have read my articles will know the importance I place on aquarium algae as part of the diet of delicate species like Butterflies and Angels. However, algae also play an important part (however incidentally) in maintaining water quality because they absorb nitrates and help to keep these within controllable limits, if they (the algae) are regularly harvested. They will also raise oxygen within the aquarium (through photosynthesis), help stabilise pH and remove organic and end-products of bacterial metabolism. So, how about taking this a stage further by establishing an algae filter?

An algae filter can be easily and cheaply made and is best achieved by the use of a shallow tray approximately the length of the tank, half the width of the tank and about 3 inches deep (fitted into the hood, between the lights and the water). This tray is split into passages by strips of glass as shown in the sketch. Water can be raised from the aquarium by a powerhead or an air-lift, but the flow rate needs to be slow

to allow maximum contact time with the algae. The aquarium hood will need to be revamped to get all the lighting in, but the effort will be well rewarded with better water quality and healthier fish.

Butterfly snippets

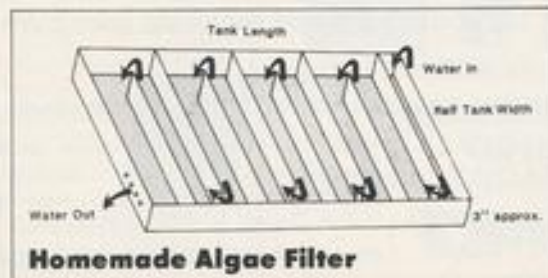
1. Some authorities recognise two subspecies of *Chaetodon auriga*, the Threadfin Butterfly, namely *C. auriga setifer* — which is widespread throughout the Indo-Pacific — and *C. auriga auriga*, which is confined to the Red Sea. Both are similar, but *C. auriga auriga* does not have the black eye spot on the dorsal which adorns *auriga setifer*. The Red Sea fish is also usually smaller — around 7 inches compared to 9 inches for *auriga setifer*.

2. The most common Butterfly in the West Indies is the Four-eyed Butterfly, *C. capistranus*. It is a pity we don't see more of these in Britain for they are gorgeous, and a piece of cake to keep.

3. One species which seems to be finding its way into Britain with increasing regularity is *Chaetodon triangulum* — the Triangular Butterfly from the Indian Ocean. This fish is so indescribably beautiful that it will take all of your willpower to follow my advice, but if you see one for sale, leave it where it is. *Triangulum* is a coral feeder and you won't stand a chance of keeping it alive for longer than a few weeks. The same applies to *C. melopterus*, *C. baronessa*, *C. meyeri* and *C. ornaticaudus*.

4. There are two species, however, which are becoming increasingly popular over here, which are just the opposite — the Dot-and-Dash Butterfly (*C. polemonis*) and its cousin, the Spot Banded Butterfly (*C. punctatofasciatus*). Richard Sankey is bringing these into the country, so you shouldn't find it too difficult to locate either.

5. Did you know that the Copperband Butterfly (*Chelodactylus rupestris*) is not actually a coral fish? It comes from coastal waters and even estuaries.



UNTIL THE NEXT TIME



Above left, This is the female which produced over 170 fry. Besides having a larger throat than males, females also lack the characteristic white V mark. Above right, the male *Ctenopos nobilis* involved in the first successful breeding attempt. Note the white patch in front of the dorsal fin. This is part of the white V which distinguishes males from females.

THE FIRST SUCCESSFUL BREEDING OF CTENOPS NOBILIS

We continue our series of "firsts" on this rare Anabantoid with Danish aquarist Svend Bitsch's report of his success at breeding this interesting, and still "new" (in terms of aquariumkeeping) fish.

My favourite fish is the Chocolate Gourami and I had been keeping them for some time when I found six *Ctenops nobilis*, an arguably related species, in 1987. My experience with *Sphaerichthys*, along with information gathered from the Anabantoid Association of Great Britain, meant that I had no initial problems. I kept them in a 160-litre tank with water of medium hardness (7°GH) and of neutral pH, at a temperature of 27°C (80.5°F). Prophylactic dosing for Velvet, a fortnightly 33% water change, and avoidance of a high nitrite and nitrate concentration, were also advantageous. I dealt with the last of these using *Venularia dubyana* (Java Moss).

Sex differences

After only 14 days, I saw one fish drop a white, opaque egg. Later, I was able to identify the sexes as the male chased the female and I saw a series of false embraces (as described in the July 1987 *Aquarist* and *Pondkeeper*), which continued for two days. (The males have larger, more muscular bodies with a white V in front of the dorsal fin, while the females have a larger throat as they carry the eggs.) On the third day, I saw the female had eggs, which were quickly swallowed.

First success

A week or so later, on 19 August, 1987, she had another mouthful of eggs, so I replaced the aquarium light with a 15W incandescent lamp which was kept on 24 hours a day and divided the tank into a light and dark side with the aid of a dark towel. After 10 days, she was still carrying the eggs, so I removed her to a 30-litre tank, again divided into a light and dark side. Initially, she spat out two free swimming fry of about 5-6mm and, over the next five days, she spat out



This fry (from the original batch) was photographed just under four weeks following egg-laying, by which time it was already 13mm long.

about 170, which I removed to another 30-litre tank, where they were fed brine shrimp nauplii. On 17 September, at a length of 13mm, the fry were photographed to show their resemblance to those of the Chocolate Gourami.

Raising the young

Raising the young *Ctenops* was not easy. Many were small and weak, and died soon after the female spat them out. The second problem was with parasites. Although I changed 50% of the water, four times a day, many fry died. Copper Chloride, Malachite Green and Methylene Blue (which was not very well tolerated), were all tried, and failed, before a dose of one teaspoon of salt to 10 litres of water cured them.

The fry grew to 20mm after seven weeks, by which time they had their labyrinth organ and were growing strongly. After 14 weeks, eight *C. nobilis* remained, and, at 4cm, they were already showing signs of aggression. At this stage, they had a

dark brown body, alternating to silver, a broad red margin to the caudal fin, a red dorsal, a yellow, green or black anal, and a silver lateral line with 15 spots in a line along the body, like the adults.

This, then, is the story to date. Before I finish, though, it is worth adding that one of my original adults has died of what may be a *Metacercaria* (trematode) infection, with which Michael Kokoscka of IGL thinks most imports are infected.

POSTSCRIPT

Since the original manuscript for this article was received, Svend Bitsch has successfully bred *Ctenops* again and has submitted the following summary details regarding both successful spawnings:

FIRST BREEDING

Temperature 27°C (80.5°F)
Hardness 7° dGH
pH 6.8

Dates and Details:

Aug 9/10 — False embraces
Aug 11 — Spawning
Aug 12 — Eggs swallowed
Aug 19 — Second spawning
Aug 29 — Removal of female to 30-litre tank
Sept 1 — 2 fry spat out
Sept 1 — 49 fry spat out
Sept 2 — 21 fry spat out
Sept 3 — 40 fry spat out
Sept 4 — 58 fry spat out
Total — 170 fry after 16 days

SECOND BREEDING

Temperature 24°C (75.2°F)
Hardness 7° dGH
pH 6.8

Dec 10/11 — False embraces
Dec 12 — Spawning
Dec 22 — Removal of female to 60-litre tank
Dec 27 — 14 fry spat out
Dec 28 — 21 fry spat out
Dec 29 — 94 fry spat out

Total — 129 fry after 17 days.

Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every 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 expert to whom your query should be directed. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper, Buckley Press Ltd, 58 Fleet Street, London, EC4Y 1JU



TROPICAL
Dr David Ford



COLDWATER
Pauline Hodgkinson



PLANTS
Barry James



KOI
Roger Cleaver



MARINE
Graham Cox



DISCUS
Eberhard Schulze

Coldwater Natural pond benefits

I have designed the surround of my pond to be as "natural" as possible, hoping to attract local amphibians. This aim has been quite successful, several frogs and toads having made their summer home by the pool, in which I have kept a moderate number of Goldfish. The pool is well stocked with oxygenators; I have two lilies and a number of floating plants and Duckweed providing approximately one-third surface cover.

I would welcome your advice on whether:

(a) the installation of a fountain and/or small waterfall would be beneficial to the pondlife (bearing the interest of the fish foremost in mind); and

(b) (if so), whether any beneficial effect would be provided if the pump were to be run for a few hours each day, rather than continuously — i.e., might there be a danger of producing oxygen "highs" and "lows" which might stress the pondlife, particularly the fish.

I am delighted to hear that you have the local amphibians in mind in providing a natural habitat in the type of pond which you have created. However, bear in mind that single male frogs can pose a danger to slow-moving Fancy Goldfish in spring. I have witnessed frogs clamping the round-bodied, twin-tail types in a

deathly embrace, though I expect that the fast-swimming varieties of fish are not so easily caught.

A fountain adds to the overall good effect of a pond and so must be an all-round benefit to the pleasing feature and to the inhabitants of the pond. I see no reason to believe that, by only running the fountain for a limited period each day, you will cause any stress to the fish.

Peaceful Sterlet

Would you please supply me with some information on the Sterlet (*Acipenser ruthenus*)?

Acipenser ruthenus, the Dwarf Sturgeon, though termed dwarf, can reach an adult length of four feet. The Sterlet is a "dwarf" in the sense that it is small for a sturgeon; some like the Beluga (the source of Russian caviar), reportedly, reach a length of almost 30 feet and a weight of 1½ tons!

With proper care, sturgeons have been known to live for at least 20 years. However, to do well, they must be given a large aquarium, because they need a

Despite its common name, the Dwarf Sturgeon, or Sterlet, is too large for most tanks.



lot of room to move about and, though slow-moving, are fairly active. Cramped conditions will cause a great deal of stress and, inevitably, an early death.

Sturgeons are coldwater fish and have little tolerance for high temperatures; they should, therefore, be kept at 50 to 60°F (10-18.5°C). The water should be hard and somewhat alkaline. They are peaceful fish and not a threat to other coldwater fish, though I personally prefer to keep the goldfish varieties with their own kind, but that, of course, is only my own opinion.

Feed a good variety of foods such as brine shrimp and tubifex worms, chopped earthworms and diced fresh fish.

Tropical Nose- bumping blues

My male Blue Gourami keeps "nose bumping" the side of my Dwarf Gourami. Will this do any harm? Is the male fighting, or just interested? If he is interested, will they mate?

The Blue Gourami, *Trichogaster trichopterus*, is only peaceful towards fish of equal or larger size. The Dwarf

Gourami, *Colisa lalia*, does not belong to the same genus, so cross-breeding is most unlikely.

If the Dwarf is a female, and is obviously ripe, and if the Blue is a male building nests, then spawning attempts could explain the behaviour; but it is more likely that you have a large fish bullying a small one. If any damage is seen, or the Dwarf is harassed too much, separation is the only solution.

Cloudy eyes

What causes a fish's eyes to cloud up?

Various things can cause eye clouding. One is a parasite within the eye, and, obviously, nothing can be done about this condition. Another is a cataract, which is also non-treatable. Fish Tuberculosis will cloud the eye if the disease is sited near it — again no cure.

Another is local fungus growth, which will respond to a dip in a Fungus Remedy cure. Next there are poor water conditions, because the eye is the most vulnerable part of the fish and can be affected by toxins. This is more common in marine fish. The obvious cure is to improve the water quality.

Finally, there is damage from scraping or a fight; the bacteria gain access in the scratches and the cure here is to kill the bacteria to allow natural healing. There are eye treatment cures for this, usually based on silver salts.

Which of these many conditions is present can be assessed

by viewing the fish through a magnifying glass (all good aquarists should have one) to see if the problem is external or internal to the eye.

Blown up sword

I have a female Swordtail which has been "blown up" for three weeks. Although she spends a lot of time in a corner at the bottom of the tank, she can certainly move when she wants to. What's wrong with her?

Are you sure the Swordtail is not just pregnant? An older fish carrying a lot of developing eggs inside her can get very fat indeed. The fact that she is not feeding may indicate problems — perhaps she has become egg-bound (although live-bearers, they still develop eggs). If so, nothing can be done to help her.

If the scales begin to protrude, giving a furry appearance, this indicates Dropsy. This is caused by water getting into the fish which has lost the ability to excrete it fast enough. Many diseases, from heart failure to bacterial attack, can create this condition. Since the

problem is within the fish, treating it externally via chemicals in the water is a waste of time and money.

Try dosing the fish with antibiotic via treated flake food (your local vet. can supply a prescription). If she refuses to eat this, the prognosis is not good, but do not contemplate "destroying" her; where there's life there's hope . . .

Koi Koi stats

How long do Koi live, and how big do they grow?

Some years ago, the Japanese were said to have discovered a collection of Koi which contained a specimen over two hundreds years old. The method of ageing this fish has since become suspect, and all that can be agreed is that the fish was exceptionally old.

This fish was the exception and most Koi will not outlive their owners. I know of Koi in this country which have been in their owners' hands for 15 to

16 years and are still doing well. I feel that 20 to 25 years would be a good lifespan for our Koi, although I expect there to be exceptions to this.

In Japan, Koi in excess of one metre do exist, but, again, these are the exceptions. Given the best conditions, quite a few Koi are appearing in excess of 30 inches in Japan today, but I believe that, unless we use heating in our pools, this will not be achieved in the U.K. Twenty-four inches is a more realistic target for our Koi to grow to in Britain due to our inclement weather conditions.

Plants Hard options

My tank water is hard and alkaline. What plants should I use?

Generally speaking, those plants from sub-tropical regions will fare better under these conditions than those from warmer ones. However, with a few notable exceptions, most plants adapt quite well to tanks

holding water of medium hardness and pH levels.

It is quite easy, nevertheless, to soften your water, and lower the pH with conic exchange resins and pH acidifiers and buffers widely available through the aquatic trade, thus rendering your water even more suitable for plants.

Marine Complete strip

How often should I need to strip my marine aquarium down completely, i.e., including throwing away all the coral sand and filter plate?

If you make your filter bed properly (i.e., first 1 inch of coarse coral gravel, then 2in-3in fine coral sand) this will last you for 10 years. However, you must remember to siphon off all the non-biodegradable sea humus from the top inch of coral sand each time you do your partial water changes. The U/G filter lasts virtually forever.

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Spotlight

MARBLED HATCHET FISH

It is quite surprising the number of aquarium fish that are related to the marine Flying Fish: Garfishes and Halfbeaks are but two. The other (unrelated) fishes sharing a similar "flying" characteristic belong to the family Gasteropelecidae, of which the Marbled Hatchetfish, *Carnegiella strigata*, spotlighted this month by Dick Mills, is a member.

Photograph Michael Gilroy.

The family Gasteropelecidae is widely distributed throughout South America, from the northern shores right down to the River Plate; it contains three genera — *Carnegiella*, *Gasteropelecus* and *Thoracocharax*.

The genus *Carnegiella* was named in honour of Margaret Carnegie. It may be distinguished quite easily from *Gasteropelecus* by virtue of not having the small adipose fin. Of the three species within the genus, *C. marthae*, *C. mystri* and *C. strigata*, the last is the most colourful.

Described to science by Gunther in 1864, the species is native to the Amazonian region and Guyana. The body shape is instantly recognisable and cannot be mistaken for a species from any other family. The dorsal surface is straight; the ventral surface is keel-shaped and runs from the snout right round to the caudal fin.

These two physical factors enable definite actions to be taken on the part of the fish. A straight dorsal surface in any fish, especially when associated with an upturned mouth, clearly indicates a surface feeding species, this body contour allowing the mouth to get as near as possible to the water surface, i.e. floating foods such as alighted insects. The deep body is necessary to house very powerful pectoral muscles; these drive the large wing-like pectoral fins enabling the fish not only to leap from the water, but to propel itself for several metres across its surface, either to capture insects or to escape capture itself. In this respect, while

the majority of Flying Fishes may be loosely termed "gliders," the Hatchetfishes have taken the process a little further and can be described more as "flappers."

The popular name Hatchetfish comes from the sideview silhouette of the fish which resembles a hatchet blade or axe. The top half of the body is silver, and a longitudinal stripe running from gill cover to caudal fin separates the lower half of the body, which is marked by some dark wavy patterns giving a marbling effect. Variations in patterning of this marbling, together with distributional differences, have led some authors to suggest subspecies status, i.e. *C. strigata strigata*, *C. strigata fasciata*, and *C. strigata vesca*. On some well-marked specimens there may be a light area on the caudal fin's base with white patches above and below it. There are no external clues as to guide one towards successful sex determination.

Aquarium care

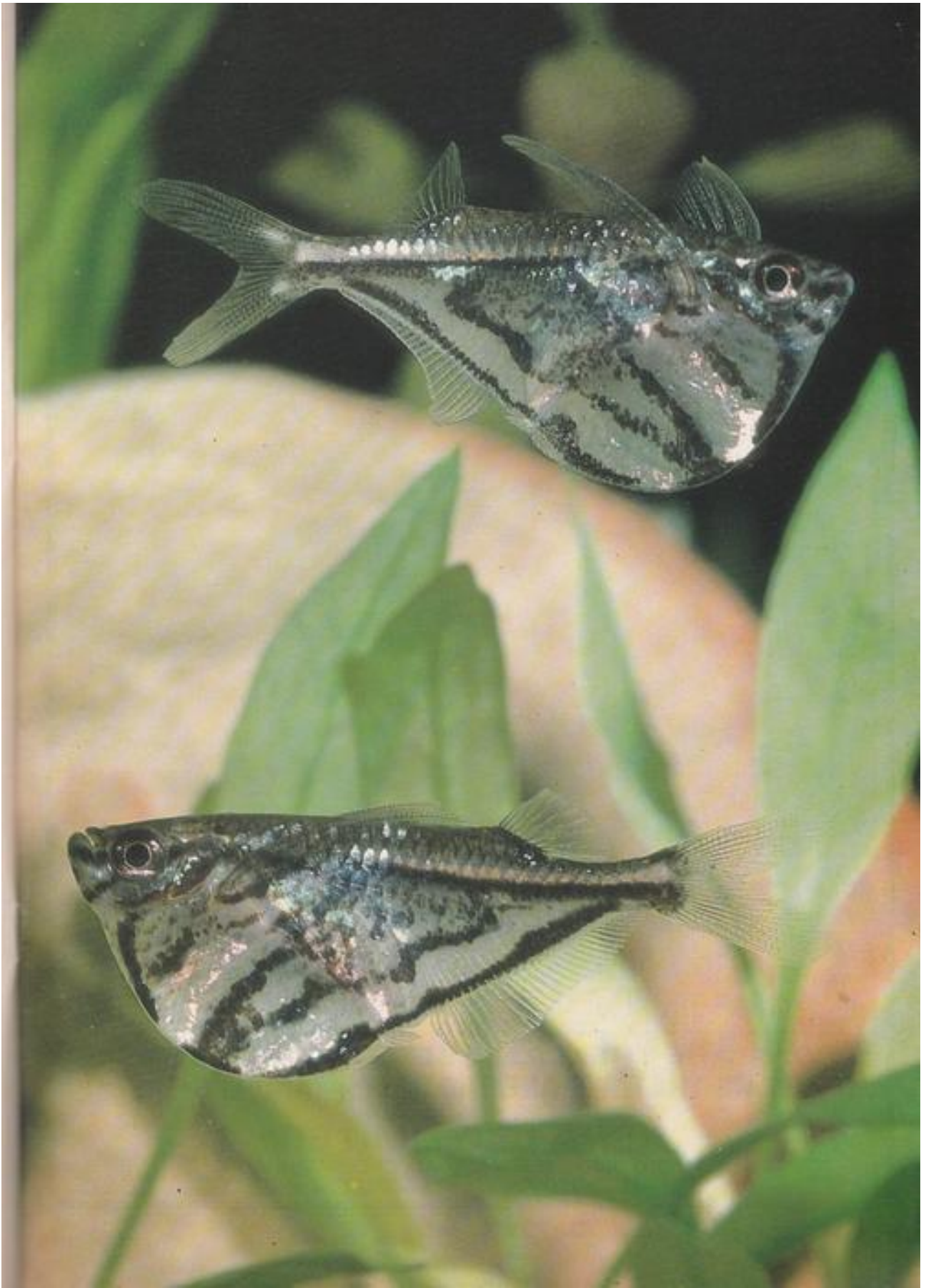
Carnegiella strigata is a gregarious fish and should be kept in a shoal of its own kind. The aquarium should be well-planted, using a few floating plants to offer some shade to these surface-dwelling fishes. Water conditions should be soft and slightly acidic; many hobbyists find that using peat in the filtration system (in filter bodies, not beneath gravel) assists greatly in achieving this state. Temperature should be around 27°C (81°F).

Obviously, floating and other slow-sinking foods are easily taken, but it is not unknown

for these fish to follow worm foods down to the bottom and seize them from an almost overbalancing backwards, vertical position. Compared to other species in the genus, *C. strigata* appears to be a little hardier and longer-lived.

While the Marbled Hatchetfish is not a large species (up to 45mm, 1.8 inches), the aquarium should be fairly roomy, the longer the better, although unless enough clear "headroom" is made available above the water (yet below the cover glass or hood) the fish will not be allowed the luxury of practising their natural talents. In this respect, it is very important to keep the aquarium securely covered at all times; take extra special care when working in the aquarium during maintenance, when introducing new stock, or when the hood needs to be removed for whatever reason. Maybe an automatic numerical check of inmates, following any occasion for "open-tank" activities might not be a bad procedure either!

Spawning has been reported; the action appears to be a rather hectic affair at the water surface among floating plants, culminating in the adults quivering side by side in a head-to-tail position. Released and fertilised eggs are distributed among fine-leaved plants. Hatching occurs after 24-36 hours and the young should be raised using the well-tried techniques of increasing amounts of small live foods together with regular water changes. It may be necessary for a slight increase of temperature to stimulate spawning.



OUT AND ABOUT

with John Dawes

Koi lovers who failed to visit the Staffordshire County Show-ground on 27-28 February, should be kicking themselves. For the first time ever, Koi dealers from right across the UK got together and presented a Koi extravaganza extraordinaire, bang in the middle of winter when the hobby is in its most quiescent period, thus presenting the enthusiast with an opportunity to view possibly the highest quality Koi ever seen.

This, coupled with an absolutely tremendous array of filters, pumps, foodstuffs, stone ornaments, bonsai, bric-a-brac of every description, and, of course, Koi of every size and variety, gave any Koi lover an unforgettable day out. There was even a large demonstration pool very tastefully constructed straight onto a flat concrete floor, no mean feat of engineering!

Chairman of B.A.N.D. '88, Ian Brown of Transcontinental Goldfish Co, and the rest of the team deserve the heartiest of congratulations for their efforts in producing a memorable event. The logistics involved in staging an event such as this are quite staggering, as I know only too well from past experience. If I had just one niggling criticism, it would be over the failure of the amateur side of the hobby to make its presence more obvious, as the stand of the major UK Society was a very insignificant affair more suited to a village fete.

B.A.N.D. '88

One aspect which really struck me personally were the conditions in which the Koi were exhibited. Nice, large vats with clean, very well oxygenated water with added zeolite, quite a contrast with the more normal conditions displayed at most shows. Also, the behaviour of the public appeared to be

exemplary, as I did not witness one act of misbehaviour, such as dipping of hands in the water, or flicking cigarette ash into the vats, both of which are regularly seen at most shows!

And what about those Koi? They were truly magnificent! In fact, I had difficulty in restraining myself from picking

Above, spacious surroundings and well-thought-out displays, including a large demonstration pool, gave a real touch of class to the show. Below, "Which one shall we buy?" Interest was intense throughout the event — just as it should be.



JOHN CUVELLER

some of them up and giving them a cuddle! Even the fact that the price of some of the fish for sale represented more than five years worth of my vocational pension could not detract from the pleasure of simply looking at them. The participating dealers had already judged and awarded prizes for the various classes prior to the exhibition opening to the public and every fish was for sale, an interesting development within the show regime and one with promise for the future.

My intention in attending the show, in addition to producing this write up, was to renew old acquaintances and to meet some of the newer names among the traders. How wrong can you be? Trade was so brisk at every stand that there was only opportunity for a quick pat on the shoulder and a "Hello" for the people I knew; the rest were regrettably passed by! Even now, I'm not certain whether the black-clad Peter Waddington of In-Filtration ever realised I had whizzed through! John and Glenda Cowles of 'Quality Koi', when last seen, were literally buried under a heaving wave of customers. One can only hope that every trader had a successful two days. They deserved it.

And what of the future? I hope we can look forward to B.A.N.D. '89, because if it was only half as good as '88, it will still be worth attending.

John Cuveller

SWINDON AQUARIST SOCIETY



OPEN SHOW
Sunday, May 1

Park Youth & Community Centre
Marlowe Avenue, Swindon, Wilts.

Guest Speaker: Dr David Ford

Head of Aquarian Advisory Service. Approx 1.00 pm
Further Details: Show Secretary, Kevin Curtis — (0793) 728194



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A GREAT DAY OUT FOR ALL THE FAMILY

News from the societies

OBITUARY

Northampton & District Aquarist Society

HOWARD BILEY FZS

On 15 November 1987, the aquarist world suffered a great loss. For 20 years Howard had been a member of Northampton and District Aquarist Society. He was also a highly respected conservationist, naturalist and entomologist. 1987 was also the year in which Howard became President of the Northampton Natural History Society and

Vice President of Northampton Aquarist Society.

He was a very knowledgeable speaker on numerous subjects and had been on the F.B.A.S. Speaker's list for a number of years. He was also a judge and, at the inaugural meeting of the Mid-Shires Area Group, was voted secretary.

During his membership of Northampton Aquarist Society, he was club judge, chairman, official photographer and delegate for F.B.A.S. assembly meetings.

The local Societies around

the Northampton area will certainly miss this great man who was never too busy to offer his help and expertise whenever called upon.

Chris Swain (N.A.D.A.S.)

Runcorn Aquarist Society

The R.A.S. meets twice-monthly (second and fourth Mondays) at 8.00pm at the South Bank Hotel (upstairs reception room), Lord Street, Runcorn, Cheshire.

The 1988 Committee:

Chairman: E. Derrick

Secretary: G. Janion
Treasurer: F. Cobb
Assistant Secretary: Mrs. R. Muckle
Show Secretary: K. Huxley
Asst. Show Secretary: D. Litherland
Joint P.R.O.'s: A. Loftus, S. Droham
Lay Members: S. Jones, J. Bate.

Further details from Gary Janion (Secretary), 18 Dalton Street, Runcorn, Cheshire, WA7 5NN. Tel. (09285) 61521.

FBAS PUBLICATIONS

The following list contains details of all F.B.A.S. Booklets and Technical Information Guides which may be purchased from

F.B.A.S. Show Stands at Societies Open Shows, from the Publications Officer by Mail Order, or at General Assemblies.

MAIL ORDER

When ordering by Mail, please enclose Cash with Order plus Postage.

Booklet No.	Title	Price			Price
1	<i>Cultivated Fishes</i>	1.00	11	<i>Plants</i>	1.00
2	<i>The Sunfishes</i>	0.75	12	<i>Dictionary of Common & Scientific Names (Marine Fishes)</i>	1.00
3	<i>Show Fish Guides</i>	0.75	13	<i>Nishiki Koi (in Colour)</i>	1.50
3 Supplements	1, 2, 3, 4, 7, 8, 9: <i>Show Fish Guides and Technical Information</i>	0.75	14	<i>Organisation of the Open Show</i>	0.50
4	<i>Goldfish Standards</i>	1.00	15	<i>Revised Cichlid Names and Show Glasses 1987 Edition</i>	0.50
5	<i>F.B.A.S. Constitution & Show Rules</i>	1.00	16	<i>Rasboras</i>	1.25
6	<i>National Show Fish Sizes 1987</i>	1.50	17	<i>Goodeids</i>	1.25
7	<i>F.B.A.S. Year Book</i>	1.00	18	<i>Quizzes</i>	1.00
8	<i>Characin Guide</i>	0.45		<i>Loose Leaf Binders</i>	2.50
9	<i>Dictionary of Common & Scientific Names (Freshwater Fishes)</i>	1.25	Tank Labels	<i>Class And Exhibit No per set (96)</i>	1.00
9 Supplement 5	<i>Additions to Book 9</i>	0.75		<i>Award Labels 1st 2nd 3rd 4th per set (96)</i>	1.00
10	<i>Scientific Names & Their Meanings</i>	1.25	Judging Sheets	<i>30 Copies</i>	0.50

Postage should be added at the rate of 20% of the total price of the books ordered.

Publications Officer, 9 Upton Road, Hounslow, Middlesex, TW3 3HP.

Diary dates

Bridlington & District Aquarist Society

The 15th Annual Open Show of the B.D.A.S. will be held at Hildertorpe Junior School, Shaftesbury Road, Bridlington, East Yorks., on Sunday 29 May. Schedules and details from Mr. M. Jordan, 12 Greenfield Road, West Hill Estate, Bridlington, E. Yorks. Tel. (0262) 674109.

Thorpe & District Aquarist Society of Norwich

This year's Open Show is scheduled for Sunday 15 May at Norwich's largest hall, the St. Andrew's Hall. The show will be sponsored by Robin Smith of Tas Valley Koi. Further details from Paul Sparks (Secre-

tary), 5 Gowing Close, Helledon, Norwich, Norfolk, NR6 6PX.

Tongham Aquarists

Tongham Aquarists are holding their 1988 Open Show on Sunday 15 May. All enquiries concerning the show to Mr. M. Grant (Show Secretary), 6 Murrel Road, Ash, Aldershot, Hants. Tel. (0252) 310564. For further details of Tongham's new format for encouraging new members and juniors (including the scrapping of subs, and their replacement with a small fee paid on the night), contact N. Thomson (P.R.O. — Tongham Aquarists), 9 Rowan Close, Camberley, Surrey, GU15 4DD.

Three Counties Group of Aquarist Societies

The Three Counties annual Auction will be held on Sunday 8 May at Dec Park Community Centre, Tay Road, Tilehurst, Reading — starting at 2.00pm. Booking in from 1.00pm. Further information from Janet Tonna (0734) 420272, Carol Perrett (0734) 412566 or Sue Andrews (0734) 421810.

British Marine Aquarists' Association

The B.M.A.A. Spring Seminar (sponsored by Technical Aquatic Products) will be held at Bristol Zoo. Full programme of speakers to include Dr Peter Miller, Dr Elizabeth Wood, Ian Sellick, Les Edmonds and John Dawes. Details from Roy

Martin, 20 Richens Drive, Carterton, Oxfordshire.

Ellesmere Port Aquarium Keepers Society

The 1988 Open Show will be held at the Shell Sports & Social Club, Whitby Road (off the M53), on 15 May. Full details from L. Bowman (Secretary), 50 Maple Avenue, Little Sutton, South Wirral.

Stafford Aquatic Society

The S.A.S. 2nd Open Show will take place on 15 May at the Northend Community Centre, Holmcroft Road, Stafford. Further information from L. Lainton (Show Secretary), 280 Sandon Road, Stafford. Tel: Stafford 44406.

A POND FILTER FOR EVERY NEED

All the basics of pond filtration in a single article — courtesy of Dr. David Ford, Head of the Aquarian' Advisory Service.

Ponds are as individual as people. Most aquaria are a standard size and so, uniform filter systems are available from all the manufacturers, but a filter system for a pond has to be tailor-made. In fact, draughtsman's plans are available from some manufacturers for personal designed systems to suit your particular needs.

Filter systems can be so complex they are a hobby in themselves to DIY engineers, but ready-to-install filters are on sale for instant connection by those who are just as capable, but far too busy...

WHY FILTER?

Just as occurs in aquariums, a pond has to mature and develop bacteria that digest the fish's excreta. However, unlike in the aquarium, a stable balanced system never develops. A pond is subject to the seasons, changes with the weather, and even experiences a daily change in water chemistry. If you wish to have a natural pond that shows all these changes, just like the rest of the garden, you have to accept that, some of the time, you will not see the fish.

If the pond is 'busy' with fish (that means filled to its maximum of 1 inch to 10 gallons) the excreta can build to give a nitrite reading (test it with a kit from the aquarium shops), which is bad news for the fish, but ideal for the algae to grow. A simple filter system will remove this nitrite and help to keep the pond fish healthy.

It won't give you clear water, however. This requires mechanical filtration, whereas the nitrite remover is simply biological filtration. If you want a clear water pond, and, perhaps, crowd it with fish beyond the 'busy' levels, you must have continuous, powerful and large *biomechanical* filtration.

FLOW RATES THROUGH MEDIA IN FILTER BOXES

Do not exceed 40 gallons per hour for each square foot of surface area, or square footage of medium, multiplied by 40. This equals maximum desirable flow.

HOW LARGE?

How large? — is an interesting question. When I once visited Japan and toured their incredible Koi ponds I noted that all had crystal clear waters, and when I asked the secret they said it was to build a filter system *the same size as the pond itself*. At the public aquarium in Himeji, the Koi ponds are connected to a huge filter bed filled with gravel that is never 'cleaned'. Every year lorries arrive to take the dirty gravel away for scrap and new gravel is delivered, again by the lorry load.

THE CHOICES

For simple bio-filtration, use an internal box filter with a small pump attached. Off-the-shelf units are available from aquarium shops and Water Garden Centres. A DIY unit can be a plastic dustbin or cistern filled with pebble gravel with a submersible pump attached that pulls or pushes the water through the pebbles at a rate not exceeding 40 gallons per hour, per square foot or pebble surface. Beyond this flow the bacteria cannot 'capture' the passing excreta.

The unit can be external too, with flows upward through the gravel, or downward by gravity, with an internal or external pump. It does not really matter what design is used, as long as the water is moved through the medium holding the nitrifying bacteria. For maximum efficiency, turn over all the pond water every 2 hours, but

certainly not below every 4 hours, otherwise it has no effect at all.

For water clarity larger filters are needed. Assuming the Japanese 50% water/50% filter is not possible, make the filter have a surface area at least 20%, preferably 30%, of the pond's surface area. Anything less will give very low or zero nitrite values, but you cannot also expect clear water. The filter itself can be undergravel, submerged box, external box or pressured.

Undergravel

This is a network of pipes with holes that sucks the pond water down through, at least, a 6-inch layer of gravel at the pond base. Obviously, the pond should be constructed so that dirt rolls down the sides onto the filtered area, which must be at least 25% of the surface water area. The pipe can be the fairly cheap polypipe from any plumber's merchants or DIY centre.

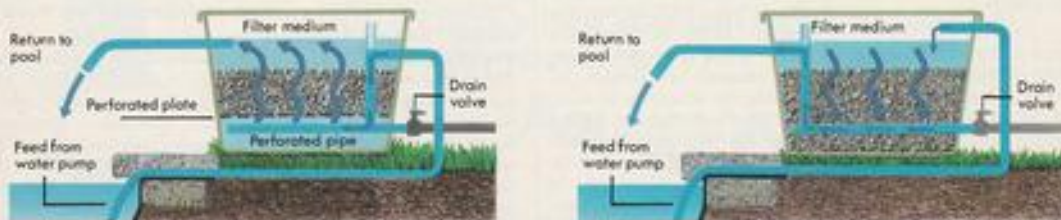
Do not use any diameter less than 1/2 in; a good idea is to choose the same diameter as the pump's inlet, then adaptors are unnecessary when connecting the pump. Use the polypipe system of elbows and joints to give a network that will cover the base area in a square with cross pieces at about 6-inch intervals. Drill 3/16th-inch holes at 1-inch intervals along the top of every pipe and place on the pond base.

Connect to a submersible pump of sufficient power to draw water through the overlaid gravel at a rate calculated by

Left, this external box pond filter is arranged to act in the "upflow" or reverse mode. A variety of filter media can be used in the single chamber, typically Canterbury Spar gravel.

Right, "Downflow-type" box filters are efficient and easy to install. A perforated pipe buried in the filter medium carries the water back to the pond.

(Illustration reproduced from "A Fishkeeper's Guide to Koi" by Barry James — by courtesy of Salamander Books).





My pond is a three-level affair with waterfalls in between (the holes and sills are just visible). The filter is housed in the topmost compartment.

multiplying the filtered areas' surface in square feet by 60. For example, if the gravel base over the filter pipes is 6 square feet, $6 \times 60 = 360$ gallons per hour flow rate is required. Buy a pump of, at least, this rating.

The one problem with u/g systems is that cleaning the gravel means a major breakdown of the pond is needed. However, this need

UNDERGRAVEL FILTRATION

Measure surface area of filtered gravel and multiply by 60 = flow rate required.

only be an annual event, which should always be done anyway.

Submerged Box

Internal filter boxes for placing inside the pond are available as complete units or you can build your own . . . but it must be large. As stated before the surface area needs to be 20 to 30% of the pond surface for clear waters.

The pump will push the water down a pipe to the bottom of the filter box and the water filters back up through large pebbles, then 1/2-inch granite chippings, then small

grain aquarium gravel, all in roughly equal parts. Keep each layer separate with plastic mesh (from Garden Centres). The water overflows the top back into the pond. To clean, reverse the pump's inlet and outlet so it sucks the dirt from the pebble base (pump to waste, of course).

External Box

This can be dug into the ground alongside the pond so that the water levels are equal, or mounted above ground with a return pipe or waterfall. The advantage of burying the filter box is that it is less conspicuous and a smaller pump can be used, because water is very heavy and raising it takes more power than just moving it around. A raised filter box, however, can be fitted with a drain so that flush cleaning is simple.

A major advantage of external filters is that they can be compartmentalised, with an initial 'settling' tank. The inflowing water from the pond will deposit its solids in this compartment so only soluble material is carried into the main filter compartments. This is ideal for the nitrifying bacteria.

To encourage proper settling, the first section can be filled with nylon brushes. Large cylindrical ones are available from specialist firms, which are easy to remove and rinse. The main filter material can be pebble gravel, but Koi-keepers will swear by their own particular media, be it ceramic pieces or clay granules, "ring" media carbon or even nylon hair curlers.

Again, calculate the surface area of the



Top view of my pond filter (filled with "Biological" ceramic medium). Water passes out from the filter into the topmost pond. Thence via a tunnel type waterfall (under the slate) into the first "main" pond below.

filter medium and multiply by 40. This will give the maximum desirable flow rate in gallons per hour for the pump.

External filters can be 'downflow', which is the easiest to install, or 'upflow', which is easier to maintain. Koi-keepers strongly recommend the upflow of water through the filter medium as being more efficient.

Pressure Systems

The swimming pool trade offers all kinds of systems for water filtering. These are expensive, but if that is not a problem, one can fit a sand filter and high pressure pump to really polish the pond water. Such systems can be found in public aquaria, too, and the specialist manufacturers have units for sale, this system being quite unsuitable for a DIY job.

PUMPS

There is an incredible choice of water pumps because manufacturers all over the world make these pumps for industrial use. Once you have decided on the ideal system and filter size for your pond, do the necessary calculations to make the final choice of pump size, then buy the best you can afford.

Remember that a bio-filter has to run continuously to be effective (if stopped, the bacteria go into reverse after only a few hours, producing toxic materials rather than removing them). Remember also the cost of

PUMP SIZES FOR BOX FILTERS

Total gallonage of pond every:
 one hour = ideal
 two hours = good
 four hours = minimum

running the system continuously. A kilowatt (1000 watts) for one hour is 5 to 6 pence according to your area (see the electricity bill). A medium size pump is 1/2 horse power, or 0.22 kilowatts, or about 1 pence per hour — but that is 24 pence a day, or £87 a year. A large pump can consume 1 kilowatt costing nearly £500 a year. On the other hand, a small 24-volt fountain pump is only 15 watts, or only £7 a year.

If the garden slopes (like mine) pools at different levels can be built with connecting waterfalls. This is very nice but the water has to be lifted to the top (which is my filter) so a large pump is needed. In fact, it is larger than the volume calculation allows because of the enormous back pressure of 8 feet of rising pipework.

To accommodate this power, the pump moves 8000 litres of 1760 gallons per hour and operates a T-piece outlet below the pond surface. One side goes to the pipework and the other to an 18-inch pipe with a blocked end and 4 saw cuts along its length. This bleed-off lowers the volume of water flowing to the filter, but that water is at sufficient pressure to climb the 8 feet of the garden slope. Incidentally, the fish love to gambol in the water welling up to the pond surface.

MOVING WATER

Fountains, waterfalls, watercourses and cascades are all widely available "off the shelf". John Dawes outlines some of their advantages, along with one or two pitfalls, which need to be borne in mind when planning this aspect of pond design.

To many people, a pond without a fountain appears incomplete. To many others, watercourses, cascades and waterfalls are also "absolute musts".

Whatever one's personal inclination might be, there is no denying that properly conceived and installed water features such as these can add great beauty to a water scheme — and go a long way towards ensuring an adequate oxygen supply in the process.

FOUNTAINS

Formal ponds, in particular, can look quite incomplete without, at least, one ornament placed somewhere around the edge, or in the water itself. This could be a statue serving a purely decorative purpose, or one which combines decorative and functional qualities in the form of a fountain or gushing stream of water.

Away from the ornaments themselves, decorative-cum-functional features can also be provided by fountain pumps which lie fully immersed at a strategic point in the pond (and, thus, hidden from view) with just the outlet pipe projecting slightly above the water surface.

The design of outlets has come in for a great deal of experiment in recent years, and this has made it possible to create virtually any spray pattern desired, ranging from a mushroom-type design to a single upright water stream, with every possible permutation in between.

In addition to their obvious aesthetic value, these arrangements also perform some very useful functions. For a start, they create water movement which, in turn, helps to stabilise the temperature of the water throughout the pond.

Secondly, water turbulence is about the most efficient method of aeration, and fountains are, obviously, ideally suited for this job.

Many aspects of pondkeeping rely heavily on personal opinion and the choice of an appropriate fountain is no exception. Despite this, some guidelines can be offered to help in fountain selection.

(i) High water sprays are more likely to be deformed by even light gusts of wind than lower ones, particularly if the individual water jets are not very powerful or robust.

(ii) Small ponds tend to look unbalanced if they contain a powerful fountain pump which spurts water up high.

(iii) Equally unsuitable arrangements are narrow or small ponds fitted with wide-spraying fountains. The opposite generally applies to larger ponds.

Most pond owners and water gardeners will sooner or later opt for some water movement in their design, so it is of the utmost importance that the right decision be made at the outset.

Not only is it important to match fountain and pond as outlined above. It is equally relevant to consider how compatible your envisaged choice is with your existing pond. How, for example, could you have a wildlife pond with such an obviously artificial feature as a fountain, and still call it a wildlife pond? However, a spring or "bubbling brook" design involving the use of a pump arrangement like that found in millstone and pebble fountains can produce an attractive display, and a functional one enjoyed by birds, insects and pond owners alike.

WATERFALLS, WATERCOURSES AND CASCADES

A similarly appropriate choice would consist of a waterfall, watercourse or cascade. All these features are very adaptable and can be used, with appropriate modification, in most water schemes.

In wildlife and informal ponds, waterfalls, courses and cascades should consist of pre-fabricated or home-built units which avoid straight-walled channels. Such a wide range of these is now available from water garden centres and other specialist outlets that there seems to be a strong case for avoiding the do-it-yourself approach altogether.

While it may still be true to say that some of the cheaper versions are somewhat flimsy and look too artificial — not rock-like

— the better end of the market is now represented by moulded designs made out of reconstituted stone or other suitable alternatives that look remarkably authentic, particularly when they begin to weather and adopt a veneer of mosses and other moisture-loving, encrusting plants.

Waterfalls, courses and cascades for formal ponds do not necessarily have to have straight edges, though these are the most popular and can look very effective. Nowadays, there are all sorts of formal-looking, attractive units, such as kidney-shaped, lipped troughs which can be installed individually to act as a header pool with a single outflow into the pond, or as an impressive multi-unit, cascade.

Most of these waterfalls, courses and cascades can be obtained in water garden centres and other aquatic outlets, while some of the more unusual ones are also available via landscaping ones.

ESSENTIAL COMPONENTS

When installing or constructing waterfalls, watercourses or cascades, one must not forget that their greatest tangible asset (besides looking good) is that splashing water makes a very pleasant, soothing sound. It also aids aeration, but this is not usually foremost in people's minds when they decide to install one of these systems.

From the pond inhabitants' point of view, of course, it doesn't matter in the least whether the design constitutes an eyesore or not. As long as they receive an adequate supply of oxygen, they will be happy.

Incidentally, the same applies to water turbulence in ponds as in aquaria. In the latter, aeration is always linked, not just with oxygenation, but with the removal of excess carbon dioxide from the water through diffusion. Since the situation in ponds is no different in physico-chemical terms, it follows that surface turbulence, by whatever means, will result in the elimination of potentially toxic carbon dioxide at the same time as oxygen diffuses in.

Applying this in practice to the installation of falls and other similar features, it becomes obvious that they will only be of any real use if they make provision for water to splash from a higher level to a lower one.

This is usually achieved by means of a lip or sill built on to the front edge of the individual units. If you buy a ready-made system, this sill will almost certainly be of an appropriate width. This apparently minor detail is very important. If the sill is too wide, water will simply trickle over the edge rather than rush through and splash on to the unit below at anything like a decent rate.

If you are thinking about building your own units, don't be tempted by visions of wide, gushing waterfalls. Get things into perspective. Even if you could construct a wide, gushing waterfall, its value, in most

JOHN DAWES



An ever-growing number of outlets have customer-operated fountain displays that help you choose from the extremely wide range of spray patterns currently available. Shown in the photograph is part of just such a system at Ashford Aquatics.

ATER FEATURES

garden ponds (hardly, if ever, the size of a real lake) would be debatable. A certain amount of turbulence is desirable, but a churning torrent will wreak havoc with anything you put in your pond, including most fish. Then, of course, pumps capable of producing this kind of effect are not cheap!

In general terms, the width of the sill should be around 15cm (6in) or less. At the other extreme, an excessively narrow sill will produce a jet of water rather than a curtain and should therefore be avoided. A pump capable of circulating water at the rate of the pond's capacity per hour, will produce a satisfactory waterfall, provided the sills are of a reasonable width.

To put this into figures, a pump servicing a 1900 litre (500 gal) pond should be able to turn over about 1900 litre (500 gal) of water per hour if it is to produce a decent waterfall.

Besides aerating the water via fountains or waterfalls, pumps can be used to drive pond water through a filter, thus helping to provide clean water along with all the other facilities already mentioned.

One important fact to bear in mind when installing a filter in line with any of the systems above, is that the resistance provided by the filtering media will tend to slow down the overall flow of water. It is, therefore, a good idea to seek advice from a reputable dealer who will match pump, filter and water flow to your personal needs (and pocket).

Excavating even a modest-sized pond produces, literally, heaps of soil. Watercourses, waterfalls and cascades, by definition, require elevated ground and can, therefore, prove perfect outlets for all this surplus soil. Surprisingly, quite a few people go wrong in this part of the overall pond scheme. Several potential pitfalls, therefore, deserve brief discussion.

POTENTIAL PITFALLS

A difference in levels is obviously essential between the point at which the water emerges from the pump outflow pipe and that at which it flows back into the pond. This will generally take the form of one or more uninterrupted sloping channels in the case of watercourses, a single main step if it is a waterfall, and a series of steps with a cascade.

Steep Slopes

If the slope is too steep, a watercourse will become a torrent with few soothing qualities about it. The torrent will gush into the pond, creating unnecessary and undesirable water currents which could ceaselessly churn up any mulm or debris that would otherwise settle on the pond bottom. It is virtually impossible to obtain clear water in these conditions.



A waterfall such as this one requires a pretty powerful pump to produce this impressive effect.

Waterfall Drops

When it comes to waterfalls, it does not follow that the bigger the drop, the more impressive the water curtain will be. In fact, unless a very powerful pump is used, the broad stream of water that emerges from the waterfall sill will tend to "join up" into a progressively narrower stream as the distance between the sill and the pond increases. The stream will also tend to be drawn backwards towards the face of the fall, rather than drop perpendicularly into the pond, as it should. So what started off in the imagination as a fantastic waterfall could turn out to be no more than a wet, dripping wall.

Rockerries

One thing to be avoided at all costs is a rockery or pond surround that looks like an unattractive, artificial steep pile of soil. Instead, one should aim to reconstruct a rockery which looks as natural and pleasing to the eye as possible. This usually means one of modest height and gentle contours. Besides looking unsightly, high mounds require greater effort and expense to make them suitable for watercourses, falls or cascades. The number of units needed could be larger than for lower, gentler, sloping schemes and the pump needs to be more powerful, and hence, more expensive.

Siting the Inflow Pipe

So far, I have referred to the water which flows out of a pump and into the pond. The other equally important half of this is the water that is taken out of the pond and pumped into the circulating system.

Opinions vary about the ideal siting of the inflow pipe and, in the end, personal preference could play a part. Some argue that placing the inflow pipe as far away as possible from the return point creates a circular current of water which can affect some plants and fish adversely. This is

likely where the turnover rate is fast, and in quite shallow ponds. In deeper, larger ponds with a slower turnover rate, the effects could be minimal.

One way to avoid the problem is to site the inflow pipe as close to the return point as possible. On the credit side, siting the inflow close to the outflow cuts down the length of pipe or hose required. Since friction inside a hose will slow down the flow of water, having the inlet and outlet close to each other exploits the efficiency of a pump better than the opposite arrangement.

A potential disadvantage of this technique is that it could leave some parts of the pond furthest from the inflow relatively undisturbed or even partially stagnant (this applies especially to longish ponds with bends or shallow, densely planted sections, rather than to smaller, more open designs).

Combining Water Features

Watercourses, falls and cascades generally look tremendous if they are planned well. But their effect can be virtually destroyed if they are installed in a pond designed to take a fountain as well. It could be that vertical and horizontal moving water do not go together visually, or that watercourses, falls and cascades are supposed to look natural, while fountains are meant to look artificial. Whatever the reason, many people find that the vertical/horizontal combination does not look "comfortable".

All the same, taste is a very personal thing. What others dislike intensely might well be just what you prefer. If so, nothing should stop you going for the type of arrangement you like, provided your fish and plants do not suffer.

NOTE

The text for this article is largely based on a forthcoming book on *ponds and garden ponds, and other water features*, by John Dawes, due to be published by T.F.H. Publications Ltd.

PRODUCT ROUND-UP

By Dick Mills

FOCUS ON
POND
ACCESSORIES

It seems a pity that much of the effort put into creating a water garden fades from view at sundown. Now, thanks to modern, much safer equipment, you can enjoy the results of your labours well into the twilight and beyond, the only drawback being perhaps the nuisance of insects attracted by the lights.

BETTER WATER GARDEN PRODUCTS

FKI GARDEN LIGHTING may not be quite so familiar a name compared with other 'household' names but, thanks to BETTER WATER GARDEN PRODUCTS, who have just been appointed sole UK distributors, things could change dramatically.

OYSTER underwater lighting is safe to use and has the advantage that its basic 24 volt, 2 lamp set can be extended to 4 lamps without the need to buy another transformer. The 2 lamp set costs £46.48. Additional lamps (available in amber and blue) are £18.26 each. Additional replacement lenses are also available. Should an extra transformer be required, it costs £15.68. Similarly, the NITESPOT range of garden lamps includes 2 and 4 lamp sets, priced at £32.85 and £52.03 respectively. Attractively boxed, even down to single underwater lamp packs, these new lights will add a new evening-viewing dimension to your pool. The surrounding garden need not be neglected either as 240v CORONET Lanterns and FESTIVAL Lamps can be used to bring a touch of glamour to dim areas. MINICORONET lamps are 24v operated and are ideally-suited for indoor decorative (Christmas Trees, etc) purposes. Details of FKI products from BETTER WATER GARDEN PRODUCTS, Blagdon Water Garden Centre Ltd., Unit 6-7 Walrow Industrial Estate, Highbridge, Somerset (Tel: 0278 781556).

OASE

OASE products have a range of mains-operated underwater lights in thermo-plastic housings, which can be either fitted via brackets to their pumps or

POND LIGHTING

Below, Oyster low voltage pool lighting can be used on the surface or underwater, and Nite-Spot garden lighting, right, is available in 2 or 4 lamp sets.



used separately. The lamps (available with red, blue, green or clear lenses) are rated at 150 watts and provide really strong lighting effects. Prices are around £103 for lamp (less cable), £130.39 (with cable), spare lamps £6.73. Bracket for pump attachment £5.80.

Details from WDT (Pump Sales), 5 London Street, Andover, Hants SP10 2NU (Tel: 0264 333225).

HOZELOCK

Water movement in the pond (or anywhere else in the garden for that matter) is more than adequately handled by HOZELOCK products. It is not surprising, therefore, that they should have turned some considerable effort into lighting equipment too. Much concerned with safety, ease of installation and suitability for various (yet specific) uses, their lamps may be purchased in integrated sets or, by intelligent group-

ings, built up to suit your exact requirements.

E.850 AQUA-GLOW is an underwater 2 lamp set. Lamps are coloured blue and amber and come together with cable and transformer for £45.25. Spare lenses, easily interchangeable for sheer effect (or for replacement in the event of damage) are available in clear, green or blue and cost £1.95 each. The E.851 2 lamp supplementary set costs £33.75.

Transformers are rated according to loading requirement (another safety consideration): E.863 (for 2 lamps) £25.95; E.864 (for 4 lamps) £30.95; E.865 (for 6 lamps) £38.45.

2 and 4 lamp sets are also available for 'land-lighting' and are further divided into three ranges suited for different uses. The MOON-GLOW model is useful for illuminating individual shrubs or bushes; HIGH-LIGHT models give a good spread of light for driveways and other large areas; NIGHT-

GLOW, on the other hand, gives gentle pools of light around patios and pathways, making comfortable, yet definite, lighting for that barbecue area.

2 lamp sets (including 25ft cable):

- E.845 MOON-GLOW — £39.75
- E.825 HIGH-LIGHT — £34.95
- E.895 NIGHT-GLOW — £39.45

4 lamp sets:

- E.840 MOON-GLOW — £66.95
- E.820 HIGH-LIGHT — £59.95
- E.890 NIGHT-GLOW — £64.95

HOZELOCK are confident in their range of products, which are aimed to provide total satisfaction with total safety. They operate a very comprehensive Customer Advisory Service, which is allocated a direct telephone line to itself for the express purpose of dealing with any unlikely-to-arise product problems, although planning, installation or operational queries will also be more than sympathetically dealt with.

Details and brochures from HOZELOCK-ASL Ltd., Had-denham, Aylesbury, Bucks HP17 8JD (Tel: 0844 291881; Customer Services — 0844 292002).

LOTUS

Long-established LOTUS is probably one name that everyone knows already and they, too, offer in-pool and garden lighting systems. The 2 lamp POOLGLOW system includes lamps, 12v transformer and associated cables for £55.51. At the top end of the scale, the RAINBOW FOUNTAIN gives sequential changes (at different speeds) of four colours through a fountain spray by means of a rotating disk and a powerful 150 watt floodlight; this will grace your pool for the sum of £253.97 (which includes the pump too). The unit is also available without the pump at £182.26. For a more modest outlay the LOTUS LIGHT FOUNTAIN (inclusive of cable, amber or green LENSE

and transformer) costs £54.51. The LOTUS AQUA FLOOD-LIGHTING set consists of three 120 watt lamps together with amber, blue, green and red lenses (for white light leave off the coloured lens) and costs £230.14; a single complete Aqua

Floodlight retails at £78.29 and replacement lamps are £6.11. Out of water, the HIGH-LIGHT range includes clamp-, spike- or bracket-mounted spotlights for individual lighting purposes, while the HIGH-LIGHT LIGHTMASTER has

a 200 watt halogen lamp giving an excellent spread of light for larger areas. For tree decorative uses, the DECORLAMP lighting set has ten 25 watt lamps: used in conjunction with supplied sockets and plug connectors, up to four sets can be

coupled together for an impressive display. Details of prices and 40-page full-colour catalogue available from LOTUS WATER GARDEN PRODUCTS, 260-300 Berkhamsted Road, Chesham, Bucks HP5 3EZ (Tel: 0494 774451).

NEW "CORAL" FOODS

Feeding marine fishes has always posed something of a problem, particularly with the more exotic species; this is also true for invertebrate life and to an even more important extent to the nutritional requirements of beneficial algae. This being the case, any increase in variety of suitable foods coming on to the market is to be welcomed. No less than nine new CORAL-LIFE products are now available through LAHAINA. Aimed primarily at invertebrate and algae requirements, they are:

Invertebrate Appetite Stimulant — Contains natural lipids, amino acids, vitamins and minerals to stimulate corals and anemones to absorb the nutrients they need for growth. £5.95.

Invertebrate Smorgasbord — Contains essential growth factors for the proper development and metabolism of invertebrates; promotes the absorption of nutrients and acts as a corallite-builder. £7.95.

Invertebrate Gourmet Gumbo — Provides a varied diet of high quality nutrients — shrimps and homogenised gourmet vegetables. £7.95.

Invertebrate Target Food — Special bottle has syringe and plastic tubing designed for the direct feeding into the mouths of corals and anemones. Food consists of shrimps and homo-

genised vegetables, natural vitamins and chlorophyll-rich spirulina. £7.95.

Invertebrate Vitamin Formula — This preparation of Vitamin B complex, fat-soluble vitamins and minerals in a biostabilised form increases metabolism and promotes coral growth. £5.95.


Invertebrate Calcium Supplement — Contains several rich sources of organic and inorganic calcium, crucial to the growth and development of corals and other invertebrates. It ensures rapid uptake and metabolism of calcium to promote optimum growth. £5.95.

Aquatic Plant Food — Contains all the major and minor ingredients needed by freshwater and saltwater plants. Discourages the growth of undesirable Hair Algae, but promotes the growth of macroalgae without altering the pH. £5.95.

Macroalgae Iron Supplement — Periodical application maintains the desired iron level essential for the growth and development of macroalgae. £5.95.

Macroalgae Micronutrient Supplement — Contains micronutrients often missing in synthetic seawater or from other plant foods. Used with the previous two products ensures complete nutrient requirements for the rapid growth of macroalgae. £5.95.

The new range of metal halide lamps from Lahaina.




● Protective UV absorbing glass lens
● Fan-cooled for virtually no heat generation

LENGTH	BURNS	LUMENS	PRICE
6'	3,175 Watt	4,000	£395
4'	2,125 Watt	3,000	£295
2'	1,175 Watt	1,500	£195

Remote ballast with 15 foot lead and plug included. P&P and insurance extra.

LAHAINA

Made to measure sizes available



NEW PRODUCTS

Amphibious P1800 pump, with fittings and in-pool foam filter fitted onto the intake strainer.

BETTER WATER GARDEN PRODUCTS



New Metal Halides

Also from LAHAINA is a new range of metal halide lamps, ideal for providing the brilliance of lighting essential for the maintenance of invertebrate and algal life in the marine aquarium. Available in 2ft, 4ft and 6ft reflectors, prices are £195.00, £295.00 and £395.00 respectively.

Details of all these products (and, of course, the LAHAINA range of purpose-built marine and tropical aquarium systems) from LAHAINA, School Lane, Udlimore, Rye, East Sussex (Tel: 0797 224237).

THE NEW AMPHIBIOUS P1800

A welcome addition to this best selling range of pumps is the Amphibious P1800 (1800 GPH at 3ft head) for large waterfall and fountain projects.

Like the rest of the range it has the unique disk motor design. The motor is completely sealed from the water. There is no shaft, the only moving part being the impeller which works on magnetic drive.

The Amphibious P1800 is specifically designed for water garden application and continuous filter use, unlike cellar pumps which are designed to run for only short periods.

Even when a pump appears cheaper it is important to compare running costs and the specification of a pump. The Amphibious P1800 runs on 175 watts. Hence, the savings per annum for continuous usage

would be substantial.

The Amphibious P1800 has an 1 1/2in external thread to allow you to plumb off for large projects with 1 1/2in fittings. It has 10 metres of cable. RRP £149.00 (inc. VAT).

Further information from Better Water Garden Products, Blagdon Water Garden Centre Ltd., Bath Road, Upper Langford, Avon, BS18 7DN. (Tel: 0934 852973).

Safe 'Harrow' water

All manner of additives can be found in the mains water supply these days, and following severe losses during 1987 HARROW KOI CO have come up with their own total de-chlorinator. Called the HARROW AQUAPURE, it is an 'in-line' cannister that fits into the water supply hose. Designed to be used during water changes or pond-fillings ONLY, it will remove non-dissipating chlorines, odours, colours, pesticides, etc from the water supply. A backwashing facility allows fast cleansing, and the unit is ready for use again very quickly. Perfected after 12 months' trial, the free-standing unit also has a built-in 25 watt heater for winter use. Capable of handling up to 300 gallons per hour water pressure (enough for any household) the unit costs £310.00.

Further details from HARROW KOI CO, rear of 269 Watford Road, Harrow, Middlesex (Tel: 01-423 0208).

Koi Talk

by John Cuvelier

Koi-compatible planting baskets

The presence or not of plants within the confines of a Koi pool has always been a matter of some disagreement, as Koi are notorious "diggers" of anything found growing in their home.

I have always felt that a pool without plants is much like a desert and must certainly seem a most artificial home for the inhabitants. Unfortunately, most of the blame for the problems found with planting a Koi pool must be firmly laid at the door of the individual who designed the planting baskets for water plants which are on sale at almost every outlet: an inverted pyramid with the point chopped off, filled with soil, and topped off with a layer of gravel which, it is hoped, will prevent foraging fish from disturbing the plant within! A more unstable object is difficult to imagine; the slightest touch with a net or similar object results in the thing falling on its side and disgorging the contents all over the place!

Trot along to your local plant nursery and exert some of your charm to persuade him/her to sell you some of those marvelous plastic trays which are universally used nowadays for transporting potted cuttings, etc. They make splendid planting baskets in the pool, being both spacious and ultra stable. What is more, being fairly deep, they hold more plants, soil, and gravel. Line them out with one sheet of builder's black polythene (this is not bio-degradable), place the required amount of loam, etc, and cover with a thick layer of large pebbles. I defy any Koi to shift that lot!

The last job before placing the "baskets" in the pool is to prick all round with a knitting needle or similar object which allows water to percolate around the roots. These baskets are rather heavy and, so, require some effort in placing in position. I resigned myself to the inevitable and bought a pair of chest waders which made life much easier. As this is being written in mid-winter, the photograph only shows an



My version of a partly planted Koi-proof planting basket.

empty basket, but you get the idea!

Koi micro-tags

If you are one of these people who have thirty or forty thousand pounds' worth of Koi swimming around your pool (yes, there are some, believe it or not), no doubt the appearance of the passive identity implant described elsewhere will prove of interest. I think it very sad that our society has reached the stage where there is a need to "tag" our pet fish in case they are stolen.

Although the device is extremely tiny and supposedly painless to the fish when implanted, how do we know? It's reminiscent of the old argument as to whether or not a fish feels pain from the hook that catches it! I might be old fashioned, but the whole idea simply does not appeal to me at all!

A spot of night fishing

If you are unlucky enough to have a fish which suddenly needs treatment for some ailment or other, how do you go about catching it? Are you one of the many thousands who pursue the unfortunate target all round the pool with a net, stressing every other fish, upsetting plant baskets, and generally causing mayhem? Well, desert! As in all things there is a right and wrong way!

Wait until night falls, switch off any house lights which throw light on to the pool and, arming yourself with a net and torch, stalk your prey! You will find it simplicity itself to catch your fish! Always try to bring the net towards the head of the fish and having netted it, gently tip

it into a container. Do not yank it skywards the way an angler usually does when fishing. That will only result in damaged scales at best. The beauty of this type of "night fishing" is that any other fish in the pool do not appear to suffer any stress, which can only be a good thing for all concerned.

Talking of stress, it is quite common for Koi, particularly those of a light colour, to exude quite copious amounts of blood from under the scales when caught in a net. Although visually distressing for the owner, the Koi does not suffer any lasting damage as this is a perfectly normal reaction to the stress of being netted.

Early feeds and treats

By the time you are reading this, the shelves of Koi dealers around the country will be groaning with the weight of "goodies" for you and your Koi to enjoy. Brightly coloured bags of pellets, additives of every description and, perhaps, even a few Koi! Please do remember my earlier advice regarding allowing time for your fishes' digestive systems to become fully adjusted to early seasonal feeding.

Plenty of "greens" should be the aim. A nice fresh "iceberg" lettuce thrown in whole will go down very well at any time during the "season". As a special treat, the odd prawn is usually devoured before it hits bottom.

I have fond memories of the time when I used to sit on the wall of our pool surrounded by two cats, the dog, and a large number of waiting Koi. In theory, I was feeding prawns to the Koi, but, in practice, it was a case of one for each cat, one for the dog, two for me and some for the Koi! A pound bag of prawns soon disappeared! Those days are sadly over, with prawns at almost three pounds sterling per pound! My Koi do get an occasional packet of a well-known Koi-Stick with colour enhancer which really does seem to work. Trouble is, once they get a taste for these treats, it can be difficult to get them back on to ordinary pellets, so be warned!

Derek



Red Sea competition winners celebrate A DREAM

Regular *A & P* readers responded in their thousands when we ran our special Red Sea Holiday Competition in last May's issue. Unfortunately, there was only one top prize — but what a superb one it was! The lucky winner, as announced in the magazine, was Pat Mason of Knutsford in Cheshire.

Pat won a one-week holiday for two, in Eilat, with air, hotel and diving, plus behind-the-scenes visits to Coral World, etc., thrown in . . . not to mention £100 spending money.

Pat and husband, Geoff, have recently come back from what was, without doubt, the holiday of a lifetime and have sent us their "report". Despite being green with envy (in the nicest possible way, of course!), we are delighted to publish Pat's account of their exciting and adventurous visit to Eilat.

THE CORAL WORLD

On Friday we presented ourselves at the Coral World Observatory, where we met the manager Mr Eitan Levy who, after warmly welcoming us, introduced us to our guide, Hanna Shoshanna.

We were shown the Red Sea reef tank first which is a large round tank covering the walls of the room. It is 20 metres in diameter (just what I've always wanted!) and contains some of the larger species, Parrotfish, a very graceful Eagle Ray, Picasso, Rainbow Wrasse, Butterflyfish, Triggerfish, Smooth-headed Surgeon, and a lovely big Puffer which I would have loved to bring home with me, and, of course, many corals and anemones of every shape and colour.

We next visited the aquarium hall which had over 20 tanks set up to display the fish and corals — in closer detail — all of them had been collected in the Red Sea. There was so much to see that I would have been quite happy to spend the whole week there.

I was fascinated by them all; they were all so beautiful — well, most of them. I wouldn't give the Stonefish many points for beauty, but I suppose their mother loved them. We were introduced to the divers and technicians who have helped collect, and who also looked after all the fish, etc., in the Coral World. It was also explained to us how the filtration system worked, which we found very interesting.

We approached the underwater Observatory which was some distance from the shore, by bridge. We went down what could

7 GEOFF MASON



1. Pat and Geoff take a breather with their hostess Hanna Shoshanna, right. (in charge of public relations at the Coral World). 2. A colourful inhabitant of the Red Sea. 3. The exciting Coral World. 4. Luxury at the Lagoona Hotel. 5. Meeting a Red Sea inhabitant. 6. Pat's favourite, the Giant Puffer. 7. The circular reef tank surrounds you on all sides. (the diver is cleaning the glass!)

PAT MASON

6

ate in style

OME TRUE

only be described as an upturned lighthouse. It felt as if we were in the aquarium and the fish were coming to see us.

The sea was so clear that there was no difficulty in seeing a lot of the reef, and there was such a lot to see that I do not know where to begin, beautiful Butterflyfish, Angelfish, shoals of Sea Goldfish, Peacock Fish, Lionfish, Flutefish to name but a few. I particularly liked watching the little baby fish who lived close to a cluster of coral and dashed into it when a large fish approached, and showered out a minute later when danger had passed. I enjoyed watching a shoal of blue Fusilier Fish who stayed close to the windows peering in at us, looking like a class of school children on a visit to the Zoo.

After seeing the Shark and Turtle pools we left Coral World slightly bedazzled by all we had seen; it was just too much to digest in one day. We did, however, pay a second visit to Coral World on our last day in Israel when we were able to see even more of the wonderful life of the Red Sea. ”

LUCKY DIVERS

“ We explained to Raffi, our instructor at the Lucky Divers scuba centre, that Geoff could not swim, but he said Geoff could go if he wanted to, so we collected our equipment, and set off for the coral reef.

On the beach, Raffi showed us how to put all the equipment on, no easy task for the inexperienced ones of the party (eg.) Geoff and me!

Raffi escorted us, one at a time, down to the coral reef. I was a bit apprehensive at first but forgot my fears as soon as we were in the sea. The sea was so beautiful and clear.

I thought it was great to be able to touch real live coral and see

all the fish so close. When I was inspecting an anemone my hand was butted by a Clownfish who objected to me invading his home. I saw different coloured Corals, Starfish, Sea Lettuce, Sea Cucumbers and Giant Clams. The sea was teeming with life, and for 8 hour I was part of it —
I would not have missed it for the world! ”

AN UNFORGETTABLE HOLIDAY

“ Our week in Eilat was really and truly a holiday of a lifetime and one we will never forget. We had a wonderful time. When we started out on 2 December, 1987, we were starting out for a week of new experiences.

We had never flown before, but it was great; we thoroughly enjoyed it. We had never stayed in a hotel before, so to stay in the 4-star Lagoons Hotel was sheer luxury. The food was very good, the staff were fantastic, and we were looked after really well.

The scenery around Eilat was breathtaking — mountains and crystal clear sea. As the temperature reached the 80's (°F) some days, we found it perfect for lazing about; when it got a bit cooler in the afternoons, we explored the town. We arrived home with lovely suntans.

Diving was great fun and Geoff is claiming the distinction for being the first person to dive with Lucky Divers who could not swim. No, they did not add "and come out alive" so I imagine they were quite impressed!

I consider myself extremely lucky to have won this holiday and cannot thank the sponsors enough. Thank you, Thomsons, Isrotel, Lucky Divers, Coral World and last, but by no means least, Aquarist and Pondkeeper. ”

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News

O.F.I. bans the Rainbow Butterfly Fish

Following the last O.F.I. meeting in Barcelona, all O.F.I. members have been requested not to export or import the Rainbow Butterfly Fish. This fish is known to suffer great rates of mortality once it is removed from its natural environment.

Other than statutory impositions made by CITES, this is the first occasion in recent times that O.F.I. has asked its members to voluntarily impose a conservation ban on a species of fish or plants.

Further information on the Rainbow Butterfly Fish can be obtained from Graham Cox, 476 Bath Road, Longford, West Drayton, Middlesex UB7 0ED. Telephone: (0753) 685696.

Note: Watch out for further news on this topic in next month's *A&P*.

AFE '88 — a dazzling prospect

Now in its fifth year the 'Aquarian' Fishkeeping Exhibition, firmly established as one of Europe's most exciting and popular fishkeeping shows, will open its doors at Sandown Park, Esher, on 18 June at 10am.

Last year over 12,500 people poured into the 'Aquarian' Fishkeeping Exhibition over the weekend to view dazzling displays of thousands of fish, and to meet Britain's Champion Fish.

This year, top aquarists will compete for over 50 trophies and special club awards for their superb tableaux and furnished aquaria, which will be on display.

For the festive weekend at Sandown, many of the country's top aquatic retailers, manufacturers plus fish breeders and importers will be assembled under one roof, offering the



unique opportunity to look at and buy the latest in aquatic hardware and accessories — plus, of course, superb fish specimens for aquaria or pond.

Special features for this year's show include the chance to visit a unique edition of the ever-popular 'Aquarian' Learning Maze, which will feature rare, exotic and unusual fish. In addition, the experts from

The Advisory Service was in great demand, as ever, at last year's A.F.E.

the 'Aquarian' Advisory Service will be on hand to answer any queries or problems you might have on any aspect of the hobby.

The exhibition will be open from 10am-6pm on Saturday 18 and 10am-5pm on Sunday

GEM PANAVISION 2000

Sizes starts from 24" x 12" x 18" overall height.

The Gem Panavision 2000 is now available in three finishes, walnut, oak and black.

The Gem Panavision 2000S includes waterproof light fittings to take one tube in 12" wide tanks and two tubes in 16" wide tanks.

With no intervening panels, the 2000S features direct light to water illumination for maximum light penetration and easy access for feeding and cleaning.

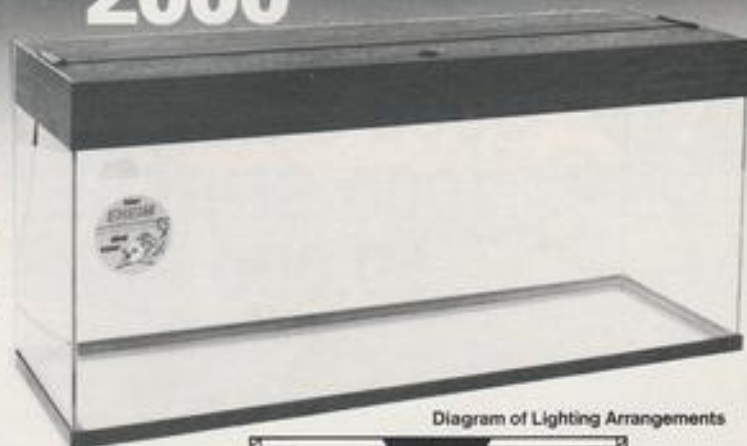


Diagram of Lighting Arrangements



Removable plastic splash guard contains spray from air stones and other powered equipment.

Optional second tube can be fitted in 12" wide tanks.

John Allan

AQUARIUMS LIMITED

Eastern Way Industrial Estate, Bury St Edmunds, Suffolk IP32 7AB
Telephone: 0284 755051

ject

National Amphibian Survey project calls for volunteers

19 June. Entrance costs £2.50 for adults, which includes a free show programme, and £1.00 for children and Senior Citizens. The exhibition is open to the disabled without charge.

For further information please contact: Caroline Franklin, 4 Bedford Square, London WC1B 3RA. Tel: 01-255 2424.

An investigation into the status and distribution of all British amphibian species is currently under way, co-ordinated from Leicester Polytechnic, on behalf of the National Conservancy Council. The aims of the project are:

1. to discover the status of amphibian species in Britain by carrying out "blanket" surveys in every county;
2. to locate and conserve the best amphibian sites in the country by carrying out "casual" surveys.

Blanket surveys include locating and recording the contents of every pond within a given area. Such surveys, of course, require quite a high level of involvement. However, if you can't make such a large commitment, then "casual" surveys may provide a more manageable alternative. These involve the recording of ponds known to contain animals.

So far, response has been encouraging but, even so, many more surveys are required up and down the country.

If you wish to contribute to the project by investigating ponds in your local area, please contact: Dr M. J. S. Swan, Amphibian Survey, School of Life Sciences, Leicester Polytechnic, Scraptoft Campus, Leicester, LE7 9SE. Tel (0533) 431011 (Ext. 329).

Livebearer Information Service

The Livebearer Information Service is a non-profit-making organisation set up in December 1987. It publishes a quarterly magazine, 'Viviparus' which includes colour photographs and information sheets. These will build up into a livebearer book in time. The publication dates (which are strictly adhered to) are the 15 January, April, July and October.

The Livebearer Information

Service also runs a Species Maintenance Programme to help in the conservation of livebearing species in the aquarium hobby. Regular collecting trips are also being organised in order to bring new species into the hobby.

The Livebearer Information Service aims not only to provide an excellent quality service for its subscribers, but also to produce it at a reasonable cost.

The subscription rates are as follows:

U.K. & E.E.C. £5.00
All Other £6.00 Surface Mail
£7.00 Airmail

Society £6.00
Please make all cheques and Postal Orders payable to The Livebearer Information Service and send them to:

The Livebearer Information Service, 20 Queen Mary Ave., Morden, Surrey, SM4 4JR.



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4. ALGIZIN[®] has none of the disease control properties of ALGIZIN[®].
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Naturalist's notebook

By Eric Hardy

Sperm storage & turtle puzzles

A recent conference of the American Association of Zoological Parks' Aquariums heard of research at Cincinnati University into the ability of female turtles to store the male's sperm for long periods in their oviducts, after mating, before reproducing. Apparently this covers some of their long sea journeys to their isolated breeding islands, to which only the gravid females return.

Males, and the shorter-tailed females, migrate usually at the same time, early in the year, and mating usually takes place in tranquil water near the beach. The males return to where they came from and the females go ashore. Some, however, may vary that with earlier mating.

Last New Year the warden of a caravan camp on the Lancashire coast at Formby telephoned me that he had just found a young turtle only 1 1/2 inches long, washed up by the tide, dead but fresh; a real one not a plastic toy. So soon after Hilbre's turtle, we speculated whether it crossed the Atlantic from the Caribbean on the North Atlantic Drift, for all specimens of these warm-water turtles stranded in Britain between December and March have been dead.

Alas, when it reached me it was the Elegant Terrapin, *Chrysemys elegans* (*Pseudemys scripta elegans*) the American Pond-slider, commonly kept as a pet. How did it get into the Irish Sea? Maybe flooded out of some garden-pond up the Mersey or Ribble valleys, it came down-river to be washed inshore by the tide. This species is unpopular in the U.S.A. because it has been responsible for Salmonella food-poisonings.

Turtles (minus divers!) — and their unusual habits, figure prominently in this month's Notebook.



It is often argued that the full moon has no influence on turtle migrations and breeding, but at the University of Western Australia such photothermal effects have been found to influence the Musk Turtle's ovarian cycle.

Sand-loving snakes — et al

One thing which didn't get into the news from the Gulf War was that not all Europeans there spend their spare time on the new golf-course. In the United Arab Emirates, a member of the Emirates Nature History Group has discovered the sand-loving snake, *Pseustes schokari* in the Sweihan area. But this was confusingly headlined "A New Snake" in *Wildlife Review*, the American international journal of scientific abstracts. In fact, known as the Variable Sand-snake *P. schokari*, which feeds on small birds and rodents, is a whippy thin, olive-brown, thinly-striped snake up to 48 in (120 cm) long, occurring widely from Afghanistan and Sind through Iran, Arabia and Palestine into North Africa. The late Prof Norman Corkill, a Liverpool herpetologist, included several

locations in his 1932 book on *Snakes in Iraq*. In densely cultivated areas it inhabits trees like olives, darting upon birds and mice.

How sea-snakes control their under-surface buoyancy is being studied at the Scripps Institute of Oceanography, San Diego, and how snakes adapt their circulation to Gravity at Florida University, while Florida State Museum studies the Glossy Crayfish Snake.

Who was Duvernoy?

Why should herpetologists be interested in Duvernoy? Who was he? He discovered Duvernoy's gland, a venom-producing gland in back-fanged colubrids. While Canadians were recently interested in an albino of the common North American Garter Snake, *T. striatus*, though albinos occur from time to time in most snakes, due to failure to produce pigments, Washington University has been more concerned with the myonecrotic (muscle-robbing) effect of Duvernoy's gland in the Western Terrestrial Garter or Ribbon Snake, *Thamnophis elegans vagrans*.

Breeding checkers

A playful, peaceful community fish to watch in the breeding tank is the Checker Barb, *Barbus oligolepis* — old name, now *Capoeta(?)*, but still sharing its specific name with the Glass Tetra and the few-scaled Archer Fish. Attractively adorned with an orange dorsal edged with black, this flashy, green-blue Sumatran, chequered with dark marks on its flanks, is seldom at more than 2ins (c 5 cm). A ripe female pushed an unready male around the tank to encourage his interest until the spawning drive began. This was in the afternoon and evening, even on rainy days and bright morning or sunrise. The male chased the female, butting her sides as she dashed among the fine-leaved Fanwort (*Cabomba*) a good spawning plant, releasing batches of up to 200 eggs which stuck to the leaves. Parents must be removed after spawning or they eat as many eggs as they can find; then any fry.

Their eggs hatch in 75 to 80°F (c 24-26.5°C) in just over 2 days; but in this case it was in 56 hours at 80°F (26.5°C). Their tiny, almost transparent, eggs are easily overlooked when they have to be fed with tiny infusorians and algae-water. Sprinkling powdered dried food on the surface at spawning time assures some infusoria for them, as this encourages their growth. After 10 days, the new fry need *Cyclops*, newly-hatched brine-shrimp, young *Daphnia* and micro-worms. Distributed among several tanks instead of kept crowded in one, the fry grow quicker.

Tail pieces

Other researches range from the food-patterns of the West Javan Crab-eating Frog to the discovery of histamine (which gives us jaundice) in the Gaboon Viper. Most lizards, except the chameleon, are well known for regenerating lost tails. Shah, Swamy and Ramchandran found the regeneration of the tail in a scincid lizard is related to the breeding season and thyroid activity. Then, why not help a lizard that lost its tail with a little thyroid extract?

FRED THE PIRANHA.



© BY PETER Mc GEOUGH

Basic statistics

Gymnochanda filamentosa

Synonyms: None.

Origin: South East Asia, Malaysia (Johore, Singapore).

First Import into Europe: 1955.

Sex Differences: Males: "second" (soft) dorsal fin and anal fin possess strongly lengthened fin rays, surrounding the fish as an aureole. Females: are a little smaller and do not develop the fins as the males.

Social Behaviour: Like *Chanda ranga* (Indian Glassfish) it is found in huge shoals in its natural habitat. Therefore, it is best to keep this small jewel in a group of 10-15. Kept in a "friendly" group, adult males perform courtship dances almost daily, displaying their radiated fins wonderfully.

The Aquarium

(i) Bottom: The bottom layer should preferably be of dark coloured gravel or, still better, split basalt.

(ii) Space: Along the sides, dense planting with fine-leaved plants, varied with open spaces in the centre, is preferable.

(iii) Water Composition: Normal tap-water, with an addition of 0.5-1% seasalt is adequate.

Size: Males: up to 4cm (1.6in); females: 3cm (1.2in).

Food: Predominantly live food, preferably *Cyclops*, *Artemia* and glass worms; sometimes red mosquito larvae. So far, eating of flaked or granulated foods has not been reported.

Additional Information

One of the main attractions of these tiny fish is the ever-changing attitude of the males courting the females. Especially if some sunlight comes into the aquarium, the males take the opportunity to display their most beautiful colours, using the sunlight reflecting on their pure golden "shine" and displaying their halo of diamond-pointed fin rays before the females. Doing so, they tempt the ripe females to follow them into the plant thickets to mate.

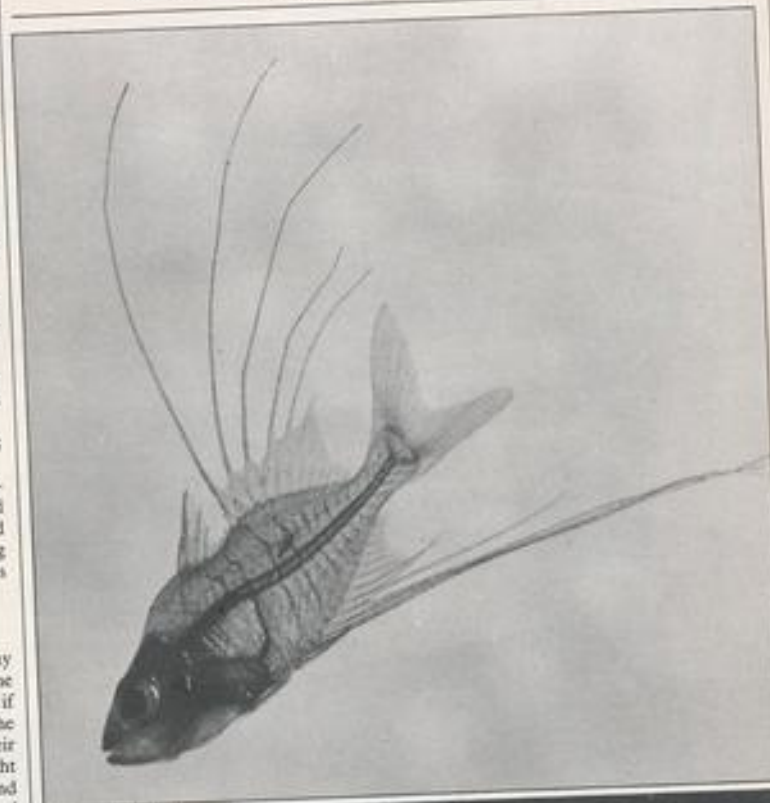
Although the fertilised eggs hatch easily in 3 to 4 days, at a constant temperature of 26°C (79°F), the young are so tiny and delicate that they can only be raised by a very experienced fish breeder. After they are able to swim, the young rely for food mainly on microscopic plankton, like *Cyclops* nauplii and other larvae of copepods. The general impression is that they have a lifespan of about 1½ years.

Gymnochanda is known as a delicate fish, requiring continuous attention, for it is susceptible to Velvet Disease, as all members of the Centropomidae family.

Therefore, this species is best suited for specialists or experienced fishkeepers, rather than beginners.

THE CHALLENGE OF LONG-RAYED GLASSFISH

Fancy a real challenge? Well, how about the Indian Glassfish's rarely-seen, long-rayed cousin, *Gymnochanda filamentosa*? United Nations consultant and expert photographer Bill Tomey sets the scene.



Above, the long, delicate fin rays of a *Gymnochanda filamentosa* male can be clearly appreciated in this photograph. Right, this is *Chandra ranga*, the most popular of the Glassfish species.



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FINDING FISH AT THE RACES — THE STORY OF THE 'AQUARIAN' FISHKEEPING EXHIBITION

This summer the 'Aquarian' Fishkeeping Exhibition, now in its fifth year, will open its doors at Sandown Park, Esher, on 18 and 19 June for an action-packed fishkeeping festival. The exhibition offers visitors a weekend of fish and fun.

This year, top aquarists will compete for over 50 trophies and special club awards for their superb tableaux and furnished aquaria which will be on display for all to admire, plus Britain's champion fish.

In addition, for the festive weekend, many of the country's top aquatic retailers, manufacturers, fish breeders and importers will be assembled under one roof offering a unique opportunity for you to look at and buy the latest in aquatic hardware and accessories and, of course, buy superb fish — maybe even a champion fish. Last year over 12,500 people poured into the Exhibition, making it Britain's favourite fishkeeping show.

The show has not always been held at Sandown Park, however, although its link with horse racing started half a decade ago! In 1984, the first 'Aquarian' Fishkeeping Exhibition was staged at Kempton Park Race Course and it caused quite a stir. The exhibition was, and still is, organised by Thomas's in conjunction with the Association of Aquarists who have, over the years, organised the many aquatic aspects of the hobby, including providing the stewards and judges for the Exhibition.

The show now has a long line of fine champion fish which have won the coveted award of "Best in Show" including Rambo (*Cichlasoma hernandezi*) owned by Cliff Walton last year and an exotic African Catfish (*Synodontis notata*) owned by Ray Cook in 1986.

In the first year the show was held, nearly 10,000 people visited the Exhibition at Kempton to see the dazzling displays of fish, enter competitions and see what was new in the hobby.

After the success of the first show, a second exhibition was held the following year — same time, same place. That year, over 10,000 people visited the exhibition, including Su Pollard an energetic aquarist herself who, on the Sunday afternoon, talked to visitors and signed autographs. She also chose a winning tableau and presented the winners with the Su Pollard Trophy, which has since been an annual award. In addition Dr David Ford, Head of the 'Aquarian' Advisory Service, was on hand as he will be at this year's show, to discuss any fishkeeping problems with people at the 'Aquarian' Advisory Service Stand.

By this time, the popularity of the exhibition had spread and grown so great that Kempton was bursting at the seams, and so, the show needed a larger venue — thus it moved to Sandown Park in 1986.

The first special 'Aquarian' Learning Maze was introduced at the 1986 Sandown Show and proved a great success. The maze was

designed as a special Children's Learning Maze to give them an educational, yet "fun", insight into the fascinating world of fish. The Maze illustrated that there is more to the hobby than winning goldfish from the fair — it proved so popular it caused a human traffic jam!

Since then the 'Aquarian' Learning Maze has been a regular feature of the Exhibition. Last year, a 'Beginners' Learning Maze' was designed which featured numerous coldwater, marine and tropical fish from Fancy Goldfish to a pair of playful Oscars. A unique edition of the Maze will be featured this year, when visitors will have the chance to see rare, exotic and extremely unusual fish.

Sandown has proved a highly successful venue and offers easy parking with over 3,000 free spaces, plus a frequent train service from London — Esher Station is only five minutes walk away.

This year's show opens each day at 10.00 am, closing at 6.00 pm on Saturday, 18 June, and 5.00 pm on Sunday, 19 June. Awards ceremonies will be held at the 'Aquarian' Advisory Service Stand at 2.00 pm on Sunday and will be presented by Nick Davis, one of the presenters of 'The Really Wild Show'.

Come early and stay late for a fun-packed day for all the family.

THE COMPETITION

Simply answer these questions on the history of the 'Aquarian' Fishkeeping Exhibition, and then complete the sentence below in no more than 10 additional words.

1. With which two horse racing courses does the 'Aquarian' Fishkeeping Exhibition have links?
2. What famous international aquarist heads the 'Aquarian' Advisory Service?
3. What famous TV personality will be presenting the prizes at Sandown this year?
4. How many different colour flakes are there in the 'Aquarian' Tropical Flake Recipe?
5. What "version" of the Learning Maze was exhibited at last year's exhibition?
6. How many people visited the 'Aquarian' Fishkeeping Exhibition in 1987?

Now complete the following sentence in no more than 10 additional words:

"Fishkeeping is a fantastic hobby because

.....

THE RULES

1. All entries are subject to these Rules (including explanatory material and instructions).
2. Entries, on a postcard or stuck-down envelope, must be received by us no later than 31 May, 1988.
3. Write your name, address and telephone number in BLOCK CAPITALS on your entry before posting.
4. All entries must be addressed as follows: 'Aquarian' Competition, Aquarist & Pondkeeper, 58 Fleet Street, London EC4Y 1JQ.
5. The competition is open to all UK residents except employees and their families of Thomas's, their agents and anyone connected with the administration of the competition.
6. No responsibility is accepted for entries which are lost, delayed or damaged in the post. Proof of postage is not accepted as proof of delivery. All entries, and the copyright in them, will become the property of Thomas's on posting and will not be returned.
7. Winner will be notified by post. The name of the winner will be published in Aquarist and Pondkeeper in July and will be available from the competition address on sending a S.A.E. marked "Results" after the closing date. The Winner's name may be used in future publicity material, and the winner may be required to take part in future promotional activity.
8. The judges' decision is final and no correspondence will be entered into.
9. The prize arrangements will be co-ordinated by Thomas's acting as an agent for the winner who agrees to be bound by all terms and conditions imposed by third parties.

Letters

Welcome return

I have recently returned to the hobby after giving up my tropical fish in 1965 due to service postings. I have kept a few Goldfish and Orfe in a small pond since settling here in 1971, but took no active interest until I saved a few eggs from a spawning last summer.

This gave me the excuse to buy a 24in tank for the growing fry and, seeking information on their care, I was relieved to find that the dear old *Aquarist* was still being published in what was a much changed world from that I left in 1965!

I am grateful for the helpful advice from Pauline Hodgkinson and was able to dispose of most of a healthy brood of fry to friends last September. The few I kept have been overwintered in two smaller tanks and I equipped the 24in for tropicals.

I now have two community tanks containing a variety of small Tetras and Barbs, plus Sharks and Corydoras. The 'specimen' fish are Pearl Gouramis and Kribensis. I am still experimenting with filtration, although comparison is difficult as Tank 1 (Gouramis) is a dim world of Cryptocorynes and a biological filter, while Tank 2 (Kribis) is a well lit area of Vallis with my own arrangement of mechanical and biological filtration.

I am quite impressed with the advances in modern equipment, though saddened to see so few British firms now. I also feel that the advent of cut price mail order will eventually affect the local dealer and lead to a

loss of choice in both equipment and fish in the medium term.

However, long may *A & P* live!

J. R. Penley-Martin
Diss, Norfolk.

Detrimental "hard" gravel

The reason for my writing concerns Chris Andrews' informative article about soft acid water aquaria (*Tropical Supplement* — Feb. '88). The focus of my concern is that Chris did not say much about the gravel, and I feel that it could have a

Limestone-free gravel would be a tremendous help to anyone who, like Mervyn Hudson, is "bonkers" about Discus.

detrimental effect on the hardness of the aquarium water if it is not limestone free.

The control of the hardness of the water going into the aquarium was well described but, over a period of time, the water, even if partial water changes are carried out, becomes harder due to calcium salts being leached out of the gravel. The use of ion-exchange resins, I feel, is not an ideal solution because of possible extraction of useful ions for plant growth, for example.

In setting up a tank for Discus, I put the gravel into a bucket and cover the substrate with dilute nitric acid. The fizzing that is produced can be vigorous, reflecting the considerable amount of limestone in the gravel. After leaving the

gravel for 24-48 hours (stirring occasionally with a piece of wood) the acid is poured away and the gravel is washed with copious amounts of clean water. After such treatment I have not had the experience of the water becoming harder, and the trouble and effort in preparing the gravel is, in my view, worth it. Indeed, the control of the hardness of the aquarium water comes a great deal easier because it is just a matter of controlling the hardness of the topping-up water.

In view of the obvious dangers in handling dilute nitric acid, especially in inexperienced hands, it is a pity that limestone-free gravel is not more readily available for the benefit of people like me who are bonkers about Discus and the like.

Mervyn Hudson
Crosby, Liverpool.

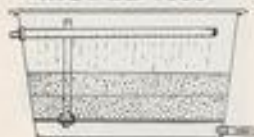
Chris Andrews comments . . .

I would agree that, in creating and maintaining a soft water environment, careful selection of substrate, rocks and other decorative items is vital. With regard to the use of ion-exchange resins, I believe I am correct in saying that (for example), the *Interper* 'Water Guardian' only removes the bicarbonate ions from water and leaves the trace elements untouched.

Thank you for your comments, and your active interest in the *Aquarist* magazine.
Chris Andrews,
Assistant Curator,
London Zoo Aquarium.



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SETTING UP A GOURAMI COMMUNITY AQUARIUM

Dr Derek Pluck, a member of the Anabantoid Association of Great Britain, has kept gouramis in community aquaria for over 24 years. Like everyone else, he has made mistakes and, as a scientist, has learned from them. His advice is, therefore, second to none. Read on . . .

Gouramis, particularly those of the genera *Colisa* and *Trichogaster* are colourful, graceful and extremely interesting aquarium fishes, with exciting courtship displays and unusual breeding behaviour. In addition they are hardy and not particularly exacting in their requirements as regards water chemistry.

However, it will be admitted by even the most ardent Anabantoid enthusiast that —

with the possible exception of the Pearl Gourami (*Trichogaster leeri*) and the Thick-lipped Gourami (*Colisa labiosa*) — gouramis do not usually make ideal members of the general tropical community aquarium, being strongly territorial, sometimes aggressive, but more often timid and "highly-strung".

Beginners often include gouramis in their first community tanks with disappointing results; a male Three-spot Gourami (*Trichogaster trichopterus*) may turn into a bully;

the extremely colourful male Dwarf Gourami (*Colisa lalia*) may languish in a corner — kept in the background by larger or more active fish; the Indian or Striped Gourami (*Colisa fasciata*) may dash frantically about the tank whenever approached — injuring itself; or, the long thread-like fins, especially the "feeler-like" pelvic fins — characteristic of certain gouramis — may be nipped by other inmates such as barbs (Tiger, Black-ruby and Rosy being the worst offenders) and some characins.

In contrast, specialist tanks set up just for gouramis can appear sometimes almost empty and lack aesthetic appeal. The single-species tank, which really comprises a single territory and is likely to result in spawning, might be ideal, but is not really for the living room or average aquarist who just happens to like the look of gouramis.

So, is it really difficult to keep gouramis in a community aquarium? Not really, but we need to look closely at our gouramis, the choice of species, particularly their nature and character, and we will need to consult the aquarium literature to find information about habitat and general requirements.

The waters are usually warm, generally soft, and on the acid side of neutral, and may be stained with tannic acid.

Gouramis are territorial and can be aggressive; the males are particularly so when in breeding condition and may drive the females, vigorously butting and biting at their flanks.

In still waters, and undisturbed by other fishes, many will construct a bubblerest — usually at the surface — which may incorporate plant material; some, such as the Kissing Gourami (*Helostoma temminckii*) scatter eggs on the surface, whereas the Chocolate Gourami (*Sphaerichthys ophrotremoides*) is a mouthbrooder.

How should a tank be set up, and which species and how many should be chosen?

Aquarium requirements

It is best to start with as large a tank as possible, 48 x 15 x 12in (120 x 37 x 30cm) being the smallest aquarium recommended to allow several "territories", hiding places, regions of open water and still permit growth to a good size. If larger species such as the Moonlight Gourami (*Trichogaster microlepis*) or the Snakeskin Gourami (*Trichogaster pectoralis*) are to be kept, the tank should preferably be 60 x 18 x 15in (180 x 45 x 37cm).

The tank should be furnished so as to provide "territories" and hiding places with very densely planted regions separating several regions of "open" water.

It is recommended that about 20lb weight (approx 10kg) of gravel should be used per square foot (approx 900sq cm) of aquarium base so that it can be banked up at the back and the front section divided into "hills and valleys" by careful use of supporting bogwood and smooth rock (rough objects should not be used, to avoid injury).

When looking from the front, the tank should be seen to comprise three or four "valleys" with very densely planted "hills" of about 6in (15cm) in height separating them. Each open area can contain dwarf plants and a central feature, e.g. pieces of

AN ANABANTOID COMMUNITY AQUARIUM (TOP VIEW)



V = Vallisneria
As = Amazon Sword
Ap = Aponogeton
Planting on raised areas

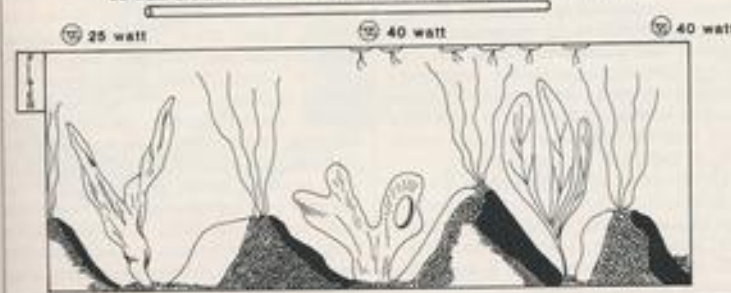
Slate or other thin slices of rock

Bogwood

Gravel on raised portions

AN ANABANTOID COMMUNITY AQUARIUM (FRONT VIEW)

30 watt Grolox Fluorescent Strip — in front and above tungsten lights



cork (anchored by gluing to plate glass) so that direct confrontations and lunging are reduced. Plants such as *Vallisneria*, *Aponogeton* and Amazon Swords are best as they permit gouramis to move easily between them; the "forests" provide a security from which they readily emerge and into which they can escape. Each open water-section will probably become a "territory" from which a male will venture, and to which he will return when chased.

The tank can be filled with tap-water (provided this is not too hard) and will acidify slightly in the presence of bogwood. The water temperature is best kept at around 78-80° (25.5-26.5°C) and can be kept moving slowly by gentle external filtration which should discourage bubble-nest building over, at least, part of the surface. It is not recommended that strong undergravel filtration be used, as good plant growth is required.

Lighting should ideally be a mixture of tungsten and fluorescent; tungsten light provides natural warmth to the surface layers and tends to result in good plant growth and also ensures a humid layer of air above the water. Some floating plant should be included to provide shade and cover. Some sunlight is beneficial for *Colisa* species.

Selecting gouramis

Suitable gouramis should be chosen as inmates. Most species of *Trichogaster* and *Colisa* are suitable and one should aim for a mixture of colour and size for interest and aesthetic appeal. It is not recommended that the Kissing Gourami (*Helostoma temminckii*) be chosen as, when large, it becomes aggressive, and the vast quantities of food required by it may lead to fouling the tank. The Chocolate Gourami requires specialist treatment: acid water, a high temperature and mainly live food. The Sparkling Gourami (*Trichopsis pumilus*) and the Croaking Gourami (*Trichopsis vittatus*), though colourful and interesting, are best kept in peaty water away from more boisterous species.

One should consider the size to which gouramis grow, but it is more important to use the marine rule of stocking, from the least aggressive first, to the most aggressive last. The table on this page summarises these details for a number of species.

Recommended mixes

It is best to have no more than four or five species. The first, least aggressive, species may be purchased half-grown, others should be added young (but sexed) and allowed to grow into the existing hierarchy, producing the minimum friction as territories are re-adjusted. One male of each species, and two or more females, is usually the best arrangement, spreading the attention of the male and giving harassed females a chance to recover.

A particularly attractive mixture with which I've enjoyed considerable success is:

- 3 Honey (1 male/2 females)
- 3 Striped (1 male/2 females)
- 3 Pearl (1 male/2 females)
- 2 Snake-skin (1 male/1 female)
- 1 Three-spot (female)

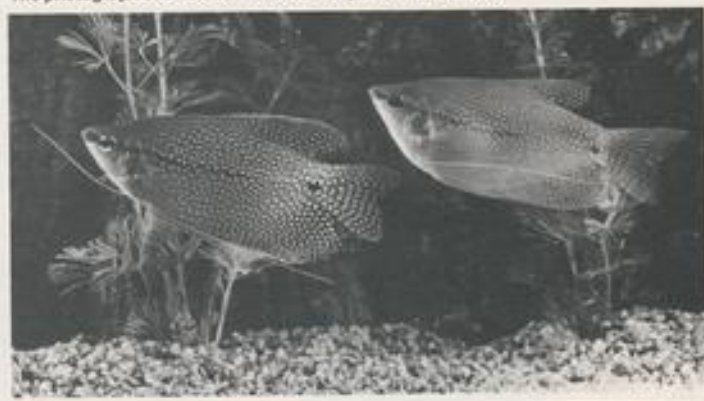
GOURAMIS WHICH MAY BE HOUSED IN A COMMUNITY TANK

	COMMON NAME(S)	LATIN NAME	LIKELY SIZE ATTAINED IN AQUARIUM	
			INCHES	CENTIMETRES
MOST AGGRESSIVE	Three-spot Gourami (also Golden variety and Opaline variety)	<i>Trichogaster trichopterus</i>	6	15
MORE AGGRESSIVE	Moonlight Gourami	<i>Trichogaster microlepis</i>	7-8	17-20
	Thick-lipped Gourami	<i>Colisa labiosa</i>	2½-3½	7-8
	Indian, or Striped, or Giant Gourami	<i>Colisa fasciata</i>	3½-4½	8-11
	Pearl or Mosaic Gourami	<i>Trichogaster leeri</i>	4-5	10-12
	Snake-skin Gourami	<i>Trichogaster pectoralis</i>	8-10	20-25
LEAST AGGRESSIVE	Dwarf Gourami	<i>Colisa lala</i>	2	5
	Honey Gourami	<i>Colisa chuna (sota)</i>	1½	3-4

N.B. Aggression is somewhat subjective, and each fish is an individual; the likely order of aggression is based, largely, on considerable experience with a number of specimens of each fish.

The tank size given is likely to be below that sometimes quoted for the species because, in community aquaria, fish rarely attain sizes comparable to the largest wild species.

Pearl Gouramis (*Trichogaster leeri*) are usually good community tank inhabitants. The photograph shows an excellent adult pair (male in front).



The above gives a variety of shape, size and colour.

It is inevitable that some aggression will occur, but, usually, a male gourami will defend a territory of plants and will chase rivals or pursue females across the open-water region to the next clump of plants whereupon, unless intent on spawning, it will return to its territory again. This arrangement avoids long-term pursuit and opportunities for biting, leading to damage. Bossy individuals could be substituted or removed for a short time and this may change their position in the community hierarchy. Breeding activity and bubble-nest building is most likely to occur at the end away from the external power filter which, at least, leaves half the tank in peace.

If one intends to breed gouramis it is best to remove individuals concerned to another tank of similar water with a higher temperature, although it is possible to raise Snake-skin and Dwarf Gouramis in a community set-up if the tank is densely planted (Snake-

skin Gouramis will not eat even quite tiny fry).

A tank with just gouramis, which tend to inhabit the middle and upper strata of the water and feed mainly from the surface, can look bare, so it is recommended that a few small, not too active midwater and bottom dwellers are included. These should provide some additional colour, a sense of movement, help to discourage spawning activity and, thus, reduce aggression. If one keeps it an all-S.E. Asian affair, Rasboras, such as the Glowlight and Harlequin, and loaches, such as Coolie (Kuhli) and Clown, will provide ideal tankmates.

With correct feeding (gouramis feed mainly at or near the surface and thrive on flake food, wingless fruitfly *Drosophila* as well as more usual life foods such as *Daphnia* — supplemented with vegetable food, such as oat flakes — a fairly stable hierarchical community should become established which enables you to keep your gouramis in a most attractive setting.

HUMANE DISPOSAL OF FISH

Amanda Grimes' thought-provoking article on this important issue elicited a tremendous, and very welcome, response from readers. Here's a round-up of some of the most important issues raised. As ever, we would, obviously, be very pleased to receive any further comments you may have.

Back in October '87, when my feature "In Sickness and In Health" was published in the magazine, I expected a response. The article dealt with the painful and often distressing question of fish 'euthanasia'. Obviously, I could only speak for myself and a few friends when I admitted that some of us found the disposal of fish very upsetting. I suspected that many of you felt the same — and your response has confirmed that suspicion.

This feature is the result of your letters (and for those of you who meant to write but just never got round to it, here is the proof of how seriously we follow up correspondence!). After several months of research, I have news that should help both you and me when all else fails.

Opinions

I will, taking the subject in order of importance, repeat that phrase again — *when all else fails*. This is something that cannot be emphasised enough. The October feature included those very words; and they were echoed by readers and experts alike:

Mr R. Barlow of Fleetwood asks: "My dilemma is, having isolated a fish and fought for some time to keep it alive, **when do I give up?**" He goes on to relate how he found a *Barbus 'schuberti'* floating on the surface, apparently dead. After an immersion in salt water, the fish recovered completely. "So when" he asks, "is a fish irreversibly ill?"

I am not qualified to answer your question, Mr Barlow. It is to be hoped that the magazine will soon be able to publish a guide to just this by one of the experts. For myself, I try everything appropriate to help the fish, and salt baths are often very effective. In view of your letter, however, I shall now give my fish this last chance.

Daniel Bennett of Glossop points out: "Knowing when to step in is, at least, as important as knowing which methods are humane." He does not destroy deformed fish and finds they are quite happy. I agree, though I never breed these fish. He also points out that fish in shock look remarkably like fish that are dying...

David Sampson of 'Aquarian' asked me: "How often do you need a humane killer? The majority of fish diseases are preventable with good husbandry..."

Jerzy Gawor of JG Associates wrote: "It is a sobering thought that many of us at some time are faced with a fish disease situation. We try the various remedies available. More often than not these, together with sensible



L. E. PERKINS

Right, this male Goldfish has a pronounced abdominal swelling which gives it a lopsided appearance. The cause is, almost certainly, an internal parasitic infection which cannot be cured. Is this a good-enough reason for disposing of the specimen humanely?

Above, loss of balance through malfunction of the swim bladder is not uncommon in Fancy Goldfish. The complaint is sometimes permanent, sometimes temporary. When do you decide that things have gone far enough?

water management, will work. On other occasions we see a fish gradually deteriorating, perhaps losing finnage, developing deep ulcerations, etc. At which point, do we say 'Okay, this fish has suffered enough. No remedy will bring it around; am I better off putting it out of its misery?'"

It is the 'other occasions' that I am looking at; not the majority of diseases but the minority.

Having established that 'euthanasia' can only be recommended when you have tried everything else, let's consider those who cannot, by whatever means, carry this out themselves. As Stuart Elton of Colchester wrote: "I can see no shame in delegating this task if a person is faced with destroying a fish they are particularly fond of."

K. R. Digby, the Production Manager of New Technology Laboratories Ltd wrote: "It is our policy to encourage fishkeepers to use their vets as much as possible." They sent me their excellent leaflet on pondkeeping, in which they publish the telephone number of the British Veterinary Association (01-636 6541). The BVA have a list of specialist fish vets.

Jerzy Gawor also favours vets: "My personal advice on the subject of fish 'euthanasia' is therefore to consult a veterinarian. Their training should include not only the treatment of fish but also painless and humane



JOHN DAVIES

ways of their disposal in extreme cases."

At this point, I refer to the very valuable information given to me by Peter W. Scott, MRCVS, of the International Zoo Veterinary Group. Later this year, *A & P* will be publishing an article I am writing with Peter about vets. I must now dip into that article, briefly to raise the following points:

Fish are omitted from the Veterinary Surgeons Act of 1966 — resulting in very little time being allowed for the study of fish by vets during their training. This is not a lack of interest, but an oversight.

There are over 200 vets actively interested in fish — but is there one near you? Ring the BVA to find out.

Finally, realistically, can you afford to pay a vet to destroy a small fish?

It is not my wish to undermine the terrific contribution vets make to our fish-keeping — the forthcoming feature on this subject will explain the situation in full and is being written in the hope that we can stimulate more interest among the veterinary profession.

Before I pursue the various methods of 'euthanasia' that have been recommended by readers and experts, I would like to draw your attention to two things: Firstly, Peter Scott informed me that research work published last year confirmed that fish do feel pain.

THE ANSWERS

Secondly, because it cannot be repeated often enough:

Tricia de Brett of Clacton-on-Sea wrote: "Please warn readers not to flush their incurable fish down the loo. I did this only once. After flushing, to my horror the poor fish was still there, with blood pumping from its gills." To add the voice of authority, Dr Neville Carrington of Interpet wrote: "What, in my view, has to be very positively discouraged is throwing fish down the toilet while still alive."

This view was echoed by, among others, Dr Chris Andrews of London Zoo Aquarium and Dr David Pool of Tetra.

Recommendations

So what is recommended? I will deal first with the manual methods:

A hard blow to the top of the head was suggested by readers and experts alike. This could be done with either a priest (a type of truncheon) or a hammer. The fish can be immobilised for this by using a wet cloth or paper towel. Smaller fish should be thrown hard onto a concrete floor, or put in a plastic bag and hit against a hard surface.

Brian Woodward of Stratford-upon-Avon found this difficult: "I resorted to the method of hurling fish with considerable force onto a concrete floor. I'm over 12 stone and an ex-weight trainer. . . . It didn't work for him and he had to finish the fish off. He added: "Have you ever seen a fishkeeper of 30 years' experience with tears in his eyes?"

So, another option from Neville Carrington, recommended in his book "Maintaining a Healthy Aquarium": "Place the fish into a dish of ice cubes and put the dish in the deep freeze."

This method is very similar to the one recommended by the British Veterinary Association. However, where Dr Carrington admits that the freezing method is rather slow, the method the BVA favour is instant: "Place some ice cubes in a bowl of water large enough to take the fish. Leave this in the fridge to chill and then drop the fish into it. Death occurs immediately."

For those looking for that elusive anaesthetic — I am delighted to be able to end your search. Richard Inskip of Leeds first put me on to MS222. He supplied me with the address of a firm in Norwich he had bought it from in 1984. Unfortunately, Richard, they are no longer there, but you started the ball rolling.

Throughout my researches, MS222 and Benzocaine cropped up again and again. Dr David Pool of Tetra, Dr Chris Andrews of London Zoo Aquarium, David Sampson of 'Aquarian' and another reader, Dr D. Bruno of Aberdeen, all referred to these anaesthetic preparations.

Unfortunately, none of them knew where the non-professional aquarist could obtain supplies. That is, until David Pool told me

that Koi-keepers use them! David, I am forever in your debt!

I phoned two Koi dealers local to me. Steven Hickling at World of Koi in Bromley answered without hesitation:

"Ok, yes, of course, we supply MS222. In three sizes, from 10 to 50 grams. The 10 grams costs £11.21 and we do Mail Order on credit cards."

Bernice Brewster of Kent Koi in Sevenoaks was surprised that I didn't know they sold MS222. Apparently this is well known among the Koi fraternity. A classic case of the left hand not knowing . . .

I have asked both these companies to consider mentioning this in their advertisements — and would extend this request to Koi dealers throughout Great Britain.

So that solves the great MS222 mystery. As for Benzocaine, Peter Scott informed me that it is still on the Controlled Drugs List and is therefore not available to the public.

While I was talking to Bernice at Kent Koi, she asked me: "Have you considered Propylene Phenoxethol? You need much less of it, so the cost is considerably reduced." She went on to explain that she uses it as a humane killer, although it is not marketed as such. The "killing" solution is 1 ml to 1

litre of water. A stock solution can be made up and kept indefinitely, though you must be sure to shake the bottle before use.

Phenoxethol is not easy to get hold of. The makers are Nipa Laboratories, Llantwit Fardre, Pontypridd, Mid Glamorgan. If it is not available to individuals, it might be an idea for those of you who are members of Societies to ask your Secretary to approach the manufacturers for a supply. In that way, the Society can hold this — and possibly MS222 — for your use.

WARNING: As with all medicines and dangerous substances, it must be stressed that these preparations, should you choose them, must be kept in a very secure place, well away from possible access by children and animals.

Finally, in reply to reader Ken Parry of Shrewsbury, who wrote: "I feel the whole issue of disposing of sick fish has been oversensitised."

I asked everyone I approached in gathering material for this feature how they felt about destroying fish. The reply was unanimous — and best summed up by Jerry Gawron:

"As a biologist and someone who is exceptionally fond of all aquatic life, the thought of killing an aquarium or pond fish is abhorrent. . . . Hobbyists have asked me to end their pets' suffering as they could not do so themselves. On several occasions tears were shed by the aquarists, showing quite plainly that most of us in the aquarium/pond hobby take our pets' lives and health very seriously, providing the best care and attention possible."

NEXT MONTH

With the coldwater season in full swing and aquatic centres enjoying the full benefit of our glorious summer weather (?), our June issue will feature an information-packed and thought-provoking **Pond and Watergarden Supplement**, the latest of this year's crop of guides for the more experienced hobbyist.

Contributing major features on filtration, choice of fish (other than Goldfish), pond edging, and biological aspects of pond plants, will be **Dr David Ford** ('Aquarian'), **Dr Chris Andrews** (London Zoo Aquarium), **Barry James** (Everglades Aquatic Nurseries) and **John Dawes** (*A & P* Editor).

Also featured, among all the many other attractions:

- Mysterious Mormyrids
- The Florida Experience
- Spotlight on *Julidochromis*

For the best in tropical, coldwater and marines, make sure to get your June issue of *Aquarist & Pondkeeper*.

STOP PRESS!

DIARY DATES

Macclesfield Aquarium Society
The Society's Annual Open Show will be held on Sunday 8 May at Ryles Park School, Macclesfield.

British Koi-Keepers Society

The London section of the B.K.K.S. is holding an open evening on Wednesday 25 May at Ruskin House, Coombe Road, Croydon. A talk on the theme of 'A Beginners' Guide to Koi' has been arranged, and the meeting will start at 8 o'clock.



ROBERT GOLDSTEIN

Amphiprion ocellaris adult guarding a batch of eggs. Hatching success often depends on the degree and type of interference indulged in on the part of the aquarist.

HANDLING FISH EGGS

Success or failure in spawning egg-layers is largely dependent on how well (or otherwise) eggs are treated by aquarists during the development stages. Dr Robert Goldstein explains away some of the mystery, and explodes a few myths along the way . . .

There are many areas of failure in tropical fish husbandry: One might not get young fish into nuptial condition; fish in apparently excellent condition might refuse to spawn, the eggs may die shortly after spawning; they might fail to hatch, and die fully incubated; the fry might not survive the first few days of life; or the fry might not survive a stage of metamorphosis.

We have all experienced every one of these circumstances, and perhaps that is the true measure of the expert: one who has failed in far more ways than the (inexperienced) beginner. In this regard, an "expert" is not one who is necessarily consistently successful. Rather, it is one who has extensive "experience".

Fully-embryonated egg of the annual killifish, *Cynolebia constanciae*, in dried peat moss at the end of the three-month incubation period. Submerging the egg in water will immediately drop the oxygen concentration and induce hatching.



ROBERT GOLDSTEIN

My purpose in this article is to review some of the egg-handling methods in wide use by modern aquarists, and to point out common problems that have recently been investigated, especially when the studies have produced important and practical results.

Among the egg-laying fishes, we can distinguish several kinds of eggs, using an assortment of criteria. Biologists like to speak of demersal (sinking or attached) and pelagic (floating and drifting) eggs, but that is not very useful to aquarists. We have fishes which nest and those which do not. The nest might contain sticky eggs, or non-sticky eggs. Is the mouth of a mouthbrooder a portable nest? Most mouthbrooders produce non-sticky eggs, but marine Apogonid fishes (Cardinalfishes) and Opisthognathids (Jawfishes) have mouths jammed with sticky clumps of eggs. Some Anabantoid fishes are mouthbrooders, while others, even in the same genus, are not. Some produce bubble-nests of floating eggs, while others stick heavy eggs into a bubble-nest to hold them near the water's surface or somewhere else, and still others scatter floating eggs with no nest at all.

In short, classification of eggs based on spawning location and method of incubation is not useful to aquarists. What concerns us is whether we need to handle the eggs to increase production to an acceptable level, and how handling techniques can affect yield. For that reason, we need to categorise fish by their method of breeding, and only then determine whether we wish to incur the risks attendant to manipulation in order to increase yield.

We often blame the fish for our failures because they are "poor parents" or have "low fertility". That is almost always blaming the victim for the crime. When production fails, the blame usually belongs with the aquarist. In his/her absence (or, if the fish were reproducing in nature), production would likely be much higher, at least until predation became a factor.

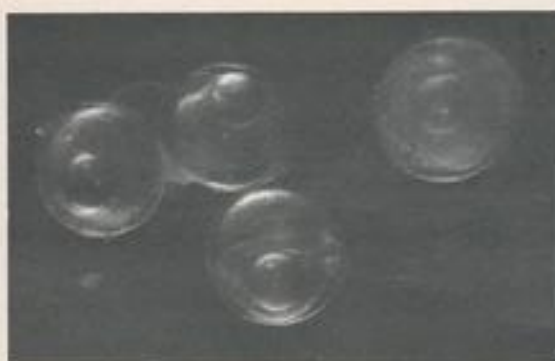
We do many things wrong, from bothering the breeders to polluting their waters. One of the least understood areas of embryo damage, however, is in the chemical and physical treatment of the eggs.

CHEMICALS

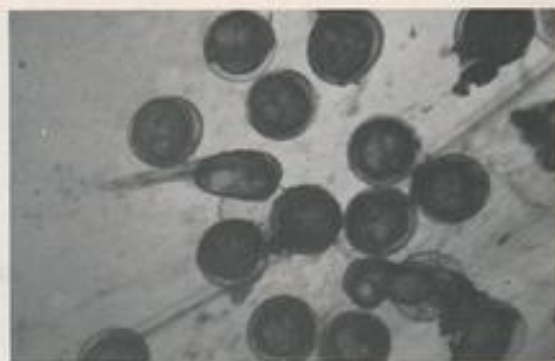
We commonly use three chemicals in fish breeding, and almost everybody uses them incorrectly.

Methylene Blue. One of the oldest chemicals in the hobby, "washable blue ink" is said to inhibit fungus development and protect eggs that are light-sensitive. In fact, methylene blue has absolutely no effect on fungi. And a paper sack over the aquarium is a far more effective light shield than the chemical, which would have to be used highly concentrated to cut down on light penetration. The only value of methylene blue is that it provides an alternative biochemical pathway for oxygen delivery in heavily polluted waters. In clean water, it is of no use at all.

Acriflavine. There is no such thing as "acriflavine," since it is a mixture of many flavine dyes. "Acriflavine" comes in a



Newly spawned *Badis badis* eggs removed from PVC tube by forcing water through a pipette.



Badis badis eggs at the end of third day in shallow dish of water, illustrating normal development.

powdered form, which must be removed from a dark bottle and mixed with water to be effective. Under ordinary aquarium conditions, there is insufficient solution of the dye in water, with many wet particles drifting about having unknown effects upon the embryonic tissues they meet. We don't know the relative percentages of the different flavines even in a well-mixed solution, and each has a different effectiveness and danger level. With time and light, this effectiveness of the liquid preparation diminishes, but, again, we do not know the rate of diminution or the residual effectiveness. These dyes interfere with protein — and nucleic acid-synthesis in some bacteria, but they probably also affect embryonic fishes.

Malachite Green. Malachite green is an effective antifungal bath for fish eggs, but it can be a dangerous drug to both the fish and the aquarist if misused. The effective dose is 1 drop of a 0.75% solution per gallon of water. A percent solution is simply grams (solid) or millilitres (liquid) per hundred millilitres of water (or other solute). But since we usually make up litre (a thousand millilitres) amounts, think of it as tens of a substance per litre (or quart, roughly). The stock solution of malachite green would therefore be 7.5 grams per litre, and you would then use a drop per gallon (or millilitre per 20 gallons) to treat your aquarium.

We have long known that malachite green interferes with the metabolism of many fungi, and is thus an effective anti-fungal agent. It also works on parasitic protozoa. It has recently been determined that malachite green's effectiveness can also damage fish embryos if they are exposed to the drug late in development. For this reason, it should only be used during the first day of incubation, and the water thereafter changed to eliminate the drug. The deformed baby fish which we have often attributed to "inbreeding" or "weak parental stock" may be monsters induced by this teratogenic drug.

Aquarists are also advised to be careful handling the drug, which can, under certain circumstances, be carcinogenic. In fact, trout farm managers, who used this drug routinely in the past, were found to have a much higher incidence of cancer than the general population.

Thus, we have one dangerous drug that is useful, and two drugs that are not particularly so.

PHYSICAL CONDITIONS Light (and Temperature)

Many fish, including species once thought to be only inducible by injection with sex hormones, can be readily induced to breed by altering the photoperiod. It differs among species, depending on whether they are naturally winter spawners (short day-length), summer spawners (long day-length), or spring spawners (a protracted period of short day-lengths, followed by increasing day-lengths). The appropriate temperature, or temperature alteration, may be required along with light manipulation.

Among many, and perhaps most, families of marine fishes, the fully-embryonated eggs will not hatch in the presence of strong light levels, and may die in their envelopes after using up all their reserves. The mechanism that controls this phenomenon is unknown. There have been many disappointed photographer-aquarists who have bred Clown Anemone Fishes (*Amphiprion* species), and then kept the light on to observe a hatching that never occurred. To photograph hatching, one has to turn off the lights and work virtually in the dark. If you then turn the lights on after hatching has commenced, it is possible for hatching to shut down, resulting in death of the remaining, unhatched embryos. This inhibitory effect of light on hatching may also occur among certain freshwater fishes, and should be considered where hatch failure is a frequent occurrence.

Oxygen (and Temperature)

The conventional wisdom is that good incubation and development is associated with high water quality, and that includes high oxygen levels. In fact, there are times when the conventional wisdom is wrong.

Killifish fanciers know, for example, that fully-embryonated eggs will sometimes fail to hatch, and their embryos will die for no apparent reason other than failure to escape the egg envelope (chorion). These aquarists also learned several methods to induce hatching. Putting the eggs in a vial in your pocket and walking around would often

work, the theory being that gentle agitation would induce hatching. (It worked, but the theory was wrong). Blowing expired breath in the egg water sometimes worked, the theory being that increased carbon dioxide triggered hatching. Again, the theory was wrong. A third method was to add dried milk to the hatching container, again based on the theory that the rapidly-formed carbon dioxide from bacterial decomposition of the material would induce hatching. A fourth method, incubating the eggs in a strongly aerated jar and then turning off the air, was also based on increased carbon dioxide levels, although it was in this very case that we should have reasoned what was really happening.

Dr Juro Ishida, of the University of Tokyo, recently reviewed current knowledge of chorionase, the "hatching enzyme" of many fishes.

Chorionase first became well-known among aquarists following the research of Dr Wourms on the resting eggs of annual Killifishes. Wourms noted that the development of annual fish eggs was similar in most respects to that of other fishes, but that it was interrupted and protracted at several points, this interruption effected or retarded by certain environmental conditions (including the levels of dissolved oxygen in the surrounding milieu).

Dr Ishida explained it all in a publication of the Zoological Society of Japan (*Zoological Science*, vol. 2, no. 1, 1985, pp. 1-10).

Many embryonic fishes have special cells. They are in different locations in different kinds of fishes (the back, the head, lining the mouth and gill chamber), but the structure of these hatching gland cells (HGCs), wherever they occur, is similar. They are secretory cells located just below the epidermis, and they begin to swell immediately upon completion of the normal term of incubation, unless otherwise inhibited.

When they swell, they force the overlying epidermal cells to separate, providing a corridor for the escape of the glandular contents of the underlying HGCs. In fishes like Killifish and Medakas, which have the cells in the mouth and gill chamber, the beginning of secretory activity is associated with gill and mouth movements. In some other kinds of fishes, where the HGCs are

found around the eyes, eye movements indicate secretory activity. Thus, it appears that muscular movements of the embryo assist secretion of the chorionase.

Chorionase has not been well characterised, but we know it is at least one protein, and there may be more than one kind. It probably requires zinc or something similar and is inhibited by laboratory compounds that lock up metals, such as EDTA.

Chorionase acts by attacking the proteins within the inner layers of the chorion, apparently at weak spots containing the amino acid, serine. Once the inner layers are weakened, the chorion absorbs water, stretches (further weakening the remaining shell), and the thrashing of the embryo finally splits the remaining membrane, allowing the baby to escape or "hatch".

The HGCs are induced to swell suddenly and emit their contents upon being deprived of oxygen. It isn't the elevated carbon dioxide level that causes hatching, therefore, but the decreased oxygen level.

In this scenario, it is clear that turning off the air supply to incubating eggs will induce hatching. Walking around with a vial of eggs in one's pocket or adding dried milk to the culture works, not because of the motion, and not because of carbon dioxide, but because growing bacteria (from the milk) use up the oxygen, and sealing the vial cuts off the oxygen supply to the embryos.

Heightened temperature levels will often help by speeding up the rates of the various reactions concerned.

MODERN METHODS OF MANIPULATION

Stripping mouthbrooders. If you've ever stripped eggs from an incubating mouthbrooding cichlid by opening the mouth with the blunt end of a toothpick while simultaneously pressing upward upon the expanded throat area, you've probably marvelled at how easy it is. Well, try it on a mouthbrooding Betta and you'll find out that it's a less effective and reliable technique than you thought! Lots of fish just won't strip, and the best way to get them to release their loads is to provide them with a private aquarium.

Transfer of adhesive eggs. Some fish will spawn on the aquarium glass (many Catfish, for example), and these eggs are usually given up for lost. Take heart! In many cases, the eggs are attached by a short (but sufficient) length of adhesive filament and can be cleanly removed by sliding a single-edged razor blade between eggs and glass. You should have a retrieval net in the other hand and be absolutely ambidextrous!

Eggs inside PVC tubes frequently incubate poorly when removed from the parent, no matter the positioning of the air-release stone. I've had good success, however, blowing the eggs out by strong surges of water from a pipette. In most cases, very few eggs are damaged by the procedure, and the damaged ones can be identified and removed by the second day of incubation.

Many aquarists think they must incubate

eggs which are normally fanned in the stream of water provided by an air-release stone. They anguish over how strong to make the current, and how close to run the bubbles to the eggs. In fact, running a current on or near incubating eggs is often not necessary. I have removed eggs of *Badii badii* from PVC tubes and then incubated them in shallow dishes containing perhaps a half-inch of water, just like Killifish eggs. Even dyes are not necessary. Bad eggs will turn opaque within 24 hours, and often before any fungal hyphae develop. These are manually removed with forceps (tweezers) or pipette under a strong hand lens. Eggs that are going to die will be dead in two to three days at the most, and thereafter every egg should develop normally. Problems develop only when the aquarist fails to remove bad eggs promptly, thus leaving a fungus culture in the midst of the nursery.

FINALLY . . .

Handling fish eggs can improve your production, or provide success where none was available before. The key to success is using methods that work. The fun is in learning why they work. And don't be discouraged if the obvious method doesn't work. Try a technique that, in your certain opinion, cannot possibly work! Try a method used on a completely different group of fishes. Evaluate the results. The really successful aquarist. (S)he keeps on trying; may succeed only once in a while, or may never succeed. That's the way to become an expert.

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Books

1986 International Zoo Yearbook (Volume 26)

Edited by: P. J. S. Olney
Assistant Editors: Pat Ellis and Benedicte Sommerfelt
Published by: The Zoological Society of London
ISBN: 0074 9664
Price: £39.75 (hardback)
£35.50 (softback)

The International Zoo Yearbook represents the most up-to-date and comprehensive review of anything and (seemingly) everything worthy of note that has occurred in the world of Zoos and Aquaria the world over.

According to the editor, "Development in aquatic management, and in the ingenuity of aquatic exhibits in Zoos and Public Aquaria, has been incredible since the last time the Yearbook reviewed the subject in 1964. The exhibits described in Volume 26 cover an enormous range of aquarium design and construction. At one end of the spectrum are the massive coral reef tanks with their complex operational systems and beautiful displays, and at the other end are the small but effective aquaria with specialised displays. The breeding and management of various species . . . are also reported".

Volume 26 differs from all its predecessors since 1964 in that it dedicates the whole of Section 1 — all 179 pages of it — to Aquatic Exhibits. Admittedly, articles such as "Observations on Keeping the Pacific Walrus *Odobenus rosmarus divergens* at Hanover Zoo" are grouped into this section, along with "more expected" titles from an aquarist's point of view, such as "Aquarium Systems for Living Corals", but, even so, there's quite a lot to whet the appetite of anyone seriously interested in aquatics.

Particularly good in this respect are reports like those on the breeding of the Four-eyed Fish, *Anableps anableps*, at Stuttgart Zoo, and the breeding of the Tokyo Bitterling *Tanakia tasago* (perhaps better known in the hobby, simply, as the Tanago) at Ueno Zoo Aquarium.

In the former case, out-of-water feeding techniques, which some readers may have seen in the Zoo 2000 TV series screened some time ago, makes interesting reading. In the latter, the provision of artificial mussels (complete with currents) for the Tanagos to spawn in, is fascinating indeed.

If you've ever wondered how large public exhibits are maintained in terms of light, filtration, etc, then examples of that, too, are included in this impressive aquatic section.

Section 2 deals with new developments in the Zoo world, involving animals other than those included in Section 1.

Section 3 lists, along with relevant details, all the Zoos and Aquaria of the world. It also features new buildings and exhibits (including those incorporating invertebrates, fishes, amphibians and reptiles), four pages of fish species bred in aquaria (plus one on amphibians and six on reptiles), and a census of rare animals in captivity.

All the above, plus numerous other facts, figures and statistics not available anywhere else, must make the International Zoo Yearbook, Volume 26, the best work of its kind in the whole world.

If you can't buy your own personal copy, then I strongly suggest that you urge your society or local library to buy one. If you are interested in animals and their welfare in captivity, then you *must* be interested in the Yearbook.

John Dawes

Australian Native Fishes For The Aquarium

By: John R. Merrick and Ray Leggett
Published by: J. R. Merrick Publications
Information available from: Ms P. R. Davies (*see below)
Price: \$A 25.00 — around £10.00

The first third of the book is taken up with the setting up of aquariums suitable for native Australian fishes. Collecting and transportation procedures may seem irrelevant to hobbyists in more temperate climates, who obtain their fishes more conveniently from the local store, but the practical hints are well worth reading (particularly if you decide to bring back species from a beach outing, for instance). The chapter on Feeding, again, delves deeply into practical matters with sound advice on preparing frozen fish foods, culturing live foods and so on. Breeding, Diseases, Photography, Shows and Exhibitions are all interests the hobbyist becomes involved with sooner or later and are discussed here with some vigour. The building of Fish-houses may differ from country to country, depending on local temperature conditions, but the design of the interior from a manageable viewpoint cannot be bettered.

The remaining two-thirds of the book bring in the fishes and some 74 species from 16 families are described in a uniform manner: this includes Native distribution; Scientific and Popular names, the former's literal meaning being provided; Community suitability (or not); Swimming level; Breeding size (for each sex) and Diet. Breeding conditions include arena of breeding (pond or aquarium, water temperature, pH), Spawning action, Egg description, Hatching period, First foods, Special techniques required, etc.

Readers familiar with John Merrick's

former work will know that the photographs of fishes are first-class; more than occasional pictures of natural habitats not only bring the book to life, but also assist in the simulation of such conditions in the aquarium. A useful Glossary is humorously entitled 'Those Funny Words' and, together with a Bibliography, completes the work.

Information, identification, constructive practical hints, unfamiliar fishes, they're all here for your enjoyment. If you can obtain a copy of this book, then you won't be disappointed. An informative leaflet about this book is available from Ms P. R. Davies, 24 Delves Avenue, Spital, Wirral L63 9YG (Tel: 051 334 6425).

Dick Mills

Fish & Shellfish Pathology

By: Anthony E. Ellis (Ed.)
Published by: Academic Press
ISBN: 0-12-257490-8
Price: £52.00

Although, technically, this volume is divided into seven parts (with Part III, further subdivided into A and B), only one (Part VII) deals with Shellfish Pathology and Diseases. The others all concentrate on fish and their diseases, this probably being a fair reflection of the relative extent of research in the two fields.

The text consists of a series of papers presented at the 1983 European Association of Fish Pathologists' Conference held at Plymouth Polytechnic. As such, it embraces both general review-type contributions (such as Diagnostic Methods in Fish Diseases: Present Status and Needs) as well as highly specific ones (e.g. First Report of *Vibriosis* in Turbot).

The main chapter (Part) headings are: I: Fish Disease Diagnostics; II: Treatment and Control of Fish Diseases; IIIA: Bacterial Diseases in Fish — Furunculosis; IIIB: Bacterial Diseases in Fish — Others; IV: Diseases Associated with Environment and Nutrition; V: Viral Diseases of Fish; VI: Fungal and Parasitic Diseases of Fish; VII: Shellfish Pathology and Diseases.

Within each Part, there are papers which, taken as a whole, represent a comprehensive and in-depth account of this vast field of study. Researchers, vets, teachers/lecturers, students, fish culturists and pathologists, among others, should all find this book of great assistance in their work. At £52.00, it's not the sort of book that 'every hobbyist should have', but it should be the sort of book that every advanced aquarist should have the opportunity of delving into. Local libraries should therefore be encouraged to obtain a copy.

John Dawes

Coldwater jottings



Stephen J. Smith

Pleased to Meteor . . . ?

"A strange egg-shaped fish which has no caudal fin. The lack of a caudal fin is compensated by over-development of the other fins — especially the pectoral and anal fins."

Such is the description of the Meteor by my late mentor Frank Orme in his famous book "Fancy Goldfish Culture". But, does anyone possess any evidence of such a Goldfish variety, either pictorial or even better, living?

As far as I know, there is no record of such a variety having been developed or even owned and, in my opinion, such a fish would not really be one which should be popularised.

However, it may hold some appeal for a few Goldfish fanciers, and I would be pleased to hear from anyone who can produce credible evidence of true-breed Meteors.

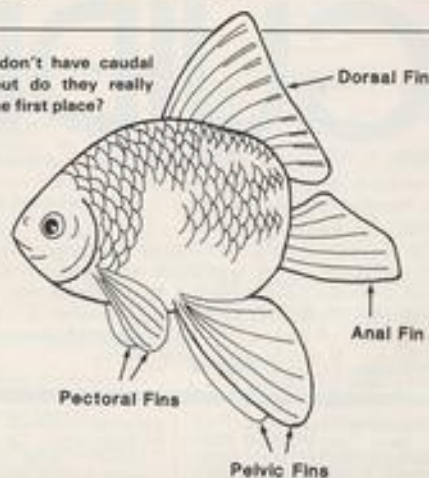
Coldwater correspondence

I am delighted to report that "Coldwater Jottings" is becoming a lively forum for debate on all matters coldwater.

The purpose of the column is to bring together all aspects of the hobby — including manufacturers, retailers and hobbyists — for the overall benefit of the hobby.

So, even if you may disagree with some of the comments made within these or any other

Meteors don't have caudal fins — but do they really exist in the first place?



columns of "Aquarist and Pondkeeper" your correspondence is just as welcome; as are your own views on any aspect of the hobby.

Insufficient Neglect — Part Two

David Gilliam of Medina Garden Centre, Isle of Wight, has responded to my comments in February's "Coldwater Jottings" headed "Insufficient neglect?"

David writes: "One of my regular customers with a garden pool came to see me about a Fantail which was in trouble."

He continues: "He first said that he had removed this fish from his pool when he saw that something was wrong. He described it as whitish growths so we looked at such things as White Spot, Fungus, nodules, etc., but none seemed to fit."

"Various treatments had already been tried with no success but, as I questioned further to identify the problem, it suddenly dawned on me that this 'unhealthy' Fantail was in fact a perfectly healthy Oranda!"

Fish Fact Finder

Information on ornamental fish farming is being sought by Mike Hutton, a student at Sparsholt College of Agriculture, Hampshire.

Mike is studying for a Fishery Management Diploma and, as the largest of four studies, he had decided to focus his attention on the ornamental fish trade in the UK.

Any information would be welcome on all aspects of goldfish farming, including spawning on a large scale (no pun intended, sorry!); age and size of broodstock; and rearing procedures.

Also figures relating to the annual production and sales of coldwater species would help.

I feel sure that, between us, coldwater breeders, retailers and hobbyists can help Mike with what can only be a most worthwhile study.

Information should be addressed to: Mike Hutton, 98 Taplings Road, Weeke, Winchester, Hants SO22 6HF; or to myself c/o "Aquarist and Pondkeeper".

Standards

Finally, my apologies to Vic Capaldi for not responding sooner to his correspondence with regard to show standards.

Vic is a well-respected member of the Goldfish-keeping fraternity and a long-standing member of Bristol Aquarists' Society.

His letter raises a very valid point, in my opinion. Any response . . . ?

Vic writes: "Having attended the annual show of the Goldfish

Society of Great Britain last year and purchased a copy of their new standards book for Fancy Goldfish, I was amazed how near the line drawings were to our own, the Bristol Aquarists' Society.

"I know it has been tried before, and failed, but I do think the time has never been more ripe for the three major coldwater societies in this country — Northern Goldfish and Pondkeepers Society, the Goldfish Society of Great Britain, and Bristol Aquarists' Society — to get together to agree on a national standard for coldwater fish and produce a common standards book for the whole of the British Isles.

"I have a great many friends in all the Goldfish societies and many express the wish for a common standard. They all know that a good fish will win anywhere in the world, regardless of standard, and I don't think that it would require too much give and take to come to an all-round agreement.

"Do any readers have a view on the need for a common standard?"

Bookshelf

Among the responses to David Healy's plea in last October's "Coldwater Jottings" for literature on Koi and Koi-keeping was a very helpful letter from Stuart Elton of Colchester.

Stuart has had a passion for Goldfish for several years and says he also became "hooked" on searching for information: so much so that he now enjoys keeping them!

I would agree with Stuart's recommendation that David (Healy) joins one of the coldwater societies in the UK such as the BKKS (British Koi Keepers Society) or GSGB (Goldfish Society of Great Britain).

I am sure that either organisation would willingly welcome overseas members, as would the majority of aquatic societies in Britain. Many societies produce a regular Newsletter, which may incorporate practical information on specific aspects of the hobby, such as breeding and rearing fish, pond construction and maintenance, etc.