

AQUARIST & PONDKEEPER

75th
Anniversary Year

Established 1924

JUNE 1999

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The Better Fishkeeping Magazine



**LET THE
PONDKEEPER
SEE THE FISH!**
DELVING INTO POND FILTRATION

BEGUILING BARBS
A WELL ESTABLISHED CYPRINID

MARINE EQUIPMENT OVERVIEW
AN EXPLORATORY SHOPPING TRIP

**THE GOLDFISH
SEASON**
CHARTING THE
YEAR'S ACTIVITIES

**REVERSE FLOW
FILTRATION**
UNDERGRAVEL FILTER SYSTEM



JUNE 1999
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AQUARIST PONDKEEPER

EDITOR
Dick Mills

ART EDITOR
Mick Beeken

**ADVERTISEMENT
MANAGER**
Gwen McNeil
Tel: 01233 713188

PUBLISHER
Andrew Standing

PUBLISHED BY
Inline Magazines Limited,
Suite 4, Invicta Business
Centre, Monument Way,
Orbital Park, Ashford,
Kent TN24 0HB

CHIEF EXECUTIVE
Nick Richardson

FINANCIAL DIRECTOR
Dave Wing

MARKETING DIRECTOR
Alan Hulyer

**TELEPHONE:
SUBSCRIPTIONS,
ADVERTISING, PRODUCTION**
01233 713188

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COVER

Just imagine what a sorry picture this would be if the water spilling from this magnificent feature was all dirty! Thinking how bad it would be for any fish is more important, so we've a pond filtration article for you to sift through.

PHOTOGRAPH: DAVE BEVAN

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A Statement from the New Publishers ...

The pages of *Aquarist & Pondkeeper* have, for 75 years, been at the forefront in bringing topical news, views and comprehensive features to the dedicated fishkeeper and enthusiast alike.

Aquarist & Pondkeeper has been rightfully proud of its front cover statement "The Better Fishkeeping Magazine" and intends to continue supporting this claim well into the next millennium under the new and energetic ownership of Inline Magazines Limited.

We at Inline Magazines believe there are exciting times ahead for A&P as the interest in all matters aquatic, pondkeeping and water gardens continues to expand. Our commitment will not forsake the traditional values in editorial and feature content so carefully built over the many years the magazine has been available. Indeed, our forward planning not only continues with the editorial expertise of our friend, Dick Mills, but also the services of many contributors who we know are well respected by A&P readers and remain firm favourites.

Current regular articles, including KOI EXTRA, will continue with frequent updates, ably supported by a whole host of new and informative seasonal features — look out especially for the August issue which will be *The Aquarist & Pondkeeper Special 75th Anniversary Edition!*

Finally, we believe our readers should be very much a part of A&P's ongoing success, so we are inviting you to write in with any local news, unusual projects (rooftop water garden?), stories, comments or advice you feel could be of interest — you never know, your name could end up in print!

ALAN HULYER
Marketing Director
Inline Magazines Limited

As you will see, ownership of A&P has passed to Inline Magazines Ltd, who have taken over the task of publishing Britain's longest-running aquatic magazine. However, this good news is tempered by less happy news from my point of view which, I must emphasise, is in no way connected with this change.

It is with regret that I find I can no longer continue as Editor. Due to personal circumstances over the recent months the task of putting A&P together has become increasingly difficult with the result that I feel I am no longer able to put maximum effort into the magazine and that the end product may also not be up to everyone's expectations. I find myself having to make a sad decision and at a most inopportune time for the new owners and at what should be a happy time as A&P celebrates its 75th anniversary.

Pleasing all the people all the time is pretty nigh impossible and, with its wide ranging coverage of all aspects of the hobby A&P has always had to spread its subject matters evenly. Indoor and outdoor "seasons", freshwater or marine, tropical or coldwater, reptiles and amphibians — all have been allocated their due space in each issue; contributors from far and wide have backed up my demands with alacrity, wisdom and entertainment. A&P has been a notable presence at major aquatic events and welcomed by readers and trade friends alike. It is an unassailable fact that I could not have carried on the editorial torch from John Dawes without help and support from so many varied sources.

I still have more people to thank for the past three and a half years: John Young, who has been a pillar of strength, a gentle advisory "persuader" and travelling friend for many years; Mick Beeken (who has made such a visual impact with his design work), and Gwen McNeil, who, as Advertising Manager, ensured that the all-important revenue was brought in from companies in the aquatic trade. Without these current "team members" along with those in yesteryears A&P would not have reached you every month.

It is not often in life that one can genuinely combine a pastime with regular employment and my association with A&P, especially over the recent years, has brought me much enjoyment. Now, as many administrators in so many aquatic organisations have said on their impending departures: it's time to get back to fishkeeping again. So, in true editorial form, I will borrow someone else's words and say as Douglas Adams concluded in one of his *Hitch-Hiker's Guide to the Galaxy* volumes: "Cheerio, and thanks for all the fish!"

Dick Mills
EDITOR

E-MAIL ADDRESSES:
dickmills1@compuserve.com
dick@aandp.freeserve.co.uk

COMMENT

DICK MILLS delves into pond filtration ... *photographs by Gordon Wiggins unless otherwise stated*

Let the Pondkeeper See the Fish

Let's get a couple of things straight, right from the start. Pondkeepers arrogantly think that the fish want crystal clear water (whereas

they are probably happy as pigs in muck with green water — and feel much safer, too — out of the sight of any itinerant Heron or prowling pondside cat); then, unfortunately,

there are still some people who think their pond is adequately filtered by courtesy of the strainer stuck on the submersible pump's inlet.

Left alone water often clears.

PHOTOGRAPH:
LINDA LEWIS



Crystal clear water will indeed let us see the fish but such water may not be "clean" from a pollutant point of view nor adequately supplied with oxygen. As for the filtering capabilities of the pump strainer, well, I'll leave that to your imagination.

At the mercy of the elements

Unlike the indoor aquarium, where the filtration system is dealing with a basic set of circumstances, the outdoor pond is at the mercy of the elements, any wind-blown introductions, and anything brought to the pond by any passing animal, bird or insect.

Not for the pond a carefully controlled environment with a predetermined length of light, nor a constant temperature range, but changes of water conditions due to rain or snow.

Then, there's the possible interruption to the pond filtration system brought about by the pondkeeper's activities which may include a grim determination to save a few pence (possibly) by turning it off for a few weeks each winter (with the ensuing adverse effects on fish health each spring before it regains its full efficiency) or by overfeeding the fish at the wrong time and with the wrong food for the time of year.

No wonder we begin to depend on a pond's filter to put things right!

What will you need?

The type of filter used is dependent on the pond's usage. A small natural pond with relatively minimal water content is probably best left to its own devices although a small fountain might help to keep things aerated in warm summer days.

The Goldfish/planted pond can usefully be serviced by a box filter containing foam sheeting material for mechanical filtration together with some suitable materials offering a large surface area for biological filtration bacteria.

Additionally, a UV clarifier can be incorporated into the system to clear "green water" algae. It is possible to build a biological filter within an area of the pond but this represents to most aquarists a ticking time bomb waiting to go off in the far distant future — just imagine having to dig out (or even rake over) such a bed of gravel!

The Koi pond requires something

a bit more elaborate if it is to enjoy tip-top water conditions. Bearing in mind the Koi pond will be lacking "water cleansing" plants, the filtration unit has to do all the work of maintaining the water quality.

Whilst it may be considered just a matter of "upgrading" the proportions of the previously-mentioned system for the Goldfish pond, extra considerations might be made. Bearing in mind the amount of waste products emanating from healthy, ravenous Koi, the first priority must be to have a pump capable of shifting the "dirt" from the pond into the filtration system.

A "solids-handling" pump is a must, in this respect. A really prudent move would be to have installed a bottom drainage system when the pond was built in order to flush away collected debris (who's wise after the event now?) A further consideration with large multi-chamber filters is their effect on the oxygen content of the water.

With all this mass of bacteria rendering the waste products into less toxic compounds, something has to be suffered; nitrifying bacteria utilise a lot of oxygen in their beneficial activities and it is common practice for large air-diffusers to be incorporated into the filter to replenish the oxygen content before the water is returned to the pond.

Another way of achieving this is to utilise a venturi system within the pond itself.

In or out of the pond?

Yes, you now have the choice of equipment location with the advent of both in-pond filtration and UV systems. Naturally, you must expect

the equipment to take up some space in the pond and, if the water depth is shallow, then there is every chance you will be conscious of its presence as will the fish who will have their swimming room restricted a little.

Externally fitted systems may be a little easier to maintain but they will need disguising, especially the larger, multi-chambered variety.

Whilst the disguising by pondkeepers can be often quite ingenious — lighthouses, hanging gardens over a tower structure, etc. — some manufacturers design "disguised filters" right from the outset and a favourite format is the pondside planted up large flowerpot — only the spout pouring out water at the base gives the game away!

Turnover rate

Whilst the indoor aquarist can often boast of super-fast water turnover rates through power filters, the required rates for ponds can seem a bit on the slow side until you realise that the actual volume of water being moved can be quite monumental.

A good guide is to circulate the volume of the pond once every two hours, but calculating just what size pump will be needed requires a slightly harder calculation than simply buying a "pond volume divided by two" gallons/per hour.

The extra complication comes in the form of physical resistance to the pump's capabilities due to the height the water has to be lifted, the friction incurred in the length of pipe runs and, of course, the amount of "dirt-clogged" media in the filtration unit itself. A kind of rough guide to pump sizing is (without resorting to flow rate tables) is to select the size of pump



Operating filter.

LET THE PONDKEEPER SEE THE FISH ... Pond filtration

calculated on half-pond size gallons per hour basis — then buy the next size up!

This seems to work for straightforward filtration needs but if you want to have a fountain as well then maybe a separate pump ought to be considered for any water movement or water feature effect.

Speaking of flow rates, the flow rate through the UV clarifier need not be "full-throttle" as the effectiveness of the UV upon green

water is (assuming you have the correct size "tube" installed for your pond) proportional to the time the water is exposed to the lamp.

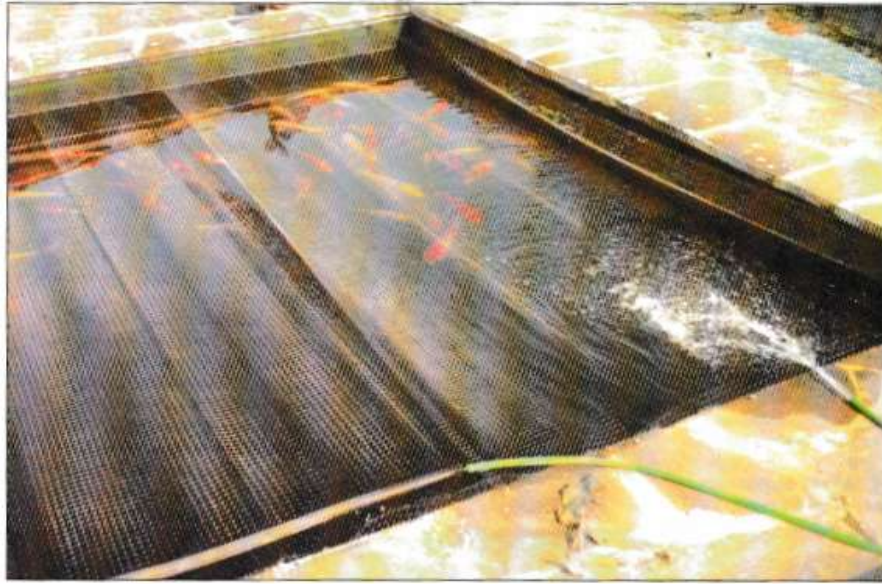
It is generally accepted practice to "tee-off" a controllable flow feed through the UV unit rather than simply connect a UV "in line". There is also some dispute as to where the best situation is to install the UV unit — before or after the filter?

It seems sensible to only let filtered water through the unit so as

original dirty water would not let the UV rays do their work and also the dirty water would soon discolour the quartz tube (if fitted) and so require frequent cleaning — a risky business — to ensure full effective operation.

The comments on UV location obviously refers to externally mounted units — in-pond locations do not offer much choice! A final point on UV use: it is good practice to renew the lamp each year.

Water aeration.



Filter bed.



LET THE PONDKEEPER SEE THE FISH ... Pond filtration

There's even another choice

In addition to the in-pond or external installation choice, you can now have in-ground or above ground sitings for your filter and this is not necessarily due to the fact of using a submersible pump as opposed to a "surface" pump. At least one compact unit is designed to be sunk into the ground and be fed from the in-pond pump.

Koi keepers will already have come to terms with housing "gravity fed" vortex type settling tanks and other large units — it's a shame that other aquarists with smaller filtration units can't have the same excuse for building a covering decking which (just by chance, you understand) becomes the perfect location for a deck-chair and a G&T!

Typical set-up

To save space we will take the liberty of describing a hypothetical filtration system that when of small proportions will be suitable for a Goldfish/plant pond but when "scaled-up" would be suitable for a Koi pond.

In effect this is a multi-chamber system but housed in a single unit for the first application but formed from separate interconnected units for the second usage. Either unit should have the added practicality of a drainage, or back-flush, facility to periodically remove any sediment that has gathered in the base of each section.

The first section is a settlement chamber where, as the name suggests, any suspended debris can "settle"; usually the filter medium in this section are brushes

hanging down vertically into the water, suspended from stainless steel (or plastic) rods.

Water then seeps into the second chamber where sheets or blocks of foam (of progressive coarser material) further strain debris from the water. So far, all the filtration has been achieved mechanically.

The third chamber will contain material on which nitrifying bacteria develop. Suitable materials include Canterbury Spar, various plastic pipe material cut into short lengths (Floroc, etc.) or even long strands of tangled plastic "tape".

Sintered Glass rings or other similarly-constructed materials can also be used, especially in in-pond filter units. It is in this chamber that air-diffusers can be installed to re-oxygenate the water on its last lap back to the main pond.

Many "multi-chambered" single units can have a UV unit fitted to either the lid or strapped on its side; UV upgrade kits are offered by many pond filter manufacturers.

Water is fed, or pushed, into the unit from a submersible pump in the pond via a length of protected, reinforced hosepipe directly into the first chamber. If a settlement chamber is not present the incoming water is often introduced over the foam material via a spray-bar. Where large multi-chamber units are sunk into the ground level with the pond, water is fed straight through the side wall of the pond and the pump supplying the "pulling power" is situated in the final chamber of the filter.

One advantage of having a surface pump "pulling" the water through the system is that the pump is only handling clean water and so its pre-strainer will not need cleaning out anywhere near so frequently as a submersible pump in the pond itself. Having said that,

there is now a "clip-on" unit available on the market which prevents strainer clog-ups (see *Buy Lines*, A&P, November 1998).

Maintenance

No matter what type (or size) of filter, nor how different its method of operation, it will need maintaining if it is to continue to do its job of providing excellent water quality. Brushes and foam materials do need cleaning periodically — and do remember only to use pond water for this task.

This is vitally important where a biological section may not be installed — a relatively dirty filter will also have a colony of nitrifying bacteria present after a period of time and rinsing in tap water will kill them off. The gravel medium biological filter section can be gently raked from time to time to ensure adequate water flow through it is maintained. UV quartz jackets (where fitted) should be checked periodically but do handle these with extreme care as they are expensive to replace!

Pump housings (when above ground) should be weatherproof as should all electrical switching gear. In-pond hoses connecting filters and UV units to the submersible pump should not be kinked in anyway nor punctured. Pumps are very reliable but it never hurts to occasionally disassemble them to check for seal leaks or to de-slime the overworked impellers.

Never drag a pump (or other in-pond equipment) out by its cable or hoses and always switch off the electrical supply before undertaking any maintenance work. Finally, remember where you have buried cables and hoses!

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AQUARIST



50 Years Ago ...

As recounted by Editor **Dick Mills**

In the period immediately after the war the increase of interest in all things aquatic was rapid. Looking through past issues of *A&P* makes interesting reading not only for the diversity of subjects raised but for the apparent enthusiasm by all contributors whether they be authors, reporters from Societies or letters from readers. June 1949 threw up this selection of topics ...

vol. XIV. No. 3

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ONE SHILLING & THREEPENCE

- With spring in the air the Editor, Anthony Evans, turned his thoughts to the attractions of an aquarium stocked with coldwater fishes, not necessarily those cultivated species such as the Goldfish but also some of our own native fishes. He reasoned that: "Quite apart from these aesthetic aspects there is the field of the unknown which keeping many of our native species in aquaria can open up. Reports of river fishes breeding in tanks are lamentably few, and detailed observations on the breeding habits of many of the species rather sparse. Large tanks may be required, and possibly special techniques are involved, but if we are prepared to meet the demands of tropicals with heaters, thermostats and the luxuries of plants from the home environs of the fish, then the pioneer, and the aquarist in search of something new, need not be dissuaded from tackling the problems that invite solution from his own doorstep."

- The 'Journals Review' column threw up one or two very interesting snippets of information. There appeared to be a prevalence in fish collections of aquarists on the Pacific coast of America of "Velvet" Disease. A seagoing naval man described how he kept Guppies on board his ship by hanging a battery jar aquarium in the gimbals of a compass cradle. Even in those days fish were being transported by car from place

to place and a compressor pump (run from the car battery) performed a portable aeration unit for the fish cans. In an article on breeding Angelfish, *Pterophyllum* sp., X-rays were shown, taken of the fry which revealed some fish had one or two lobed swimbladders. The first shipment of Goldfish from Japan arrived at the Steinhart Aquarium in San Francisco, courtesy of an experiment by Pan American Airways — the fish arrived in perfect order.

- Still with "flying fish", an improved method of tanking live fish for transport purposes had been devised in Batavia by the Inland Fisheries Office of the Department of Agriculture. This followed the high mortality rate suffered by fish during normal "in-tank" sea transit. The fish were placed in a special type of all-metal container into which a quantity of pure oxygen was admitted; the tanks were then hermetically sealed and encased in wooden crates for stowage aboard the KLM Royal Dutch Airlines aircraft. Only 40 fish, out of a consignment of 1,700 died the rest arrived in excellent condition.

- A convenient source of live White Worm food was reported by a reader — in his poultry run at the end of the garden! One has to remember that during the late 1940s everyone seemed to keep hens (for the eggs and for the Christmas table) and the lifting of the soil from their run

revealed a rich source of this "luxury food" for this aquarist's fish.

- Wartime austerity measures also threw up a plea for help from our erstwhile foes in Germany: Herr Quick, from the Verein der Aquarienfrennde in Essen-Ost, asked readers for help in obtaining dried fish foods and suitable materials for constructing nets for catching Infusoria from ponds. The readers' letters also revealed a strange colour morph — a perfect Goldfish which was a pale powder blue colour. The only other fish in the pond were Comets and ordinary Goldfish — not a Shubunkin in sight. Another reader wondered why the Gudgeon was not recommended as an aquarium fish. Since he had been keeping one for six months his tank looked a lot clearer.

- A response to a reader's enquiry result in many replies containing ingenious design for home-made aerators. Most were based on electric motors (ex-Government surplus) driving some form of piston to produce an airflow to the aquarium. One idea also utilised a wind-up gramophone motor (no electricity supply being available), another which did use electricity had the motor driving a steam engine! Of course, there were many design based around inflated car tyre tubes. All these designs were realised due to manufacturing costs keeping the price of commercially-available units so expensive (£2.50 upwards, which in those days was quite a sum to find).

- Early "conceptions" of today's OFI and OATA were becoming apparent with the formation of the Aquatic Traders' Association. Fifty members attended a general meeting with another 30 sending in apologies for absence. Among the topics discussed was the proposed

Pet Animals Bill awaiting its second reading in Parliament.

- The first Convention of the FBAS was planned to be held at Chessington Zoo on May 22. Tickets to cover return fare from Waterloo Station, entrance to the Zoo, lunch and tea were available at 12/6 (6/-p). A meeting of the British Herpetological Society took place at London Zoo on April 2. A Constitution for the Society was formulated.

- Breeding articles included such diverse species as *Ambassis lala*, the Glassfish, *Badis badis* (now, incidentally, reclassified in the FBAS National Show Fish Size Book into Class E, Anabantoids, rather than Class M, AOV Egglayers), the Red-spotted Copeina, *Copeina guttata*, and the Silver Tetra, *Ctenopoma spilargenteum*.

- A lighthearted look at the food of fishes by Jack Hems revealed that, according to a writer in a government publication, Goldfish will eat more than 30 kinds of food including linseed cake and butcher's offal. Goldfish fanciers would no doubt add to these with plum pudding and sponge cake. Additionally baits recommended for cyprinid capture included cherries, green peas, cheese paste and wasp grubs dipped in syrup. Japanese fish breeders fatten Carp on mashies of rice and honey. Native fishes had varied preferences: Carp sifted through mud for crustaceans, Rudd favoured silkworm whereas the Pike extended its tastes (apparently) from its normal diet of fishes, worms, frogs, water voles and water fowl to swimming dogs and low flying birds! Classical literature reported that human miscreants were hurled to their fate in tanks containing *Muraena* (Giant eels) in Roman times!



Established 1924

ALEX STEPHENSON charts the year's activities ... *photograph by Dave Bevan;*
graphic by the author

The Goldfish Season

Part 2: Spawning

Goldfish, or any other fish for that matter, don't need our assistance in order to breed, they do it very well on their own. However, when we call ourselves 'fish breeders', we are doing several things.

First of all we must provide

suitable conditions to enable the fish to spawn. Having achieved this we need to safeguard the eggs and, eventually, the resulting fry. Think about this for a moment. Any two fish, one male, one female, only need to produce two more fish within their lifetime for the population to remain the same.

When you consider how many

offspring can be produced by a pair of fish, of any species, during their productive lives, you have to ask "What happens to most of them?" Well, most are eaten, either in the egg or small fry stage, by a whole host of predators which can include everything from the parents themselves to snails, crustaceans, insects and so on. If this didn't happen, the world would be waist-high in fish by the time the next *A&P* is published.

As fish breeders we would not be content for nature to take its course and allow only one or two fish to survive, we want the whole spawning if possible! This is especially important for the Fancy Goldfish enthusiast. Generally speaking, the more exotic the variety, the fewer good specimens will be obtained from a spawning. This means that in order to increase the chances of getting anything worthwhile, it helps to have the maximum number to pick from.

Limiting factors

For most hobbyists there are limiting factors determining how many youngsters can be reared. These factors are to do with the amount of tank and/or pond space available, and also the amount of suitable foodstuffs.

Pond spawning, in our climate, is a "chancey" affair. Temperatures are seldom high enough for long enough to produce a good result. Often what happens is the more exotic fry are decimated by being eaten by their faster-growing, "coarser" siblings.



This is due partly to the problem of providing suitable good in sufficient quantities to maintain an even growth rate for the whole brood. This, and other factors, such as "natural selection", is why most established Goldfish ponds contain a few surviving youngsters which, from a

breeder's point of view, are worthless.

It is of course possible to pond-spawn fish, and then either remove the parents or a significant number of eggs to a hatching facility. If the former method is employed results will depend to a large extent on ambient temperatures being high enough to promote rapid growth. Then, when the youngsters are big enough to sort out, catching them all and doing a proper cull.

As someone who has employed this method on occasions, believe me when I say "this is not easy". In my case, the pond is drained down and every fish removed for inspection.

If removal of the eggs is

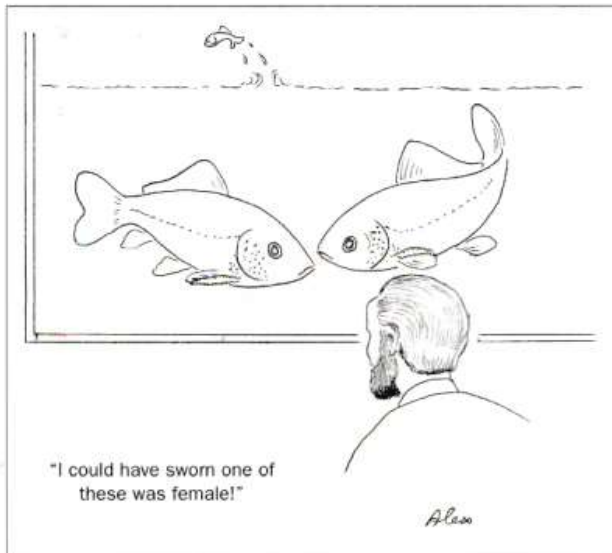
to be the method used, then it helps if you can persuade the fish to put them where they can be easily transferred. One method of doing this is to have the pond completely free of plants or other possible attractions. Then to provide either bunches of pest-free, clean plants anchored in your chosen location or, use artificial spawning medium.

Artificial medium every time

Having used both methods, I would go for artificial medium every time. Not only can you clean it properly, something real plants object to, you can use it over and over again.

Once your fish have obliged and you've collected the eggs, these can be transferred in some of the same pond water to the hatchery. Opinions vary as to what effect sudden temperature changes have on eggs in the early stages. My advice would be, don't take liberties, any temperature changes should be gradual. Having got your eggs safely into the hatching facility, they can now be treated in the same way as an "indoor spawning".

Because running out of space happens just as often when writing about fish as it does when breeding them, further deliberations will need to wait until next month.



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When it's spring a young man's fancy turns to thoughts of love and pondkeepers' thoughts turn to ways of combatting green water and blanketweed! Green Ways have two products which will assist you in this annual/perennial/ad infinitum battle and

both work on the biodegradable straw principle.

POND SNIP-ITS provides natural algae control for small ponds and water features, and a whole pad will give a single treatment for up to 700 gallons of water. For smaller volumes the pad can be divided into half, or even quarters — one quarter pad for up to 100 gallons, half a pad for up to 200 gallons. If things are really green then doubling the quantity may be required to get sufficient control.

POND PADS have the added ingredient of Lavender Straw and a packet of three pads will provide protection for up to one year (each pad lasts approximately four months), for ponds up to 700 gallons.

Both products should be placed in the pond in areas of good water circulation and may also be left in the pond to rot away completely.

• Further details from: Green Ways, Southend

Farm, Long Reach, Ockham, Woking GU23 6PF. Tel: 01483 281391. Fax: 01483 281392. E-mail: green.ways@btinternet.com

Electronic Temperature Instruments

Keep a check on your pet. The temperature of a pet's habitat should be checked regularly, therefore it is advisable to place a thermometer in the centre of any enclosure to enable an accurate reading to be taken. Dial thermometers are economical and are ideal to monitor temperature wherever pets are kept, i.e., a vivarium, cage, etc., or any environment where air temperature is critical.

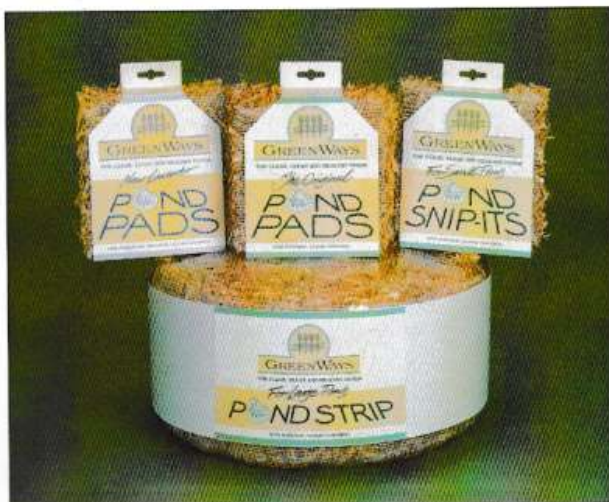
Electronic Temperature Instruments offer a range of low cost, easy to read bi-metal dial thermometers. The habitat and room thermometers measure temperature over the range of -10°C to $+50^{\circ}\text{C}$ and are housed in white ABS cases with 1°C divisions and colour-coded zones for ease of reading.

The smaller (52mm dial) thermometer incorporates a hook enabling the unit to be hung from a shelf and is priced at £1.50 each plus VAT. The larger (70mm dial) thermometer also incorporates a hook or

▼ Dial thermometers from Electronic Temperature Instruments.



▼ The Green Ways pond treatments, POND SNIP-ITS and POND PADS.



▼ Tropic Marin's range of test kits.



can be freestanding and is priced at £2.25 each plus VAT.

• For further information or a catalogue please contact: *Electronic Temperature Instruments Ltd, Dominion Way, Worthing, West Sussex BN14 8NW. Tel: 01903 202151. Fax: 01903 202445. E-mail: sales@etiltd.co.uk*

Tropical Marine Centre

Trop Marin, famous for its world leading synthetic sea salt, has launched a new range of test kits which are distributed in the UK by Tropical Marine Centre. The range includes three unique Protein Test Kits — one for ponds, one for saltwater and one for freshwater environments.

The build up of protein — produced by the breakdown of remains of food, excrement and decomposing organisms — can lead to unstable levels of pH, a build up of ammonia, nitrite and nitrate, as well as scale and gill problems for fish. It is therefore extremely important to avoid a build-up of protein, and Trop Marin is the only company that produces a kit to test for this.

The Protein Test Kits are precise and reliable and allow the detection of a build-up of protein at an early stage when remedial action can be taken. The two reagents are not activated until the first test, which increases the life of the kit and guarantees accurate results. The test is quick and simple to carry out and the results are easy to read, with clearly distinguishable colour changes.

The RRP of the Protein Test Kits are as follows: Pond Protein Test Kit, £11.81; Freshwater Protein Test Kit, £12.25; Saltwater Protein Test Kit, £12.95.

The other freshwater test kits currently available from Tropic Marin are a pH Test, which offers clearly distinguishable colour changes, a GH Test which determines total hardness in freshwater aquariums and a KH Test which gives a precise measurement of carbonate hardness. The saltwater range also includes a pH Test and a KH/Alkalinity Test. The Tropic Marin range of Test Kits will be extended in the near future with a number of other tests already in development.

• For further information contact: *Jayne Robb, Tropical Marine Centre, Solesbridge Lane, Chorleywood, Herts WD3 5SX. Tel: 01923 284151. Fax: 01923 285840.*

Trident

New for 1999 and clearly inspired by traditional wooden barrels, Trident has



▲ One of Trident's new self-contained water features.

launched three new self-contained water features. These faithful reproductions of the charming pump and barrel are manufactured from long-life resin and have the advantages of being fully waterproof and rustproof.

Designed for outdoor use the Trident barrels look equally good in a conservatory, on a patio or in a corner of the garden.

All three models — Corner Barrel, Flatback Half Barrel, and Full Half Barrel, come complete with electrical pump and are available from garden and aquatic centres. They can also be purchased through the major mail order catalogues.

• Further information from: *Trident Water Garden Products, Carlton Road, Foleshill, Coventry CV6 7FL. Tel: 01203 669012. Fax: 01203 638775. E-mail: info@trident-watergarden.com*

Sentinel Laboratories

There are many industry and general work situations which require gloves to provide tough and reliable hand protection combined with the best possible grip, especially when handling smooth or slipper materials.

To meet this need Sentinel Laboratories has introduced the Nitty Gritty range of high grip industrial gloves. These new gloves are ideal for handling smooth materials such as glass and metal sheet as well as abrasive materials like timber, tiles or concrete blocks.

Nitty Gritty gloves are manufactured with a wrinkle finished latex coat over a five-piece soft flannel liner which is anatomically shaped to a relaxed hand. This ensures

outstanding comfort and flexibility, while the multi-layer latex coating provides excellent cut, snag and abrasion resistance. The top wrinkle finish means sharp edges simply roll and bounce over the glove's surface.

An insulated version is also available if added hand protection is needed to combat extreme cold temperatures, such as in cold rooms or in the food and fishing industry.

The standard version of Nitty Gritty provides good resistance against chemicals such as ketones, dilute acids, alkalis and alcohols.

However, where the application is complicated by petroleum based chemicals that would degrade natural rubber, a nitrile over dip coating means the gloves protect against an extensive range of chemicals. Nitty Gritty gloves can be recycled and they will not shrink, stiffen or lose their properties during cleaning and laundering.

• Further details are available from: *Brian Smith, Sentinel Laboratories Ltd, Unit 12-13 Lindfield Enterprise Park, Lewes Road, Lindfield, West Sussex RH16 2LH, UK. Tel: 01444 484044. Fax: 01444 484045.*

▼ The Nitty Gritty Gloves from Sentinel Laboratories.



ANDY HORTON'S SHORE WATCH



IN THE COLUMN FOR THE YEAR I WILL EXAMINE SOME ASPECTS OF THE BIOLOGY AND BEHAVIOUR OF THE ROCK POOL FISH AND MARINE INVERTEBRATES THAT ARE BOTH INTERESTING AND USEFUL KNOWLEDGE FOR AQUARISTS

A Prawn dances gracefully over the rocks of the aquarium; its first two legs stretched before it have two nippers (chelae) attached. Nippers are also present on the second pair of legs; they are effective tools, which the Prawn uses to extract morsels of food from crevices or the inside of a dead marine snail (gastropod).

Prawns are omnivorous, able to catch smaller crustaceans, fish larvae and eggs, as well as eating seaweed and feeding on carrion. This latter attribute makes them useful in marine aquaria, where a few Prawns can perform the useful job of clearing up the microscopic remains.

During the late spring Prawns will follow the tide in. Usually, the green algae they have eaten can be seen through their transparent body.

Prawn movement

There are many different Prawns and shrimp-like creatures that inhabit the seas around Britain. Pools abound with at least two species of the genus *Palaemon* during the summer months, at least on the southern and western coasts

Shore Watch File ... 10



The Shore Prawn, *Palaemon elegans*, with an egg mass. Zoea hatch directly from the eggs in summer.

PHOTOGRAPH BY ANDY HORTON

of England.

They actively swim in midwater by rapid movement of the swimmerets (pleopods) underneath the abdomen. Two pairs of feelers (antennae and antennules¹) sweep the sea ahead of them.

Prawns need to be cautious as they are on the menu of dozens of different fish, have to dodge the stinging cells of Sea anemones, and even the greedy attentions of larger Prawns. Most of their time is spent lurking on the edge of the seaweed shelter and the

best way to capture them is to scoop your net through the weed at the edge of a pool.

They perambulate steadily over the sea floor using the three hindmost of their five pairs of legs.

School study

Experienced rockpoolers are apt to dismiss Prawns, as they are abundant on most shores, unless they are large for eating or needed for feeding the other inhabitants in the aquarium.

However, their relative abundance and the ease which they can be kept² in a properly established marine aquarium means they are highly suitable as subjects for study of Crustacea and other marine life in schools.

They also attract fascination and have even been known to be given individual names, which turned about to be rather unfortunate in the circumstances.

I thought that my rapidly-growing Corkwing Wrasse, *Crenilabrus melops*, which that grown up from a juvenile in captivity, would appreciate the greater freedom of my friends' two metre long marine aquarium.

Floods of tears gushed when the girls came home from school as their "darling" Prawns that been unceremoniously bitten in half and eaten by the Wrasse, leaving only the heads complete with their stalked eyes behind.

Larger stalk-eyed crustacea

All Arthropods, which includes the insects as well as the crustaceans, are distinguished by the external shell (exoskeleton) which the animal has to shed in order to

Shore Watch File ... 11



Adult Brown Shrimps, *Crangon crangon*, inhabit the sandy shallows below low tide mark from autumn until June. In late summer the juvenile shrimps can be found on the floor of sandy pools.

PHOTOGRAPH BY ANDY HORTON

grow and make room for the new shell growing underneath.

This applies to the microscopic bug and the largest lobster. Prawns shed their old shell every couple of months when small, leaving a spectre of their former selves on the aquarium floor.

However, the best practical aquarium exhibit to show the moulting process and change of shell (ecdysis) is the crab. The Shore Crab, *Carcinus maenas*, is hardy in captivity and because of its varied and aggressive behaviour it is an ideal choice for the educational aquarium.

It is common on most rocky shores and readily changes its shell if provided with enough food, oxygen and filtered seawater.

Food chains

Often found clutching a worm in its claws (chela) before manipulating its prey towards its mouth (including the mandibles that shred the food), the Shore Crab performs an opportunistic role in the seashore food chain.

Maligned in decorative aquaria because of its aggressive disposition, it makes a fascinating study because of its readiness to tackle different types of food.

Try feeding medium-sized crabs (with a carapace the size of your palm) on Cockles or small Mussels, or on gastropods like Periwinkles and Dogwhelks and watch the crab try to prise open the two halves on the bivalve molluscs, or try to crack the marine snails.

The Shore Crab will attack smaller crabs and also consume carrion and organic detritus.

Behaviour

Apart from the obvious discussion, "Why does the crab walk sideways?" there are also many other interesting aspects of its behaviour including fighting over females and mating.

The female crab can be distinguished from the male by the wider abdominal flap on the underneath, which it uses to hold its eggs. In summer these eggs may be released in aquaria as minute zoeae.

Occasionally the crab may be infected with a bright yellow lump of the Barnacle parasite called *Sacculina* instead of carrying eggs.

Freshly caught crabs may continue to show periods of activity coinciding with the incoming tide, although it is hard to be sure that this is the

reason, as crabs will quickly respond to the prospect of a meal.

Generalist feeders

Prawns, crabs and many of the shore inhabitants are called "generalist feeders" because they consume a wide variety of different foods. In contrast, some of the Sea Slugs are "specialist feeders" and feed exclusively on a single species of hydroid.

The generalists are a widespread group because they can usually adapt to many different habitats, feeding on the prey that is available. They also prove easy to feed in aquaria where the basic staples of boiled Mussel, Prawns, raw white fish, worms, etc., are eagerly consumed.

They are generally more interesting captives because they have to actively learn what is good to eat. If a generalist-feeding rock pool fish like the Common Blenny, *Lipophrys pholis*, refuses food in captivity, it is possible a sign of an internal injury or illness, or inferior tank conditions.

In spring the male fish may be guarding a batch of eggs

laid by the female and be reluctant to desert his post. However, it is just possible a healthy fish has taken sudden dislike to raw fish, which it was quite happily eating for months.

Generalist feeders may actually need variety to ensure they get all their nutritional requirements. I have very little evidence for the need of fish for a varied diet and I would be interested to hear of readers' experiences.

Notes

- 1 Crustaceans have two pairs of sensory antennae whereas insects only have a single pair.
- 2 Instructions for the school marine aquarium are on the British Marine Life Study Society (England) web site. Prawns and Shore Crabs can be kept at low densities in tanks without a cooling unit. Members can obtain advice by e-mail, and school teachers on behalf of their school can join for the same subscription rate (£20) as individuals.
- 3 Although Shore Crabs are relatively to keep, they need a properly maintained marine aquarium. On hot days they will leave the water and use oxygen in the air. A rock should be provided above the surface of the seawater, and the lid should be secured to prevent the crabs escaping.

Shore Watch File ... 12



The Shore Crab, *Carcinus maenas*, examining a Cockle. A detailed photographic study of this crab is available for the school computer by e-mail. Send a request to bmlss@compuserve.com.

PHOTOGRAPH BY ANDY HORTON

Andy Horton on behalf of the British Marine Life Study Society will help readers who have any difficulties to pursue their interest in the marine life around the British Isles. The first enquiry will be answered free of charge but please enclose a return stamp and do not forget to include your address. For more information please write to: Andy Horton, Shore Watch, British Marine Life Study Society, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex, BN43 6PQ. E-Mail: bmlss@compuserve.com Web Site: BMLSS (England) URL= <http://ourworld.compuserve.com/homepages/BMLSS/BMLSS> (Scotland) URL= <http://www.ed.ac.uk/~evah01/bmlss.htm> The Webmaster for the Scottish site is Alan Pemberton.

NICK DAKIN takes a shopping trolley for an exploratory trip around the mariner's shopping mall ... *photographs by the author*

Marine Equipment

OVERVIEW

A One of the joys of marine fishkeeping has to be the ability to upgrade a system at any time using one, or a combination, of new pieces of equipment. Not only does this have the effect of improving the environment of expensive livestock but it also brings about a certain self-satisfaction knowing that your pets are receiving the best possible attention.

Sometimes it seems that a new product hits the market every few days but usually it is a familiar

concept rearranged in new packaging. Just occasionally, though, a really new idea is presented to the hobbyist which does not cost a fortune and serves a useful purpose. However, it has to be said that most of the items I am about to list require a certain amount of investment and it would be wise to compare several makes, not only for quality but also value for money.

This overview is meant as a guide to what is available and NOT a list of what every marine aquarium

should have! It is by no means complete. Some items are essential from the start, such as the protein skimmer and possibly the ultra-violet steriliser; many others can be added later as more experience is gained and funds become available.

There are four categories: Essential Equipment (all basic marine aquaria should have this), Highly Recommended (very useful, labour saving and well worth the investment), Recommended (useful equipment, worth considering), Not Essential (equipment that can be



Aquarium chiller properly situated outside.

MARINE EQUIPMENT OVERVIEW ... Exploratory shopping trip

added at a later date, or as the system requires).

Trickle Filters

(Recommended)

The principle of trickle filtration is simplicity itself. Aquarium water is sprayed over a bacteria-friendly media. Here, in the presence of masses of atmospheric oxygen, aerobic (oxygen-loving) bacteria get to work on toxic ammonia and nitrite.

Unrestricted by the amount of dissolved oxygen available to them, Nitrobacter and Nitrosomonas bacteria survive and multiply far beyond the numbers to be found in traditional undergravels. Trickle filters are endlessly versatile and may be designed as features to position over the top of the tank, on the side of the tank, below the tank, or even within the tank itself.

Below the tank models usually facilitate the greatest numbers of "extras" as all the equipment is contained within a sump in which space is provided for protein skimmers, etc. The beauty of the trickle system is that practically all working equipment is out of sight and exceptionally accessible for maintenance purposes.

Protein Skimmers

(Essential Equipment)

If you keep marines and are unfamiliar with the protein skimmer, now is the time to seriously consider this vital piece of marine equipment. Like all really useful things, the skimmer is simple in operation.

Basically, into a tube of aquarium water, millions of tiny bubbles are introduced either by an air pump and wooden air-diffuser or venturi water pump. On the interface between the air in the bubbles and the water, various waste products are attracted and "fixed".

As the bubbles rise, they shed their cargo of waste into a collecting cup or container to be easily disposed of. Models may be sited



Protein skimmer (powered venturi).

underneath, inside, over the top, or beside the tank; and power may vary from a simple airpump to a powerful water pump.

Make no mistake, if your tank is without this essential item, water changes will need to be more frequent and far heavier to maintain reasonable water quality.

Ozonisers

(Not Essential)

The ozoniser is inextricably linked to the protein skimmer as it is just about the only safe way to use ozone in the marine aquarium. Ozone (O₃) is an unstable gas generated by a high voltage electrical field. It has the ability to oxidise organic waste and many inorganic substances, thus cleaning any water it comes into contact with.

As a result, Redox Potential is increased to favourable levels. Under no circumstances must ozone be directly introduced into the aquarium as it has the ability to destroy invertebrates and seriously damage the gills of fish.

Therefore, it must be contained within a protein skimmer and any excess ducted away or filtered through activated carbon. Correct dosing using a straight ozone generator is not easy as there is no real measurement of what is going

on, and this is where the next item becomes useful.

Redox Meter/Controller

(Not Essential)

Redox Potential, also known as ORP (Oxygen Reduction Potential) is, put rather simplistically, a measurement of the ability of water to cleanse itself. It is measured in millivolts (mV) and an efficient aquarium will operate at between 350-450 mV.

The only way of directly influencing this reading to keep it stable is to introduce ozone. A redox meter/controller will not only tell you, by means of a probe, what the Redox Potential is, but can also be set to switch the ozoniser on or off, so that a desired level may be maintained.

Ultra-violet Steriliser

(Highly Recommended)

Ultra-violet light has the ability to seriously damage or kill free-swimming disease organisms. This fact has an obvious and ideal application within the confines of a marine aquarium which can rapidly

become overrun by harmful diseases such as Whitespot and Oodinium.

Even a relatively small UV fluorescent tube encased in a watertight housing is capable of preventing or controlling potentially lethal situations.

As a bonus, cloudy water caused by bacteria or algal blooms can be cleared very effectively. A suitable canister filter to act as pump and pre-filter will be needed to operate the steriliser and the ultra-violet tube will need replacing every six months.



Canister Filters

(Highly Recommended)

As the name implies this is a simple external canister with a pump attached. Familiar to most hobbyists, this useful item can be used in a multitude of ways; not only packing with various types of media but running reverse-flow filtration or trickle filters.

Denitrification (Nitrate) Filters

(Recommended)

A controlled area of virtually still, de-oxygenated water will encourage anaerobic bacteria to flourish. These bacteria have the ability to convert nitrates into free nitrogen gas, thus keeping aquarium nitrate levels constantly low.

De-nitrification (as the process is termed) filters can be fitted as an integral part of an overall systemised aquarium or as an addition.

Residual Voltage Disperser

(Recommended)

Take a piece of copper wire, solder it to a length of stainless

steel and you have a residual voltage disperser — well, almost. The idea is that the bent stainless steel rod hangs on the side of the tank with the tip submerged below the water. The other end of the copper wire is connected to a suitable earth point.

In this way any residual static electricity current that has built up in the aquarium due to the close proximity of lights, heater and pumps etc., is quickly dispersed safely to earth, therefore, reducing the risk of electric shock or minor 'tingles' to negligible levels.

There is also some evidence that residual current within an aquarium may stress fish and invertebrates, causing disease and premature death. This device should eliminate that risk, for which it was primarily designed. However, I think that the added electrical safety factor may prove to be far more important.

Digital Thermostats

(Recommended)

As all marinists should know the stability of water parameters is of the utmost importance and none more so than temperature. A digital thermostat has the ability to control either under-tank heating mats or conventional immersion heaters with a great deal of accuracy, i.e., to within one tenth of a degree C.

Most models are fitted with a rotary control but only the more expensive ones have a digital readout.

Digital Thermometers

(Recommended)

If you would like to know the temperature of your aquarium water to a tenth of a degree then a digital thermometer can be purchased for a relatively small investment. A small probe is suspended into the water and an LED reading reveals all.

Heating Mats

(Recommended)

Under-tank heating mats are gaining in popularity with the aquarist and have proved reliable and effective. They need to be used in conjunction with an external thermostat but, apart from that, remain entirely hidden.

Chillers

(Recommended)

Chillers are especially useful where the ambient temperature of the room can expect to exceed that safely recommended for the aquarium. They are best positioned outside the house to let the excess heat drawn from the aquarium escape properly.

Chillers for the marine aquarium must be specially constructed so that the saltwater will neither be contaminated nor piping corroded by it.

Canister filters.



MARINE EQUIPMENT OVERVIEW ... Exploratory shopping trip

Osmolators (Highly Recommended)

Freshwater is constantly evaporating from all fish tanks, especially tropical. Marine tanks are particularly affected because the salt remains behind becoming more and more concentrated and possibly stressing livestock.

An osmolator can call on a freshwater reservoir and replace any evaporation immediately. Therefore, the salinity remains extremely stable.

Oxygen Reactors (Not Essential)

Oxygen reactors usually form part of sophisticated external trickle filters and are placed in the sump. A sealed cylinder filled with a very porous plastic media is slightly pressurised and water from the

aquarium is introduced. Oxygen is resultantly "forced" into the water creating a saturated solution.

Carbonate Hardness Reactor (Not Essential)

These work in exactly the same way as the above, except that the cylinder is fitted with small pieces of calcareous rock.

Calcium Reactor (Not Essential)

By lowering the pH in a reactor chamber containing calcium chips, the water passing through it is enriched with calcium. Carbon dioxide gas is used in the chamber to reduce the pH significantly enough for the calcium to pass into solution. A very useful piece of equipment where calcium levels are required to be high and stable, such as in a reef tank containing hard corals.

Kalkwasser Doser (Not Essential)

Calcium hydroxide when added to the marine aquarium will increase the calcium content and keep pH levels stable. A chamber is used to mix the calcium hydroxide powder and the tank water into a milky solution.

This is then added to the main tank water at a dose controlled by a pH meter. Should the pH rise too high, the supply is cut off. The same method can be applied to the calcium reactor.

Automatic Metering Pump (Not Essential)

This enables additives or medications to be added to the tank in a constant metered dose.

Surface Skimmers (Not Essential)

All aquarists at some time or another have had an annoying scum on the surface of the water. Whether formed by algae or proteinaceous oily substances, a surface skimmer maybe the answer.

A sealed container with an open top is placed in the aquarium. The open top is positioned just under the surface of the water and the inlet to a pump or canister filter is placed into the container. As water is withdrawn from the container, it is replaced by surface water and the accompanying scum.

Wave Controllers (Recommended)

This electrical box of tricks can control several circulatory pumps which may be placed at different levels of the aquarium. They are automatically switched on or off to create varying patterns of current within the water volume.

It can be set to mimic tidal turbulence and give a very natural effect which livestock seem to thrive in. These devices are not for use on pumps running biological filters as they could create problems by disturbing the flow of oxygen-rich water to the beneficial bacteria.

Lighting Timers (Highly Recommended)

As the name implies this useful device controls the lighting periods automatically. Several sets of lights can be pre-programmed to give a sunrise/sunset effect, or even a moonlight scene.

Feeding Timers (Not Essential)

Another electrical control device that is very similar to the above. However, it either reduces or stops the flow from all pumps whilst feeding is taking place. This prevents food from being dragged into the filters before it can be eaten. After a pre-set period of time, flow rates are restored to normal automatically.

Multi-Controllers (Recommended)

With the many recent

Calcium reactor.



advancements made in computing technology, aquarium multi-controllers have been developed to take charge of a host of functions. pH, Redox, pumps, lighting, temperature, etc., can all be displayed/controlled from one small box no larger than a paperback book!

Heaps of wiring packing a cupboard are a thing of the past, as pulses are sent down the house electrical supply to activate remote units. In addition, the whole thing can be monitored and programmed from an ordinary PC. Where will it end!

Reverse Osmosis Units (Highly Recommended)

The trouble with domestic tapwater is that it is usually contaminated with nitrates, phosphates, silicates, pesticides, etc., all excellent nutrients for nuisance algae, as well as a poor source of make-up water.

All of these problems can be overcome with the use of a reverse osmosis unit. 95 to 98

per cent of all impurities can be filtered out using one of these units and they are fast becoming standard equipment for most mariners. If you require high quality make-up water, then you need an RO unit!

Visit
Nick Dakin's website at:
<http://www.nickd.clara.net>

Calcium reactor.





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ACCEPT NO SUBSTITUTE

LIZ DONLAN'S KOI CALENDAR

The show season is now well under way with two of the major shows having taken place during May: the UK Dealers' Show at Telford Exhibition Centre, organised by DJ's Koi, and Koi '99 at the Stafford County Showground, organised by The British Koi Keepers' Society.

The attendance at Koi '99 was well below that of previous years — whether this was due to a change in venue and the time of year (from August to May) it's difficult to say, and it will be interesting to see what happens at other shows.

However, one pleasing aspect of Koi '99 was that the quality of the Koi in the actual show was excellent and I'm sure the judges would have had a difficult task on their hands.

Many Koi Clubs have commenced their various coach trips to shows, dealers and other Koi Clubs. A number of Clubs have weekend trips

organised with overnight stops enabling them to travel further afield. There is no doubt that these trips are the highlight of any social activities within a

Koi Club as they provide enjoyment for the whole family, irrespective of whether they're ALL interested in Koi! Invariably a coach provides



the opportunity for the Koi enthusiasts to sit at the back and discuss filtration, etc., whilst the unenthusiastic can sit together and discuss holidays, gardening, clothes, etc.

Visiting Koi keepers in other parts of the country provides lots of new ideas and information which can be incorporated into your own systems.

So, if you're not a member of a Koi club and the idea of going on a coach trip appeals to you, then why not contact one of the names listed below to enquire about membership?

David and Audrey Evans of Rossendale, Lancashire, have an ideal cover on their pond to help keep away the chill during the winter months. It fits snugly round the pond with the aid of bungees and has a couple of "windows", fastened with velcro, which can be opened to inspect and/or feed the Koi (subject to temperature, of course).

PHOTOGRAPH: LIZ DONLAN

Show Calendar

JUNE

- 12 Essex Section BKKS. Closed Show, Aveloy Sports & Social Club, Aveloy, Essex.
- 12 Crouch Valley BKKS. Section Open Show at Barleylands Farm, Billericay, Essex. (Benching and judging will be on Saturday, June 12). Contact Brenda Scott on 01375 642321.
- 12/13 Worthing and District BKKS. Open Show, Worthing Rugby Club, Angmering, West Sussex.
- 19/20 Yorkshire Section BKKS. Open Show, Lotherton Hall, Leeds. Contact Fred Harston (Chairman), on 01226 722578. PLEASE NOTE CHANGE OF DATE.
- 20 Suffolk & North Essex Section. Closed Show, Langham Community Centre & Recreation Ground, Langham, nr. Colchester. Contact Alan Carter on 01206 866011.
- 26/27 Ireland Section BKKS. Annual Show, Hillmount Nursery Centre, Upper Branial Road, Glinahirk, Belfast. Saturday, 10am-5pm, Sunday, 2pm-5pm. Contact Trevor Geary, Secretary, on 01247 466865.

JULY

- 3/4 East Pennine Open Show, The Heritage Centre, Elsecar, near Barnsley, Yorkshire.
- 4 Plymouth & District BKKS. Annual Show. To be confirmed.
- 10/11 Kennet Valley Koi Society. Open Show (English style), Hilliers Garden Centre, Hermitage, Newbury, Berkshire. Contact Bob Brown on 01635 42278.
- 18 Essex Section BKKS. Open Show, Aveloy Sports & Social Club, Aveloy, Essex.

AUGUST

- 1 Mid Staffs Koi Society. The Hollybush Garden Centre, Warstone Road, Sharehill, nr. Wolverhampton, West Midlands (M6 Junction 11). Tel: 01902 417068.
- 1 Potteries & District BKKS Section. Koi Exhibition at Stapesley Water Gardens, Nantwich, 10am-4pm. Phone Ivan on 01782 845864.
- 7/8 International Koi Show. Organised by DJ's Koi. (Contact telephone number 01922 493290).
- 28/29 North East Koi Club Show. Gosforth Park Koi & Aquatics. Contact Jean Hope on 0191 416 5794.
- 29/30 BKKS South East Section. Open Show, Ravens Wood School, Oakley Road, Bromley, Kent. 10am-5pm both days. Free parking, Dealers, Crafts, Tombola, Refreshments. Contact Susan James on 0181 698 5779.
- 29/30 BKKS West Wales Section. 7th Annual Closed Show, Margam Park, Port Talbot (M4, junction 38). Contact Angle Evans on 01639 710045.

SEPTEMBER

- 4/5 North of England ZNA Chapter. The Phoenix Sports and Social Club, Baxby Road, Sheffield. Contact Yvonne Muse on 0114 289 3437.
- 4 Leicestershire Koi BKKS. Annual Show at Farm World, Gartree Road, Leicester. 10am-5pm. Contact Wayne Eady on 01455 445014.
- 12 Cambridgeshire Koi Club Show. At Thorpe Hall, Peterborough, from 10am. Contact Graham or Jane Hagger on 01487 711129.
- 25/26 Isle of Wight BKKS Section. 1st Open Show (Japanese style) at Medina Leisure Centre, Fairlee Road, Newport, Isle of Wight. Contact Kevin Driscoll on 01983 291678.

Koi Society Meetings

JUNE

- 10 Potteries & District Koi Section (BKKS). Meeting at The Midlands Electricity Board Sports & Social Club, Victoria Road, Fenton, Stoke-on-Trent, commencing at 8pm. Contact Tina Burgess on 01782 617526.
- 20 The East Yorkshire Koi Society. Hosting a visit from the BKKS East Pennine Section. Contact Steve Mattinson on 01964 527863.
- 20 Northern Koi Club. Meeting at St. James Church Hall, Salford (near Hope Hospital). Contact Glynnis Morgan-Davies on 01708 218243.

There are numerous Koi Clubs/Societies throughout the UK and we will publish details of their meetings each month as and when we receive details. However, don't forget to include a contact name and number. Copy for Koi Calendar can be sent to me c/o Koi Calendar, Inline Magazines Limited, Suite 4, Invicta Business Centre, Monument Way, Orbital Park, Ashford, Kent TN24 0HB, or by contacting me direct, telephone (0161 794 8282) or fax (0161 793 9696).

KOI EXTRA

THE MAGAZINE FOR DISCERNING KOI KEEPERS

Volume 2 Number 2

June 1999

INSIDE

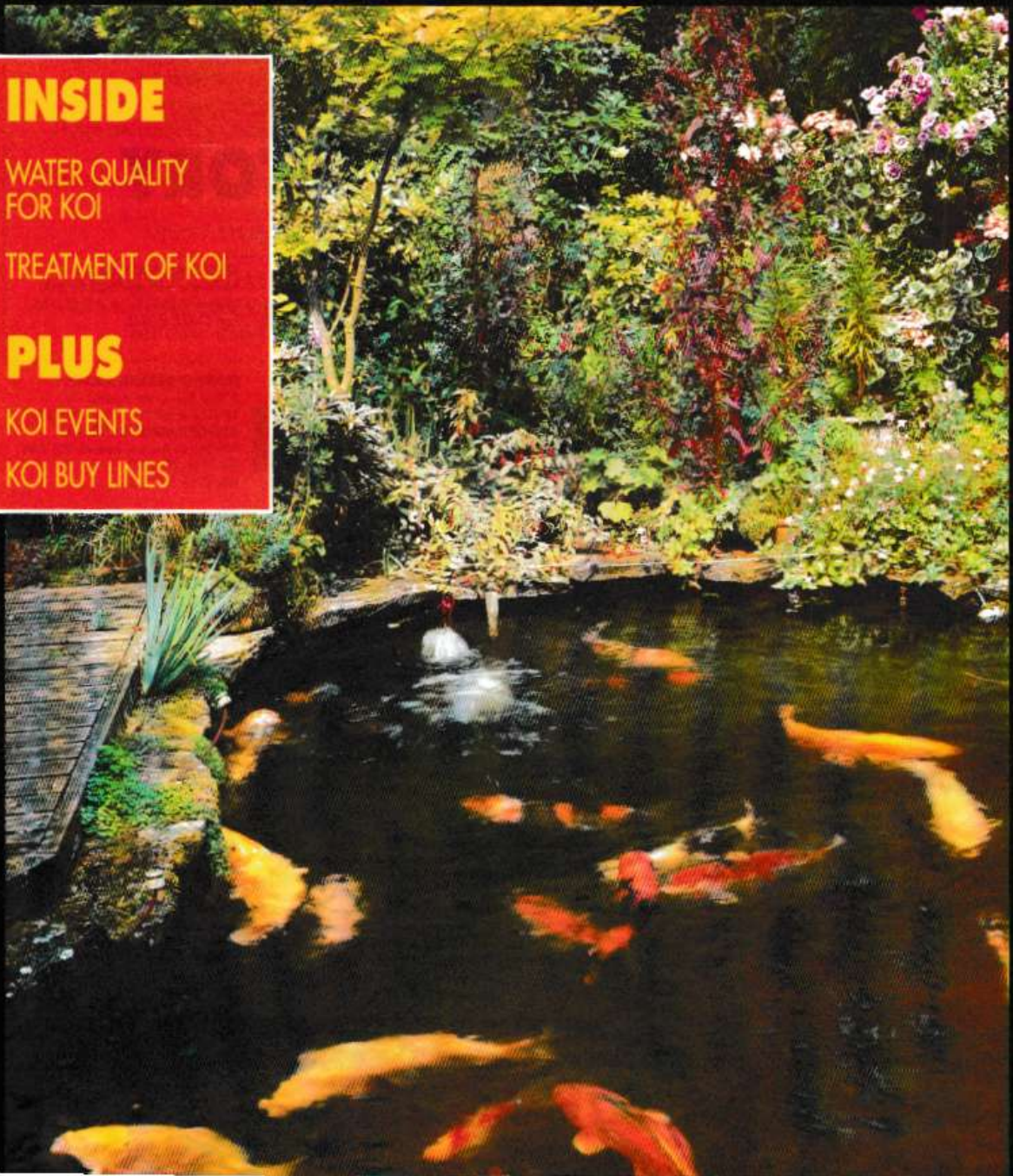
WATER QUALITY
FOR KOI

TREATMENT OF KOI

PLUS

KOI EVENTS

KOI BUY LINES



EDITOR'S COMMENT

Within the interests of Koi keeping, in common with all other areas of the hobby, there are many aspects which must be taken into consideration if success is to be achieved. Not only this, but each aspect impinges on most other areas too, often in quite important ways, so a shortcoming in one department can have a serious "knock-on" effect through the entire aquatic scene.

Paramount to success, and to the fishes' health is the quality of their water conditions. So many authors have stressed the importance of getting this right and then the rest almost falls automatically in place. Our feature on Water Quality for Koi should form the cornerstone (even if your pond is round) for your basis of keeping these wonderful fish (or even any other kind for that matter).

Unfortunately, even though conditions seem fine, things have a habit of taking a turn for the worse. Many a beginning (or even an experienced) fishkeeper will merely reach for the treatment bottle and dose away, hoping for the best.

It does help to know what you are doing — from diagnosis to correct treatment, if you are to stand any chance of saving a sick fish. Koi, along with some other pond fish such as Orfe, are susceptible to many traditional "off the shelf" treatments and many manufacturers now offer "formulated-specially-for-Koi" treatments to offset any possible danger. We have a Treatments for Koi feature this month which should be of great value to you, should your prize fish suddenly appear off colour; read it, and you will be able to treat their maladies with confidence rather than with a "hope for the best, kill or cure" attitude.



EDITOR

E-MAIL ADDRESSES:
dickmills1@compuserve.com
dick@aandp.freemove.co.uk

FRONT COVER

PHOTOGRAPH BY DAVE BEVAN

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WATER QUALITY FOR KOI

BARRY GOODWIN

looks at what is really necessary for our Koi, and suggests how we may achieve it

Photographs by the author



Aeration being provided by a waterfall.

They always say that a man is what he eats, and the same is true for a Koi — it's only as good as the water it's in. It's that old chestnut again, but it is true to say that 99.5 per cent of the problems encountered with Koi in ponds are due to a water problem of some form or another. In turn, most of these problems

are caused by poor or inadequate filtration, and in the end it boils down to what knowledge the Koi keeper has about the basic requirements of his hobby. Anybody, who has been keeping Koi for a while will agree, I am sure, that just any old water won't do for keeping these sometimes delicate fish in. Inbreeding and genetic instability has overtaken many

of our Koi varieties, and if we let water quality slide, possibly by only a little, then it is always the most highly bred (and most expensive) of our pets that succumb first.

TAP WATER

Most pond water starts at the tap, and this has been treated

at source with things like chlorine or chloramine to destroy bacterial activity, making it safe for human use. Also it may come from areas where the contaminants such as metals, whilst being humanly acceptable, are not conducive to the support of Koi. If we try to keep our Koi in such water, we may not meet with success, and so we must take precautions before we put it into our ponds. We can use a tap water conditioner, which will remove the chlorine and



maybe the chloramine, but this won't remove the metals with which the water may be contaminated. We will also need an awful lot of conditioner, as Koi need large amounts of water to exist in, and this means large occasional water changes. Water must also be treated before it goes into the pond and using a conditioner is very labour intensive, not to mention

expensive. I prefer to spend as little time as possible working on my pond, and enjoy my Koi instead. The alternative is a water purifier, and no self-respecting Koi keeper should be without one of these.

POND CONTAMINATION

OK, so we've got the input water right — now it's time to look at what goes on when it is in the pond. Does it remain as wholesome when we have Koi swimming in it? The answer to this one is no, and this is because the Koi create a lot of contamination which if allowed to build up, will cause severe environmental problems for them. We are looking at solid matter which is deposited in the water which in turn breaks down to fine particles and gives us a high organic loading in the water. As it decays further, it turns into ammonia, which is highly toxic to Koi. The Koi are also what is known as ammonotelic — they discharge the greater part of their nitrogenous waste through their gills into the water as ammonia. This will add to the

ammonia being created by decaying waste matter, and pretty soon we will have an uncontrollable situation on our hands — all because we keep them in the unnatural surroundings of a pond. There is a way of getting rid of ammonia, and thankfully that is quite simple as we provide a filter to do it for us. This builds up a colony of bacteria within the medium that oxidises the ammonia to nitrite, and then further to nitrate as the nitrogen cycle progresses. This of course means that we have nitrate rich water for our Koi to survive in, but in the quantities that we can expect it, it is quite harmless to them. Nitrate does cause other problems, and these manifest themselves as algae growth, both single-celled causing green water, and filamentous causing Blanketweed. It can be diluted by changing a percentage of the water at regular intervals, but be careful, as some tap water is also very high in nitrate. Once we have provided a filtered pond that keeps ammonia and nitrite down to undetectable levels, we will also find that it should stabilise the pH (the acidity and alkalinity of the water) to about 7.5. This is ideal for our Koi.

▶ Aeration being provided by a Venturi.



WATER QUALITY FOR KOI

◀ OXYGEN

What more is there to do? Well, quite a lot really, as another important factor that has a great bearing on how well our Koi will survive is the oxygen content. We require this to be high at all times, but not near to saturation level as this could cause gas bubble disease in the Koi.

Because a pond is, relatively, a heavily stocked environment, there is not enough water surface for enough gaseous exchange to take place at the air/water interface. We must provide a means of bringing more water into contact with an air/water interface and we do this by aeration. Air pumps and airstones, venturis, or waterfalls carry this out. A waterfall is probably the best means of doing this.

DOC

Another problem that manifests itself, and is seldom appreciated in this country, is the effect of dissolved organic solids on the pond environment.

When these solids have decomposed to the stage immediately before they become ammonia, they are present in the water as what we refer to as DOC, or Dissolved Organic Carbon. In this form its molecules cling to an air/water interface, i.e., the pond surface, and are very unsightly. It adheres to bubbles in the water such as from a waterfall, where it can be seen as unsightly heaps of foam or scum.

Its presence at levels greater than 20mg/litre will inhibit the working of the biological filter, and be injurious to the delicate gill filaments of our Koi. We can get rid of DOC by the use of a foam fractionator, the operation of which has been covered in A&P some time ago. There is another method and that is with the use of a new product called *Envirex*. This will consume the dissolved organic waste in pond water and at the same time eliminate ammonia, nitrite, and to an extent nitrate.

This may control your Blanketweed if you have such a problem. It does this by entirely natural means through enzyme action. It is essential to maintain a

clean environment in a Koi pond, to prevent the development of noxious gases from sludge build ups, and to this end it is necessary to have filters, water transfer pipes, bottom drains etc, that are capable of being flushed to waste.

MINERALS

Minerals are depleted from the water by the living organisms in the pond and these also must be replaced at regular intervals. You can regularly change a percentage of the water to accomplish this, but it is easier (and more economical) to use one of the montmorillonite clays. As well as replacing minerals, these will clear the water, and depending on any additives such as tonic salts will have other benefits for your Koi.

FEEDING

Food is another big factor in the maintenance of good water quality. You must feed Koi a correctly balanced diet of properly formulated Koi food. It is no use feeding Koi a diet of trout pellets or cheaper pond food — this does not have the correct balance of requirements that are essential for Koi. A poor food could also cause excessive solid waste matter to be produced by your Koi, causing water pollution, a build up of silt, and other undesirable effects.

A food with the wrong balance of nutrients could also cause your Koi to produce more phosphate. This is in turn a nutrient of Blanketweed, so now you have two problematic algae producing pollutants — nitrate and phosphate — to contend with! A vegetable filter with the correct type of plants should lower the incidence of both these in your pond water.

TEMPERATURE

Temperature is another

A foam laden pond surface, a sure indicator of DOC.



influential factor that controls water quality to a great extent. The stability of temperature is the important facet to consider here, as a filter relies on a steady temperature to maintain a constant performance. Pond covers, and even some heating, for the unstable months (February, March, and April) will enable a better control over water quality to be maintained.

may be beneficial in the right circumstances, I am forced to ask the question "do we really need them?" After all, we are just about back to where we started — if we maintain good water quality, our Koi should

remain healthy, with immune systems at peak, and therefore have no use for all these other preparations. Or does somebody out there know something about these products that I don't?

A vegetable filter will extract the nitrate and phosphate from your pond water if planted correctly.

OTHER CONSIDERATIONS

Rain water can also be detrimental to water quality, especially if it is acidic. This can play havoc with pH, the biology of filters, and many Koi keepers fit covered pergolas to keep it out of the pond. As for what else we should do, well there are many things of course. Everywhere you look now there seem to be other additives that you can pour into your pond, which will in some way improve the environment, the Koi's health, their immune system, etc., and so-forth. Whilst not denying that they



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TREATING KOI

**BERNICE
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*Photographs by
the author*

The spring months are traditionally regarded as a difficult time for any pondkeeper. The Koi will have spent the winter very quietly, usually lying on the bottom in a group with their fins tucked against their sides. It is also quite likely the Koi will have fed only sparingly for most of the winter; as the

water temperature increases and the Koi begin to move around the pond more freely and look for food it is best to feed the fish relatively small amounts at this time of the year.

Feeding the Koi is one of the most important management techniques we have available. It allows us to observe their behaviour and to see there are no obvious wounds or lesions

on them. Careful observation of the Koi can help to clarify the cause of the problem. For instance, if all the Koi are affected and behaving in the same way it is likely to indicate a problem with the water conditions. If, initially, only one or two fish are affected and the number gradually increases, possibly it is some infectious agent or, alternatively, if only



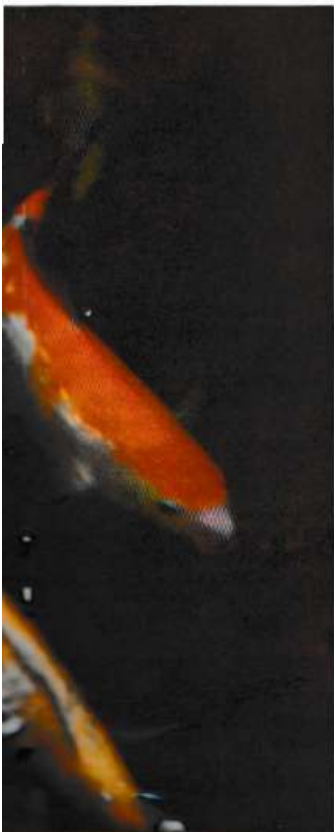
What we're all striving for ...
healthy fish.

one or two are affected it is most likely to be a physical injury.

WHAT ARE WE LOOKING FOR?

Whilst observation of the Koi is very important there are many Koi keepers who like to treat the pond every spring, regardless of whether the fish show any signs or symptoms of disease. So, what are we looking for in the spring which is so potentially life threatening to the Koi?

During winter months the fish immune system is largely ineffective. This is due to the cold water temperatures and short day length. As the spring progresses and the day length increases this is very important in helping the immune system of the Koi to become more effective; possibly initially this is more important than the water temperatures.



Most of us will be aware of just how slowly the water temperature rises through the spring and early summer. The next point that is worth considering perhaps is what happens to Koi during this transition period between winter and spring, which makes them susceptible to disease.

Temperature fluctuation is one of the most common problems in the spring, when some days are warm and sunny but the nights and early mornings are frosty and cold, which leads to some variation in water temperature throughout a 24 hour period.

Whilst the immune system of the Koi is still relatively inactive the change of two or three degrees through the day and night can allow one of the number of tiny skin parasites to thrive but, before deciding the Koi are suffering from skin parasites it is a good idea to make sure this really is the problem which is making our fish unwell.

POTENTIAL DETERIORATION IN WATER QUALITY

As Koi do not feed particularly actively through the winter months and the cold weather will reduce the activity of the filter bacteria it means that each spring the filtration system on Koi ponds will be inefficient. The numbers of beneficial bacteria in the filter system will only begin to increase once the Koi have commenced feeding on a regular basis. This means there is the potential for some deterioration in water quality during the spring and in particular if any maintenance work has been carried out on the filters during the winter months.

Koi produce nitrogenous waste in the form of ammonia, which is broken down by the bacteria in the filter system to nitrite and then nitrate. Both ammonia and nitrite are poisonous to Koi and their accumulation in the pond water will affect both the behaviour and welfare of the fish.

Nitrite is a skin irritant and will cause the Koi to flick, flash and even jump, symptoms which

could easily be mistaken for the presence of a parasite.

So, before reaching for the nearest bottle of Koi medication, test the pond water for pH, ammonia, nitrite, nitrate, alkalinity and temperature, just to eliminate these as the possible causes of the problem.

SUSCEPTIBLE TO DISEASE

If the water is polluted with either ammonia or nitrite the Koi will be stressed by these conditions which, in turn, will make them more susceptible to common parasitic infections and disease.

Often sorting out the problems with the water quality will remove the stress from the Koi and allow the immune system to deal with any parasite infection far more effectively than we can by adding chemicals to the water.

Having tested the water and found this to be acceptable for the Koi the next step is to determine what is causing the fish to behave abnormally or feed poorly.

Many Koi keepers these days have invested in a microscope, a very important piece of equipment for any fish hobbyist. The chances are the microscope will not have seen the light of day since it was used last year, so the first thing to do is ensure it is set up correctly.

The condenser should be focussed so the light is not too bright. Most people make the mistake of having far too much light, which has the same effect as over exposed photographs, with the light burning out any definable features on the slide. Then a sample of mucus should be taken from the body surface of the Koi. It is usually helpful to have someone assist with this procedure to avoid further physical injuries to either fish or hobbyist.

Examination of the slide under the microscope might reveal — a host of ferocious air bubbles which look like thick silver capsules. These are perfectly harmless and do not require treating.

Most parasites found on the body surface of the fish tend to

TREATING KOI

◀ be rather translucent in colour and are obvious because they can be seen to be moving around on the slide.

UNPLEASANT CHARACTER

Once the sample of mucus has been examined it is worth considering what numbers of parasite present constitute a potential problem.

The parasite White Spot is definitely an unpleasant character to find and just two or three on a slide is sufficient to consider adding a treatment to the pond.

On a worldwide basis White Spot annually kills more fish than any other disease. With regard to other commonly encountered skin parasites if hunting through the whole sample reveals relatively few, say up to 20, then the situation should continue to be monitored by further samples of mucus taken every few days over a period of a week to ten days. If the numbers of parasite increase then treatment should

be considered but if the numbers remain consistent or even decline no medication is required.

If looking down the microscope immediately large numbers of parasites are seen without any need to move the slide then the infection should be treated.

IMPORTANT IMPLICATIONS

Perhaps it is worth mentioning the parasite *Trichodina* sp. at this stage. Infections of *Trichodina* have important implications for the management of any Koi pond. Strictly speaking *Trichodina* is not actually a parasite of the fish as it does not feed directly on the tissues of the animal but consumes bacteria, dead skin cells and organic material trapped in the mucus.

The *Trichodina* irritates the fish, which produces more mucus, more bacteria and organic material to be trapped in the mucus and the tiny micro-organisms to thrive, so the

whole cycle spirals out of control until the fish are suffering as a consequence of the heavy infection.

The fact that *Trichodina* thrives in the presence of organic material tells us something about the condition of our filter and pond systems — they are unclean!

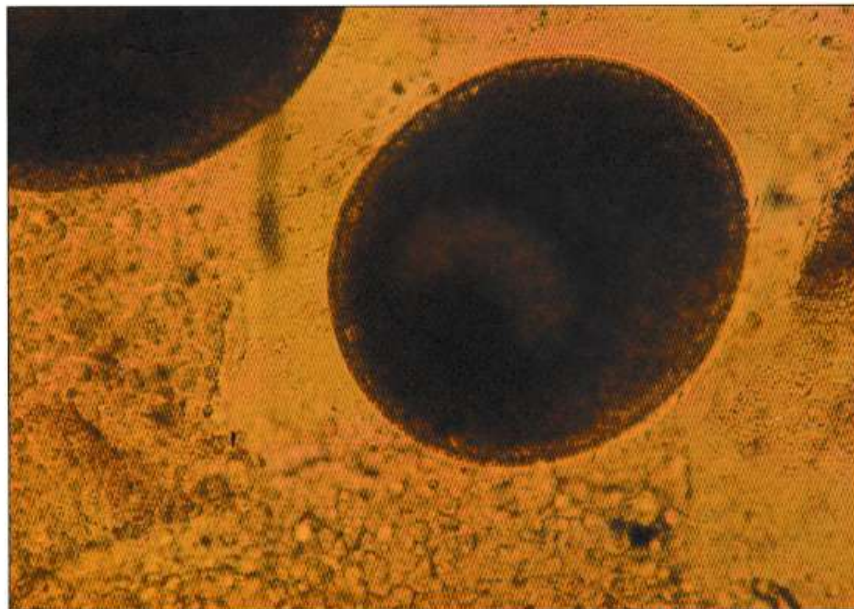
Somewhere in the system there is organic material decaying, producing the organic loading and higher bacterial numbers in the water, which encourage the *Trichodina* to thrive. In the event of discovering *Trichodina* infecting Koi, it may be necessary to add a medication to the water to reduce the numbers and make the fish feel more comfortable but, more importantly, the filters and pipes need attention.

On the whole it is better to avoid treating the Koi unless it is absolutely necessary. The chemicals which are used will indeed be effective against most parasite infections but they are unnatural additives to the water and all have both beneficial and detrimental effects.

There is no doubt that adding treatments to the water which affect the chemical composition of the water causes the fish stress. We have all purchased an over the counter medication for ourselves whether it's headache pills or cold cures and read how the treatment will make us feel better.

But the manufacturers go to great lengths to tell us of an assortment of side effects. Similarly, Koi medications do have a beneficial effect if used correctly and at the recommended treatment dose; all too often an extra few drops get added just because it looks such a small amount to add to a large volume of water. Those few extra drops do not help and could be detrimental.

White spot.



LETEUX MEYER MIX

Many of the medications which are available for treating Koi are based on Malachite Green and Formalin, formally known as the Leteux Meyer mix. Malachite Green has some interesting properties in that it is coloured green in acid (for the technically minded where the pH is less than 6.9) but solutions which are alkaline (that is pH 7.01 and above) it is colourless.

This means that in most ponds in the country where the water is alkaline Malachite Green becomes colourless within a matter of hours but it is still present in the water column. How many times do ponds get repeatedly treated because the colour has gone and therefore presumably the medication can no longer be effective? Whilst Malachite Green might appear to be an innocuous medication it is effective against most microscopic parasites because of the damage it does to the cells of their bodies, preventing them from using oxygen.

It should be remembered the cells of fish are just as susceptible to the effects of Malachite Green and therefore the manufacturer's recommendations should be followed to the letter.

There is clear evidence that Malachite Green is something called a "teratogen", which means it causes deformities in the embryo or unborn animals. There are some links between the use of Malachite Green and cancer, so these chemicals need to be treated with caution. When mixing Malachite Green and Formalin as the Leteux Meyer mix the quantities added differ slightly from the use of either of these chemicals on their own as pond treatments, with proportionately less Malachite Green added to the mix. Once again, follow the manufacturer's directions. So far we have dealt with parasitic infections but what if we suspect the fish are suffering from a bacterial infection?

NO SUBSTITUTE FOR GOOD MANAGEMENT

Finally to re-emphasise the point

there is no substitute for good management which means monitoring closely the way the Koi feed and behave. Should it become clear there is a health related problem which is not parasitic or temperature related

guesswork and treatments which may be unsuitable or out of date and potentially harmful to the welfare of our Koi. For the pleasure these animals give surely this is a small price to pay?

On a worldwide basis White Spot annually kills more fish than any other disease.



then some form of diagnostic work is required.

If Koi have open lesions and ulcers it is worth contacting your local veterinarian and arranging an appointment for them to be examined and an appropriate treatment prescribed.

If there are no open lesions it might be necessary to sacrifice one of the affected Koi in order to identify the underlying cause and usually a suitable treatment can be prescribed.

It is important to realise that if Koi are suffering from a bacterial infection there is some underlying management fault and, needless to say, this must be remedied before the Koi will make a full recovery.

All too often we are quick to blame everyone but ourselves for an outbreak of disease. However, no matter what the cause of sick fish we have an underlying responsibility to look after them and restore them to health.

This may be costly in terms of professional fees but far better to be certain of the diagnosis and apply the correct medication than to use

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AIRMASTER

Airmaster, the award-winning patented aerator, specifically developed for Koi pools, has received a major vote of confidence with a substantial funding injection. David Short, the London born inventor, stated: "While Airmaster combines air and water with great efficiency, the technology can be applied to many other fluids. This potential has attracted serious interest and the investment has enabled us to intensify our efforts to introduce the product to Koi markets around the world." The aerator, which received the BIC Award for Innovation in 1997, has found a ready acceptance with Koi keepers keen to protect their fish from oxygen deprivation. More fish die from a lack of oxygen than any other cause. A narrow range of just seven or

eight parts per million of O₂ in pond water provides the spectrum for Koi survival yet many other factors make demands on this life source. With rapidly changing conditions — particularly during summer months — the Airmaster's facility to precisely adjust the aeration level enables Koi keepers to control the amount of oxygen in their pond. This feature, combined with a radically new way of designing a venturi, enabled David Short to obtain patent protection over his invention. Powered only by the flow from the circulation pump the Airmaster delivers oxygen to water with maximum efficiency and negligible energy cost. These features, plus additional design developments, have found ready support from investors alert to the many applications in industries

throughout the world where two or more fluids are combined. David Short's fundamental re-think of the age-old venturi has opened up exciting new possibilities in areas where conventional venturi technology is unable to meet requirements. Mr Short has joined forces with fluids management specialist, The Rochem Group of Switzerland to form a new company, Precision Venturi Ltd, to develop products, applications and markets growing from his invention. In addition to the existing British patent, intellectual property right protection has been filed in the US and other key countries around the world. Precision Venturi has opened a new office in Maida Vale, London, which will deal with both the aquarium market and subsequent developments.

Managing Director Jim Bellew stated: "We are open for business with old and new Airmaster customers and our first priority is to help Koi keepers safeguard the life and health of their fish. This rapidly expanding hobby needs sound information, simply and honestly presented — particularly those just starting to discover the joy of Koi. "We intend to make people aware of the importance of aeration and understand how easy it is to avoid accidentally losing fish."

• For further information please contact: Jim Bellew at Precision Venturi Ltd, 336 Harrow Road, London W9 2HP.
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ROY
ROSMINT says you can't beat some of the well-established Cyprinid species ...

photographs by A&P Library unless otherwise stated

Beguiling Barbs

A veritable kaleidoscope of beautiful colours and attractive markings. A variety of configurations and sizes almost guaranteed to appeal to those that appreciate truly traditional fish-shaped fishes. A generally peaceful temperament and a nature that is tolerant to a wide range of water conditions!

Add to these seemingly ideal aquarium characteristics those of interesting behaviour, omnivorous feeding habits and, in many cases,

a willingness to breed and you can probably only be talking about one particular group of fishes.

With such a list of favourable credentials it is little wonder that the collection of fishes popularly referred to as tropical Barbs have long been firm favourites among fishkeepers at every level of the hobby.

Here can be found something for everyone, no matter what their individual ambition, interest or experience. This applies just as

The "Schuberti" Barb is thought to be a man-made variety.

Checker Barbs, *Barbus oligolepis*, are ideal for the modest sized aquarium.



much to the seasoned veteran as it does to the complete novice.

Barbs are members of the Family Cyprinidae, the largest of all such classifications in freshwater fishes.

From the aquarist's point of view the Family can be categorised into two distinct sections: Rasboras, Danios and Minnows making up one, Barbs the other.

As Cyprinids they are also closely related to many of the fish species indigenous to the British Isles, and a much beloved and respected quarry of dedicated coarse anglers up and down the country. The superb rod-bending capability of the magnificently powerful Barbel (*Barbus barbus*) immediately springs to mind in this context.

Many popular inhabitants of the ornamental garden pond like the common Goldfish and the greatly prized Koi Carp are further examples of the numerous fishes that go towards making up the huge and diverse Cyprinidae Family.

In contrast to say Live-Bearing Tooth Carps, which include amongst their ranks firm aquarium favourites such as the Guppy, Platy and Swordtail and which, as a group, originate almost exclusively in the New World (the Americas), Barbs are found naturally only in the Old World with varieties of particular interest to the average aquarist restricted mainly to the continents of Africa and Asia.

As the name implies Barbs in most instances exhibit one or two pairs of barbels (barbules), though this should not be interpreted to be the case exclusively. These slender tactile spines or bristles hanging from the jaws are used by the fish to advantage especially when grubbing around for food in the substrate.



Tiger Barbs do not always have the traditional colour pattern; here is a red, "not quite albino" variety.

**PHOTOGRAPH:
LINDA LEWIS**

BEGUILING BARBS ... A well established Cyprinid species

Extremely accommodating

As mentioned earlier the majority of Barbs are not particularly fussy about water chemistry, adapting quite quickly to various acidity/alkalinity and hardness values. They are also generally extremely accommodating when it comes to water temperature, often able to survive a heater/stat failure that proves fatal to other less robust tropical species.

This is not to say, however, that liberties can be taken with water quality — they certainly cannot! The aquarium must always contain well filtered, generously-oxygenated water that is frequently refreshed through all-important partial water changes — in essence disciplines that should be applied as a matter of course to any branch of fishkeeping.

Barbs are a naturally shoaling species and will thus normally be seen at their best when in the company of others of their own kind. That said, this aspect does not seem quite as critical as for instance in the case of Characins, where denial of the shoaling instinct can bring about fairly rapid behavioural abnormalities.

Being omnivorous Barbs enjoy a varied diet consisting of both animal

and vegetable matter but again not all members of the group consume these in equal quantities. Some varieties require a higher percentage of vegetable material, whilst others need more animal protein to enable good health to be maintained.

Fortunately, with few exceptions, modern balanced staple fish foods will conveniently provide all necessary nutrients for long and healthy life in suitable proportions. In circumstances where an individual species has a predominantly herbivorous appetite supplementary edibles such as lettuce leaves or peas can be offered, in much the same way as with, for instance, Suckermouth Catfishes.

Inquisitive nature

As indicated by the sensitive mouth barbels these fishes are primarily designed for life on and around the bottom, though such is their actively inquisitive nature and swimming prowess they will frequently be seen happily exploring all levels of the tank. In fact it is these very characteristics that significantly contribute to making the Barb one of the most entertaining of all aquarium inhabitants.

Though Barbs possess teeth, their dentition is interesting and could certainly not be described as in any way conventional, for these are not located in the jaws. Food is taken in via the protrusible mouth and immediately transported to the throat. Here a pair of bones bearing up to four rows of teeth are situated. These extremely powerful structures take very effective care of all necessary mastication.

Moderate cost

Barbs are readily available to the aquarist at moderate cost in almost any good retail outlet. Species range from the small as in the case of the charming Cherry Barb (*Barbus titteya*), to the largest of the commonly kept species the Tinfoil Barb (*Barbus schwanenfeldi*), with virtually everything in between. So there really is something here for every tropical fishkeeper whatever size aquarium they possess.

Other firmly established favourites include the Rosy Barb (*Barbus conchonus*), Tiger Barb (*Barbus tetrazona*), Black Ruby Barb (*Barbus nigrofasciatus*), Checker Barb (*Barbus oligolepis*), Arullus Barb (*Barbus arullus*), Striped Barb (*Barbus fasciatus*) and the Filament Barb (*Barbus filamentosus*).

With the possible exception of the
...Continued pg44

Easy to breed Rosy Barbs, *Barbus conchonus*, have a wonderful coppery sheen when viewed under side-lit conditions.

PHOTOGRAPH:
GORDON WIGGINS



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BEGUILING BARBS ... A well established Cyprinid species

beautifully coloured and marked Tiger Barb, all these forms are generally non-aggressive and make ideal members of a suitable community tank; it is perfectly true that the Tiger Barb can sometimes prove troublesome in this respect through fin-nipping, but this problem is often exaggerated. A group of young specimens introduced together offer a generally better chance of harmony than is the case with fully-matured adults.

It is also worth pointing out that the Tinfoil Barb does not generally conform to the normal determinants of growth potential demonstrated by most fish varieties. That is to say a fish will usually grow only to a size commensurate with its surroundings so far as space is concerned. The Tinfoil Barb does not appear to have heard of this general rule of thumb and will consequently often continue to grow no matter what size the body of water in which it finds itself.

For this reason the unversed fishkeeper who purchases a juvenile specimen intended for a smallish tank can, before long, discover they have a monster on their hands, with all the inevitable problems that this will present! This is a fish that will also consume vegetable matter in considerable quantities so aquarium plants are often unlikely to survive.

A large spacious tank suitably

furnished with artificial plants and inhabited by similarly robust subjects is, therefore, essential for this attractive member of the Family.

Breeding

Broadly speaking, breeding members of the Barb family is a relatively straightforward business making them an ideal proposition for the newcomer to egg-layer spawning. Some species, however, prove far more difficult in this respect than others, so there is always a suitable challenge whatever level of the hobby is reached.

The Rosy Barb (*Barbus conchonius*) and the Tiger Barb (*Barbus tetrazona*), probably two of the most popular and frequently seen forms, demonstrate a general spawning behaviour pattern that can be taken as fundamentally representative of the family as a whole. They also show a marked contrast in degree of difficulty. The former variety being one of the easiest to breed, the latter often considerably more demanding.

Sex identification of Barbs in most instances is fairly straightforward, though there are exceptions. Generally females exhibit a

noticeably plumper body and less intense colouration when viewed alongside males. In species like the Tiger and Tinfoil Barbs such differences are, however, far less apparent.

Behaviour is also often a good aid to sex recognition with mature male fish frequently showing off to other males and interested females with displays of fin and body flexing whilst swimming in a circle around them.

Once in spawning condition males in most cases take on distinctive intensification of colour whilst females quickly become heavy with roe and consequently much deeper-bodied. A particularly good example of this male breeding barb is seen in the appropriately named Cherry Barb, where the fish dons a strikingly brilliant cherry red colouration.

In any event, a breeding attempt is best made by acquiring a group of six or more young fish of the chosen species, preferably from more than one source to reduce the possibility of them all being related. These can then be grown on to maturity at which time the sexes should be separated to prevent uncontrolled spawnings taking place.

A suitable breeding tank should be set up in readiness of spawning. Clearly the size of this will be determined by the species

concerned, but in any case it should not be too small, these fishes frequently engage in much highly-active chasing.

Barbs lay adhesive eggs, which, after the spawning ritual is over (and sometime before) are regarded by the parent fish as an edible delicacy. Consequently if left to their own devices huge quantities will be enthusiastically consumed. For this reason, the parents must be removed from the breeding tank as soon as spawning is completed.

The male Cherry Barb, *Barbus titteya*, puts on a bright red appearance when ready to breed.

PHOTOGRAPH:
LINDA LEWIS



Breeding trap

This of course requires the aquarist being around at just the right time. If this is unlikely to be possible and it is desired to save a high percentage of the spawning some form of breeding trap will be necessary.

Such a device can take many forms, though the most commonly used is probably one constructed from suitably gauged netting which can be suspended in the tank, still allowing plenty of free swimming space, but through which a good proportion of the eggs can drop to safety.

Some sort of spawning medium should be incorporated in the breeding tank, this can be either artificial or natural. If real plants are to be used for this purpose those bearing fine leaves are best. Varieties such as *Ambulia* and *Cabomba* are an excellent choice.

If an artificial medium is preferred, highly satisfactory spawning mops can be simply manufactured using nylon wool or soft string knotted to a suitable weight. Various other fibres such as coconut fibre can also be effectively used. Remember that all materials must be thoroughly cleaned and scalded before use.

When all is ready, the separated parents can be brought into fine

breeding condition with a varied diet of high protein food. First introduce one or two ripe females to the breeding tank gradually increasing the water temperature a few degrees above that of the aquarium in which they have been previously housed. After a couple days the male fish can be added, preferably in the evening.

Spawning frequently takes place in the early morning within thirty-six hours of the male's introduction, depending upon species. Exposure to direct sunshine can often act as a trigger, as can a partial water change. If nothing has happened within three days the fishes should again be separated and the procedure repeated a week or so later.

Hatching of the fry normally occurs in 24 to 48 hours when the tiny fish can be seen hanging on the glass and spawning medium. For a further 48 hours they will draw nourishment from the yolk sac after which time they must be provided with copious quantities of infusoria if they are to survive.

Cultures for this purpose must be prepared in advance at just the right time. The fry will live contentedly off these infusorians for about another five or six days when newly-hatched Brine Shrimp, etc., can be offered. After a further four or five days this can be supplemented with other

recognised fry foods.

Creating the right conditions

As mentioned earlier the "degree of breeding difficulty" presented by Barbs extends across the whole range, from those considered quite easy through to the extremely demanding. That said, it is all about creating conditions for the fish in which they feel favourably inclined to reproduce.

Sometimes apparently easy forms will just not respond according to established textbook programmes if that "certain something" is missing, whilst seemingly more challenging varieties appear to spawn without much difficulty!

The message then is do not be deterred from trying simply by reputation. You have absolutely nothing to lose! Who knows you might just achieve something outstanding! As a group, tropical Barbs provide the fishkeeper with a veritable wealth of colour, interest and opportunity for a whole range of differing aquaria.

Little wonder then that they have so long remained such established favourites with all who have experienced them!

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Tropical

Q I am writing for advice on the best set-up for my tropical tank. I am thinking about having some Crabs and Lobsters in the bottom of the tank plus maybe a Thai Frog. What fish would accompany them best and what do Crabs live in and eat?

A The Freshwater Lobster is actually a Crayfish, *Astacus fluviatilis*. In Europe it is produced commercially in large numbers for eating. It is commonly called Red-Claw. There is a White Claw, *Astacus pallipes* native to Great Britain which is too small for eating.

Red Claw needs clean, oxygenated water (heater is not necessary but use an airpump and airstone to make the water oxygen rich). They are scavengers and so will eat anything, from Flaked Fish Food to kitchen scraps. They will also eat live fish, not by predation but by nipping them whilst the fish are sleeping, so any exotic fish in the aquarium are always at risk. They will also eat each other, so if a pair are kept they need to be always well fed! To breed, look at the thorax underparts. A deep groove is present only in the male. Pairing takes place annually — the autumn — when the male will upend a female and smear

sperm on her abdomen. She will then hide in a burrow (which must be supplied) and lay 100 pink eggs which she will collect in her swimming legs. There they are in contact with the male's fertilising liquid and start developing. The female carries the eggs all winter and they hatch in the spring to give tiny Crayfish identical to their parents. They cling to the mother until able to fend for themselves. Feed on the same diet as the parents.

If you want to mix with fish, the Crayfish may accept a large Goldfish or Cichlid, but small tropicals may get the "chop" as soon as the Crayfish grows large enough. Similarly, Crabs and Lobsters (Crayfish) will not co-exist in the confines of the aquarium — one will eat the other.

Marine

Q How does live rock benefit an invertebrate tank and, if it is what it says, it is "live" — how can it be shipped dry and still retain the title of live rock?

A Live rock can be thought of as coral rubble that has become detached from the reef and fallen to the sea bed. Being a natural part of the reef it will contain many diverse life forms. Shipping the rock with water would give rise to massive air freight costs.

Although it is transported dry it is packed in plastic liners and so retains a high moisture content allowing many of its life forms to survive. Many of these life forms will exist as larvae and appear in your tank many weeks later.

Obviously macro life will die and decay during transportation, e.g., Sponges and Soft Corals. If on arrival at their destination they are placed into an established aquarium they will cause wholesale pollution of the water, so before use in an established aquarium live rock has to be cleaned and cured in a separate tank by the wholesaler, retailer or aquarist. Good live rock has a decent amount of encrusting pink coralline algae and such a grade is much sought after, even at great expense, by reef aquarists. In addition to supplying an interesting array of life forms it plays a large role in biological filtration. In a well maintained tank with very low fish stocking levels, it can supply the entire filtration capacity for a tank. Prices will vary greatly depending on the grade of rock. Examine the rock carefully: just because it is being sold as living rock does not guarantee good rock. Use a reputable dealer to ensure you do not pay top flight prices for basic grade rock.

Coldwater

Q I want to find out about breeding my Shubunkins. I need to know how you recognise the sex and what to feed them on. Also I need to find out when their season is.

A Shubunkins are, of course, a variety of Goldfish, and breed in the same way as all other Goldfish. If they are kept outdoors in a pond the spawning season will occur in early spring and continue through the summer — indoor fish can spawn at any time of year. My Goldfish spawned, thoroughly inconveniently, one Christmas Eve! When males are ready to spawn, they will have small

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white pimples on the operculum (gill cover) and the leading edge of the pectoral fins. This is not the onset of White Spot or some other horrible disease — these pimples are entirely natural, and are called tubercles. You can identify males by these. Female fish are less easy to identify, but if you look down on them from above they tend to be fatter than the males, and usually look lopsided — one side of the belly is fatter than the other. This is where the eggs are being held. If you know you have a male and female fish, watch for them chasing one another in the tank. One or more males pursue a female, bumping her from behind and the sides to try to get her to release her eggs. If the tank contains any sharp or rough edges, females can be severely damaged by being pushed into them. When the fish are chasing, add lots of plants such as Elodea, or artificial spawning materials such as bunches of wool. You can buy artificial plastic spawning mops at the aquarium shop. Lower the water depth to about six inches one evening. Next morning the fish should spawn. The plants, spawning mops, and indeed everywhere will be liberally coated with small adhesive eggs. Once spawning slows or the fish start eating the eggs, you will need to move either the eggs (by moving the plants) to a new tank, or to move the adult fish, otherwise the eggs will all be eaten. After a few days the little fry will hatch, and cling to the sides of the tank like little silvers of glass. Shortly after that they will become free-swimming. You will then need to feed them. Proprietary food for egg layer fry is available from aquarium shops. They will also appreciate newly hatched Brine Shrimp and will grow rapidly. You will have a LOT of fry, so you will almost certainly need to cull them regularly, removing some to give the others space to grow. As they gain colour you will see they are all greyish brown — they will not get their bright Shubunkin colours until they are much larger, so don't worry that all your fry are going to grow up grey!



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Meet the Societies

Yes, there is a place called Strood and it should not be confused with a similar sounding town in Gloucestershire. To put the geographic record straight, Strood is just across the River Medway from Rochester — look left as you are about to cross the Medway Road Bridge going east and you can't miss it!

Strood & District A.S. was originally formed as "Elliott's A.S." and was based at the old Rochester Airport. After being a "works" club they decided to change names and venue and became Strood. As clubs in the area folded so several of their members joined, Medway, Mid-Kent, Tonbridge, Orpington and North Kent Societies have all contributed members to Strood.

As if to put something back into the hobby Strood Society has probably provided, certainly in recent years, more Council members of the F.B.A.S. than any other Society. Sid Finnis, Tony Noronha, Ken Saxby, Bill Hastings, Bob Lemmon, and (currently) John Pell and yours truly, have all had the privilege to become involved in the organisation of our hobby.

We have enjoyed the intense rivalry with other societies battling not only for the "Highest Pointed Visiting Society" Award at Open Shows but also against the same opposition during the various quiz championships — no quarter asked for or given and always remaining on the best of terms afterwards whatever the result.

Our Open Show prowess has declined a little over the last few years but make no mistake Strood will return! We hope to meet all our old friends(?) in competition and enjoy, with you all, the "wind

ups" that go on! So, are we all show-mad or what? Nothing could be further from the truth.

Within the society we have several highly experienced fish breeders who, between them, seemed to have spawned almost everything that can be kept in the aquarium. On the other hand we have also had our fair share at the "artistic" end of the spectrum with many fine wins in the Furnished Aquaria and Aquascape /Tableaux Classes, too.

Remember our eight feet long Canal Boat at Alexandra Palace in 1989 or Thomas the Tank Engine at BAF in 1990 where we also took Best in Show? Then there was our large Aquascape exhibited at the Pet Show at Earls Court in 1992 with repeat performances at Hampton Court Flower Show and, of course, at Weston.

A highly popular event each year is the trip to Holland for buying fish and generally enjoying ourselves; we also take part in joint activities with KAAS such as an aquatic presentation at Chatham's Historic Dockyard to bring the hobby to the attention of non-fishkeepers.

Our meetings are quite informal (the hosting licensed premises is no doubt to blame) and we regularly engage guest speakers for the benefit of our members. We meet at 8pm on alternate Tuesdays of each month at the Weston Arms Public House, Weston Road Strood.

For details of our next meeting please contact our Secretary, John Pell, on 01634 389362.

Society President Pete Cottle introduces
STROOD & DISTRICT AQUARIST SOCIETY

DAVE GARRATT explains how this form of undergravel filtration works quite happily "t'other way round" ... *photograph by A&P Library; graphics courtesy of Interpet Publishing*

Reverse Flow Filtration

Undergravel filtration has been with us for many years and is still the means of filtration adopted by many newcomers to the hobby. Indeed, anyone who has read my opinions over the last 18 months or

so will already know that, despite having not used it myself for many years, I retain a healthy respect and am a keen supporter of the system.

I do not wish to reiterate this information here, instead I would suggest the March 1997 issue of

A&P should you require an overview of conventional undergravel filtration.

Conventional undergravel filtration is usually run by powerheads, sitting on top of uplifts connected to the undergravel plates. The powerheads



If the aquarium is crowded out with reef materials maybe the only place for an internal filtration system is beneath the substrate.

REVERSE FLOW FILTRATION ... Undergravel system

pull water down through the sand bed, up the uplifts and then return it to the main body of the tank via the powerhead outlets.

However, such a system does have a major drawback.

The drawback of conventional undergravel filtration

By its very nature conventional (or downflow) undergravel filtration, will constantly pull debris down into the sand as it draws the aquarium water through it. This debris will coat the coral sand and eventually will begin to aggregate the particles.

As this coating builds up and binds together it will reduce the surface area of the sand particles. To produce a thriving population bacteria need a surface to which they can adhere.

Therefore, reducing the surface area available for colonisation reduces the potential population they can achieve. The biological filtering capacity of the bacterial culture within the bed is thus reduced.

Secondly, the aggregation of the sand particles will form channels in the bed. Water will always find the

easiest route and so the water being drawn through the bed will take the easy route and pass quickly through these channels.

This will produce a minimum of contact time with the sand particles, and so to a large extent the water will avoid the biological activities of the bacteria. To summarise: as the filter bed gets clogged its efficiency diminishes greatly.

This decline can be slowed down appreciably by regular maintenance of the filter bed. On a monthly basis gently rake the top layer of coral sand in the bed. This allows the debris or detritus to be dislodged from the filter bed. The debris is then allowed to settle on top of the bed from where it can be easily siphoned off to waste.

On a long term basis you should look to constantly renew the sand within your bed. This is done by removing the top half inch of sand from about 25 per cent of the surface area of the filter bed every six months.

Work along the tank taking a quarter of the tank floor in turn each six months thereby renewing your bed on a two year rotation. In this way you help keep a filter bed with a healthy bacterial population as opposed to an old jaded filter bed whose particles have become less bacterially-active because of an accumulation of waste.

Reverse flow undergravel filtration

Reverse flow goes a long way to eliminating the major problems of the conventional system and is therefore a more efficient option for an undergravel system.

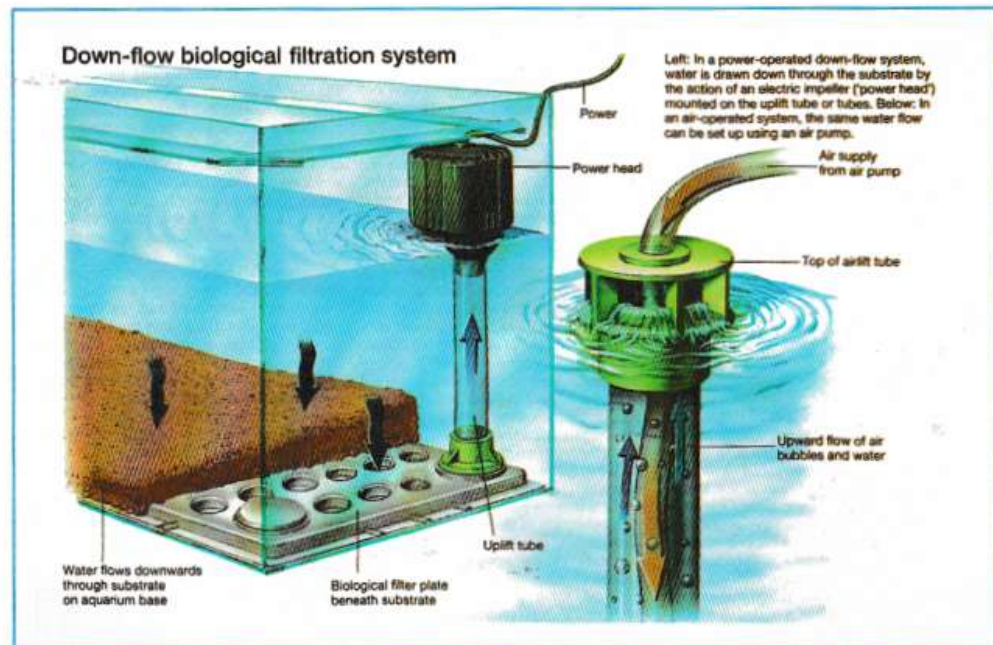
(a) Run by an external power filter

Reverse flow is usually powered by an external power filter. The water is drawn into the power filter and the filter's return pipe is used to return the water DOWN the uplift tubes and under the undergravel plates. The circulated water then percolates up through the filter bed ensuring debris is not sucked down into the coral sand.

The turnover rate is the same as that required for conventional undergravels — three times the tank volume per hour, measured when the power filter is fully packed, not when it is empty.

(b) Other means of powering the system

With a little ingenuity, and some improvised home made pipework and mechanical filtration, you could probably power the system by power heads or internal power filters. However, they would require very regular maintenance and would



probably be difficult to manage successfully.

The powerheads would sit on top of the uplifts, but at a 90 degree angle to the usual position, i.e., the outlets would point downwards inside the uplifts. It would be more difficult to construct an efficient means of mechanical filtration.

They would also be obtrusive and difficult to hide and would probably be physically difficult to service. You would also disturb the tank much more during your maintenance. Finally, they would not have the scope to match the efficiency of the external power filter.

A further way to power a reverse flow system would be to build all the filtration into one sealed off end of the tank. Water could be drawn by the powerheads situated in the filtration compartment, through an inlet, into the compartment.

All filtration and water treatment could be done in this compartment and the filtered water pumped out under the undergravel plates to return to the main tank. For most people building such a tank would be a job for the professional tank builder and not a DIY job.

The advantages of the external power filter

The tank would be expensive although it would have the advantage of having all the

equipment housed out of sight at one end of the tank, even the protein skimmer could be built in.

The external power filter type of filtration has a distinct advantage over the powerheads or compartment type — it can be easily cleaned on a regular basis. This means a great deal of particulate waste can be trapped and removed quickly and easily, on a regular basis, before it begins to break down, thereby reducing the load on the filter bed.

To be successful you will require very good mechanical filtration as you do not want to pump debris under the filter plates. Whatever debris and waste there may be in the tank should be trapped by the efficient mechanical filtration of the power filter. It can then be easily removed by regularly cleaning out the power filter.

This high quality mechanical filtration can only be achieved by well packed power filter, i.e., one that is layered with successive grades of effective filtering material.

Summary and potential pitfalls

Reverse flow deserves consideration as an alternative to the conventional down flow undergravel. It has advantages over the conventional system that merit careful consideration as an alternative approach. However, it does have a few potential pitfalls

that the aquarist must guard against:

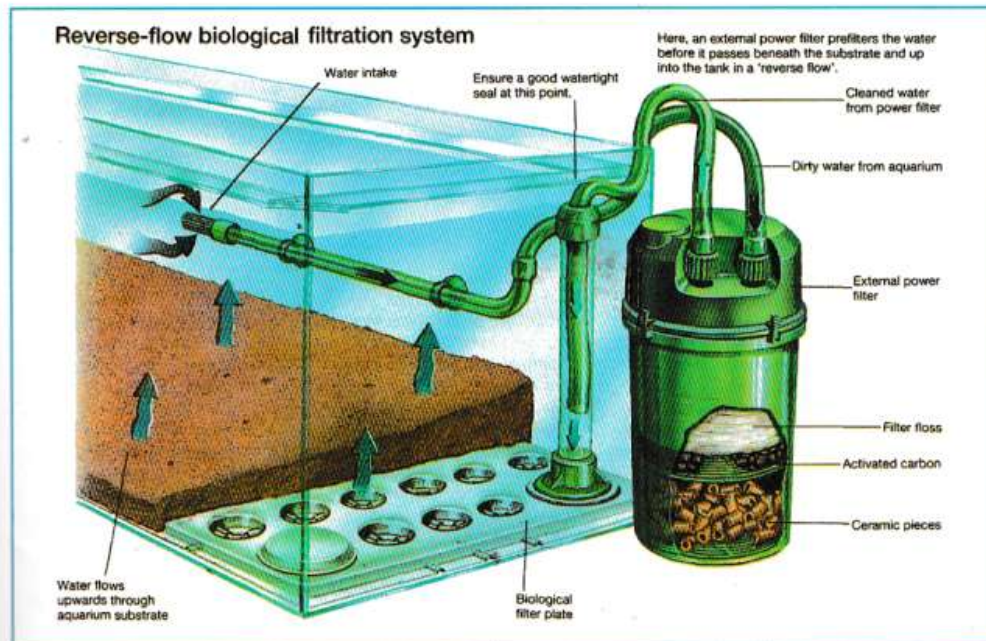
- A powerful air-pump, or a powerhead positioned with its outflow breaking the water surface, is essential. This allows efficient gaseous exchange at the water surface/air junction and is a vital function. Reverse flow does not provide this disruption of the water surface hence the need for the air pump or powerhead.

- The returning water may form channels as it rises through the coral sand. A regular gentle raking of the top layer of the bed, as you would for a conventional system, should avoid the problem. Some authors suggest this problem can also be alleviated by using coral gravel as an alternative to coral sand.

- The filter plate must be tight fitting by extending to the very edges of the tank so as not allow the returning water to escape around the edges of the filter plates.

- The system requires the same throughput of water as a conventional downflow system. Bear this in mind when assessing the turn-over of the power filter. You must take the turnover figure when the power filter is under load and not when the power filter is empty.

- As already mentioned, the system requires excellent mechanical filtration and this is probably most easily achieved via an external power filter.



BOB & VAL DAVIES'S FROGS & FRIENDS

HERP FACT FILE

"The Protection Business"

One only has to watch wildlife films to realise that nature is not all pretty flowers and cute animals but really is 'red in tooth and claw' with well-established food chains starting with plants and working upwards through various sequences of predators and prey.

Reptiles and Amphibians display numerous defensive strategies. In some cases sheer size protects against predators as in Crocodilians, Komodo Dragons and large snakes although juvenile stages are vulnerable to predation. Inflating or laterally flattening the body to make it look bigger is a tactic employed by some smaller species.

Venomous snakes would be assumed to possess the ultimate deterrent but in many cases they are attacked and eaten — venom is thought to have originally evolved for capturing prey rather than as a defensive mechanism and is less often used for the latter purpose than the former.

Toxic or noxious skin secretions, sometimes accompanied by warning colours occur in some amphibians just as some venomous snakes possess distinctive colouration. Mimicry of warning colours occurs in both snakes and amphibians.

Retaliation with teeth, claws or tail is seen among Lizards but defence is often passive (or at least initially) in which case speed, camouflage or concealment may be used. Nocturnal or fossorial (burrowing) activity may well have evolved to evade predators although amphibians may have adopted this to avoid desiccation during the day — night time is usually cooler and more humid.

Possibly the ultimate in passive defence is the shell of Chelonians which are often camouflaged as well. Like the knights of old, who withdrew to their castles when attacked, Tortoises and Turtles are relatively safe inside their individual fortress — but not always; one species of Vulture actually takes Tortoises up and drops them from a great height to split the shell. Dogs will sometimes gnaw through the shell to get to the contents.

Chelonian shells are not always hard and do not always provide complete cover. Softshell Turtles are relatively vulnerable and species such as Alligator Snapping Turtles and Snapping Turtles



Redfoot Tortoise (*Geochelone carbonaria*). A safe stronghold which had ensured survival for millions of years. PHOTOGRAPH: BOB & VAL DAVIES

have reduced shell coverage but make up for this with an aggressive nature and strong jaws.

Aquatic species tend to have lower, lighter shells to aid swimming; terrestrial species generally have higher domed and much thicker, heavier shells which is evident if adult specimens of Leopard Tortoises or Redfoot Tortoises are examined. The leading edge of the plastron in the latter is two inches (13mm), even thicker in Leopards.

Implications for the keeper mean a calcium-rich diet plus adequate D3. Artificial sunlight (full-spectrum fluorescent light) or natural sunlight when possible aid calcium metabolism needed to build shell (and bones). Chelonian shells should never be painted, varnished, polished or oiled. They need to be kept clean with regular gentle scrubbing.

Outdoors

Although the wet winter made life miserable for the unfortunate people whose homes were flooded it had a positive effect on our Frog pond which had developed a thick layer of mud and had been murky for practically all of last year.

In addition, Blanketweed had also started to develop and autumn leaf fall had aggravated the problem. However, the heavy rain was

diluting the murky broth making it clearer.

Taking advantage of a rainless and relatively mild day towards the end of January the leaves were removed with a net, the mud scooped out using an old pan and the Blanketweed (or much of it) came out as the dense plant growth was culled and placed on the compost heap.

Contrary to expectations (and previous experience) no

overwintering tadpoles or newt larvae were found but large numbers of the Water Hog Louse (*Asellus aquaticus*) were picked out and returned to the pond. Two Frogs were disturbed; their croaking was probably a protest rather than a desire to mate.

A few days later croaking was heard and on February 6 a pair seen in amplexus. Severe frosts followed. No further activity was seen until February 19 when, with an air temperature of 9°C (48°F) two pairs of Frogs were seen in amplexus with three other

males splashing about.

More rain followed the clean out; this topped up the pond and within a few days the bottom was actually visible for the first time in many months.

Although not the most pleasant job for January removal of the nutrients, plus dilution by rain, has worked wonders; no "green water" has developed although one of the neighbouring fish ponds soon began to resemble pea soup as lengthening daylight stimulated the algae. This will probably be next in line for cleaning out.

◀ Continued from page 53

one end will be used.

These Lizards are easy to feed, eagerly accepting dusted insects (of the appropriate size), earthworms, large snails and for sub-adult and adult specimens an occasional defrosted Rat pup.

Adult Water Dragons are impressive creatures, up to 36 inches (90cm) long.

Colouration is bright green. Babies have a bluish hue on the shoulders and light green, diagonal body stripes. Scales on the body are small which gives the skin the appearance and feel of smooth fabric.

Males are usually more robust than females with a larger crest and prominent femoral pores. The large scales around the jaws and neck are more brightly coloured than in females.

If obtained as babies and handled frequently Water Dragons tame very quickly and remain so when adult and, although reasonably large, do not pose the same problems in terms of size and behaviour as Green Iguanas do when fully mature.

BOB & VAL DAVIES'S FROGS & FRIENDS

Native species

The latest *Herpline*, No. 7 (newsletter of Herpetofauna Groups of Great Britain and Ireland) contained various interesting items concerning native species. A study among Kent Secondary School pupils suggests that keeping wild-caught native species is fairly common. Apparently Slow-worms and Frogs were most popular.

Data also suggests that mortality is quite high — probably due to lack of knowledge of their requirements.

Another study has shown aggregation (shoaling) behaviour in Common Toad

tadpoles when fish chemical clues are present and when siblings are present. This points to a complex olfactory system.

Although not a native of Ireland Slow-worms have been reported on several occasions in Barren, Co. Clare — an area of karstic limestone in the west of Ireland. Further investigation is continuing.

St. Tiggywinkles (The Wildlife Hospital Trust) is willing to handle reptile and amphibian casualties. Tel: 01844 292292 for further information.

For anyone feeling energetic and interested in conservation work groups exist throughout the country — new groups are

still being formed in certain areas. Training courses are occasionally organised and regular meetings held for herpetological workers.

Details of groups are available from: Froglife. Tel: 01986 784518. Fax: 01986 784379. e-mail: jim@tritonhouse.demon.co.uk.

Diary Dates

April 25: International Herpetological Society Reptile Fair at the Alumwell Sports Centre, Primley Avenue, Walsall. (A few minutes from Jct 10 on the M6). This is in addition to the normal September Fair.

June 2: Milton Keynes Herpetological Society Annual Exhibition and Trade Fair At Lord Grey School, Bletchley. For further details and directions contact Karl Webb. Tel: 01908 614131; or Alan Prudham. Tel: 01234 342538.

August 1: Doncaster Reptile Fair at Adwick School, Windmill Balk Lane, Adwick-le-Street, Doncaster. For details telephone 01908 614131.

NEWSDESK

Tropical Seas Name Change

Chris Denmark writes: "Due to our recent company name change from Tropical Seas Limited to San Francisco Bay Brand Ltd, our e-mail address has changed accordingly to sfbb@compuserve.com

Our correct mailing address is Unit R2, Horsehay Estate, Horsehay, Telford, Shropshire TF4 3PY. Phone or fax numbers are the same at 01952 505052."

Bradshaws Changes

York-based Bradshaws Direct, specialist suppliers of water gardening products, has been taken over in a management buy-in deal for a substantial undisclosed sum. The new management team, which consists of Managing Director, Andrew Ferry, and Commercial Director, David Fordham, suggests other acquisitions could also be on the agenda.

Speaking about the MBI Andrew Ferry said: "Bradshaws is the leading player in the water gardening market

which has been the strongest growing sector in the gardening products market in the last five years. We recognise the consumer interest in this market and it is our intention to consolidate and grow the business by expanding and diversifying within the gardening and related markets."

Bradshaws Director has been established for over 19 years supplying products by mail order to the whole of the UK. The company currently employs 27 people and has a strong nationwide customer database.

The management buy-in team has

been supported by organisations across the North of England. Risk capital was provided from The Royal Bank of Scotland's venture capital trust fund, based in Manchester, and debt finance from Lloyds Bank in Hull. Advisors to the deal were Leeds-based BKR Haines Watts Corporate Finance and solicitors Read Hind Stewart.

Further information from: Kathryn Williamson or Claire Ramus, The Barr Agency, Brookfoot Court, Brookfoot Mills, Low Lane, Horsforth, LS18 5PU. Tel: 0113 259 6600. Fax: 0113 259 6611. E-mail: pr@barr-agency.demon.co.uk

AQUARIST & PONDKEEPER

IS
75
YEARS YOUNG

... and to celebrate this publishing landmark our special Anniversary Issue in August will feature news and articles from bygone years. So we would like to hear from you with your interesting stories or memories spanning back over this period.

Any photographs sent in will be returned.

Send your stories to: Inline Magazines Limited, Suite 4, Invicta Business Centre, Monument Way, Orbital Park, Ashford, Kent TN24 0HB.

(To arrive no later than June 28 1999)

Kathy Jinkings logs
on for more Internet
Fish Information

CAUGHT IN THE NET

Soon, thankfully, summer will be upon us, and pondkeepers will once more be able to enjoy sitting by the waterside watching the fish, while the water plants resurrect themselves from bare roots to flourishing greenery. The shops will also reflect the start of the new season, and among the tanks of Goldfish and Koi will be many thousands of Sterlets and Sturgeon ready for dispatch to garden ponds.

While my email regularly contains pleas for help in re-homing giant Plecs, Redtail Catfish, Gouramis and the like, it has never contained a plea from a desperate owner of a huge Sturgeon.

Although many letters start "I have just bought a Sturgeon, how big will it get?" no-one ever writes to say that their fish have attained an inconvenient size. The conclusion appears to be unpleasantly obvious — the real answer to the question is usually "it won't get very big at all, because it is going to die".

This month's column is, therefore, a search for information on the ancient fish who so often meet an untimely death in garden ponds; so that those thinking of buying one can be warned, and those who realise that they are impractical pets can still find out more about these fascinating fish.

Anyone thinking of buying one should be aware that Sturgeon and Sterlets are covered under the new MAFF regulations; although at present a general licence held by MAFF covers all hobbyist keepers of these fish, this is only guaranteed to last for five years, after which hobbyists may well require individual licences.

You can find out more about the regulations at <http://www.maff.gov.uk/inf/newsrel/1998/981014a.htm> — it is a good idea to check this if you keep any coldwater or temperate fish apart from Goldfish and Koi.

As a first stop, we visit Aquaria Central again, where there is a page of information at <http://www.aquariacentral.com/fishinfo/cold/sterlet.htm>. This presents a reasonable array of facts, including the length of the fish at 36 inches, their life expectancy (100 years plus, in good conditions) and their favourite diet of Tubifex, snails, and small organisms. It does not, however, point out the amount of Tubifex required to feed a three foot long fish, an idea putative keepers should consider at length.

At the Society to Save the Sturgeon, <http://www.321website.com/members/home/data/aquaculture/sturgeon.htm>, you can read about the problems this fish

is having in the wild, and the ways in which the Society is trying to help.

This page also includes a lot of information about the Common Sturgeon, *Acipenser sturio*, including its adult length of six metres. For those who are seriously interested in the fish, joining a society like this is a much better way to find out more than by attempting to keep them.

At least one Sturgeon has made it to a safe home where he can live and grow in peace. The tale of Herman the Sturgeon and his move to a new pond is described, along with photographs, on several pages starting at <http://www.oregonlive.com/todaysnews/9812/st120302.html>.

The Sturgeon Page, at <http://www.worldstar.com/~diarson/>, is an attractive site with lots of information on various aspects of Sturgeon, and a picture of a monster fish on the first page lets you know just what sort of animal you are reading about far better than simple measurements.

The FaQ answers some general questions about the Sturgeon, summing up the species, and their history (briefly). In Sturgeon Species of the World there is a list of all the species and subspecies, along with their scientific names and home waters.

From here you move to "Sturgeon species of North America", which consists of a menu on the left of the page which links to fact sheets from other sites which appear on the right. Most of these have photos, and there are two links for each Sturgeon, so that if a link is broken (which at least one is) all is not lost.

It is quite easy to get sidetracked moving around some of the links from these fact sheets, many of which stress the endangered status of all the species. "Sturgeon species of the Columbia River" contains extensive information — don't miss the "Next" link at the bottom of the page, which takes you through pages discussing the biology and life history, fisheries, and current research. Fishermen will enjoy the Sturgeon fishing pages, although they are likely to find the opportunities somewhat limited in the UK.

Under the "Conservation" header you will find extensive conservation links, plus the history of caviar and a report on mysterious Sturgeon deaths in the Fraser river. If, after all this information, you still believe this fish is for you, then the section on Sturgeon in Aquaria provides advice on aquaria, care and feeding, and salt baths.

Finally, anyone who wants to talk to

other Sturgeon enthusiasts can leave a message on the message board. The topics under discussion range over both fishing and keeping of Sturgeon.

For those seriously interested in the Sturgeon family, a visit is recommended to the Sturgeon Specialist Group, at <http://www.sturgeons.com/>. Here you can find out about the latest discoveries and news, as well as finding a list showing the latest conservation status of the Sturgeon species.

At the Lake Sturgeon project, http://www.fws.gov/r3pao/alpena/p_sturg.htm you can read about the work that is being done to protect the once abundant Lake Sturgeon, and more about the fish. One tagged fish made a journey of 650 miles to reach Lake Erie, successfully navigating 14 dams and locks!

The Paddlefish is a close relative of the Sturgeons, and its roe is also used as caviar, sold as "grey pearl caviar". Although not such a frequent pet store and garden centre offering, nonetheless shows up fairly regularly. Very little information about them appears to exist on the Internet, so it not surprising that many people buy these monsters for home aquaria.

A page of information for fishermen can be found at <http://www.trumaninfo.com/lakeinfo/MDC/PaddleFish.html>, which contains information of interest to aquarists. The fact that the Paddlefish is a filter-feeder which eats plankton should give anyone pause for thought.

More information can be found at <http://www.nais.ccrs.nrcan.gc.ca/schoolnet/issues/risk/fish/efish/paddifish.html> in the form of easily understood short facts about habitat and lifestyle of the fish.

Both Sturgeon and Paddlefish, as well as being unsuitable for home keeping, are endangered fish. This is due not only to overfishing, but to the environmental impact of other human activities such as the construction of dams and pollution.

Next month we will be looking at some of the other fish that are endangered by human activity, and some of the web sites of organisations set up to help. If every aquarist contributed to just one effort to preserve the habitat of his favoured fish, there would be a much better chance that our children will enjoy the same diversity of species, both in our tanks and in their natural habitat, that we are able to enjoy today.

Kathy Jinkings (British Aquatic Resource Centre — <http://www.cfkc.demon.co.uk>). (AquaSource International — <http://www.aquasource.demon.co.uk>)

Famous Faces in Fishkeeping

A&P: How long have you been in fishkeeping and what started you off?

BG: I have been fish keeping since 1979, when I set up a tropical tank. I entered the hobby when my son, then a schoolboy, swapped a prized possession for a four foot tropical fish tank which he set up in his bedroom. My wife and I were not pleased and we informed him that "if they start to smell — they go!" When he went out for the evening, he would return home and say to us: "You've been sitting in my bedroom again watching the fish." This was rather obvious as there were two "bum impressions" on his bed by the tank.

A&P: Can you remember your first aquarium and what you kept in it?

BG: We were so impressed with my son's tank that our own six foot tropical tank appeared in no time, and we have never looked back since. The tank remained as a tropical feature until 1987, stocked with Angelfish, Silver Dollars, Pangassius Catfish and a whole host of other interesting types. Against all odds we managed to breed the Angelfish, Dwarf Cichlids, Mouthbrooders, and Kribensis. During 1987 we were converted to Koi, the tropicals went, and were replaced in the tank by some more interesting "living jewels". Our first Koi pond is the feature that we still have today, an 8,000-gallon formal design. This has never been altered since the day it was completed. The best advice that I took was to "build it big and build it well". I have never regretted heeding that advice.

A&P: What are your special interests?

BG: My special interests are, in order of preference: Studying Koi and all about them. You never stop learning and nobody knows it all. Writing about Koi and their environment. Photographing Koi, Koi ponds, and associated equipment. Attending Clubs and Koi Shows, giving talks or question and answer sessions. Attending Koi shows in the company of Lincolnshire Koi. Anything else associated with Koi!

A&P: Are you into breeding?

BG: I am not really into breeding as the results from Koi are seldom worth the effort. I have once successfully reared a spawning, just to prove I could do it, and still have some of those Koi in my pond today.

A&P: Do you belong to any Aquatic Society.

BG: I belong to the British Koi Keepers Society, the Nottingham Section of the BKKS, the Nishikigoi Society, and the Witham Valley Koi Society.

A&P: What do you think about Fish Shows?

BG: I like the atmosphere of Koi Shows, and the principle of showing Koi. However, I feel that those committees organising shows do too often not appreciate the important aspects of water quality. Therefore, I would like to see shows held as dealer spectacles, where only dealers' Koi were on exhibition, and the centre vats for competing Koi were dispensed with.



A&P meets the faces behind the names and lets them tell you of their own individual aquatic interests.

This Month:
BARRY GOODWIN

A&P: If money was no object what aspect of the hobby would you like to follow?

BG: I have had it planned for some considerable time what I would do if money was no object. It is my ambition to set up, in conjunction with Paula Reynolds of Lincs Fish Health, an organisation known as "Camp Koi". This would be a hotel and Koi complex with lecture and entertainment facilities where Koi keepers could stay for extended Koi-teaching seminars. They could suffer nothing but Koi, Koi, Koi, and more Koi for days on end.

A&P: What fish would you never keep and why?

BG: I would only keep Koi in my pond. I would not mix them with other species because it is often necessary to treat Koi against ailments such as parasitic invasion. Not very many other species of fish are compatible with Koi remedies or medications.

A&P: What's your favourite fishkeeping book?

BG: This is a leading question. I have to say that my own book, *The Enigma of Koi*, which was published three years ago, is really my favourite! Why? Well, not for reasons of vanity as you may suppose, but I firmly believe that it is the only book on the market that approaches Koi keeping from a straightforward point of view, that can be appreciated by both beginners and older hands alike. It is dedicated to the Koi

keeper and his problems, and not to the aggrandisement of the fish themselves. That's why I wrote it!

A&P: How do you think fishkeeping is keeping up with other modern day attractions?

BG: Koi keeping as opposed to general fish keeping is a "see-saw" hobby and it always has been. There seem to be very few long-term love affairs with Koi. People come into the hobby, run into problems and give up immediately. Others surmount these problems and go on for a number of years before giving up, whilst others such as myself make it a lifelong hobby. It seems as if us "old timers" will continue to see those of "lesser faith" passing by all the time, and will no doubt repeat our same (hopefully) good advice to them time and time again.

A&P: What do you get from fishkeeping that keeps you interested?

BG: Well, here's a funny thing — you see, I get far more from the people in fishkeeping than from the actual fishkeeping itself. Hardly a day goes by without coming across a new — and usually different — personal viewpoint and this exchange of practical information is of immense value to me and, I hope, to anyone else involved. Learning from each other is a skill well worth practising.

A&P: What's next in your fishkeeping plans?

BG: The next thing in my fishkeeping plans is to overhaul my pond filter before it overhauls me! I plan to add twin vortexes, and add more biological filtration. You can never have too much filtration!

Solway Show Change

The date and venue for the Solway A.S. 1999 Annual Open Show has been changed to August 1 and the new venue will be within the Sports Hall of the Barony Agriculture College. Further details of the show can be obtained from John Cowan on 01387 750606.

Tyne Tees Area Association News

Due to lack of trade support the Tyne Tees Aquatic Festival for 1999 has been cancelled. In its place the Tyne Tees Area Association is to hold an Open Show on Sunday, August 29 1999 at Eastbourne School, Darlington.

In conjunction with this show, replacing the usual auction, there will be two

speakers, Graham Ash (Cichlids and Catfish) and Derek Lambert (Livebearers). There will also be a buffet lunch. Tickets for the buffet, talks and unlimited show entries are £2.

Tickets, which must be purchased in advance, are available from Mrs J. A. Bell

(telephone 01325 466630). Fish show entries only, on the day, £1.

NEFAS Announcement

The North East Federation of

Aquarist Societies regret to announce that due to lack of internal support from associated club members it will be unable to hold its annual show this year.

We take this opportunity of thanking all those who have supported and helped run the show in the past. We apologise for what has happened and for the subsequent gap in the north east's aquatic calendar of events.



Auctions

- 13 June Tameside A.S.
- 27 June St Helens A.S.
- 4 July FNAS, Oldham
- 18 July NE Goldfish Society
- 25 July Merseyside A.S.
- 5 September Alden A.S.
- 12 September Silktown A.S.
- 26 September Darwen A.S.
- 3 October Halifax A.S.
- 7 November Merseyside A.S.
- 21 November Northern Area Catfish Group

The new



The NEW "Fishworld" magazine now incorporates all aspects of fishkeeping, pondkeeping and water gardening. Even better value for money with a massive 52 pages. All articles are written by hobbyists, for hobbyists. Regular features include: special offers, merchandise available, show dates, water plants, fishkeeping past, web news, coldwater and tropical features, featured specialist societies, junior section and a special section for the disabled fishkeeper. All subscribers from this date will receive a card entitling them free entrance to FBAS special shows (eg. Fishworld, Supreme Festival, etc.)*

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Society (if any)

Send your cheque/postal order (payable to FBAS) to:
FISHWORLD MAGAZINE, DEPT. AP 22, FLAMSTED AVENUE,
WEMBLEY, MIDDLESEX HA9 6DL

* Day Visitors only. Not transferrable.

Show Dates, Events & Festivals

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

- 1 June Gloucestershire A.S.
- 15 August KAAS (FB)
- 15 August St. Augustine's Church Hall, Matson Lane, Matson, Gloucester, 7.30pm. Quiz and Buffet. Possible visit to aquatic outlet. Information from Caroline, 01453 824810.
- 15 August Livebearer Open Show (AA)
- 5 June FBAS General Assembly
- 6 June Erith A.S. (FB)
- 29 August TTA (Open Show) (FB) NEW EVENT
- 13 June Bracknell A.S. (FB)
- 29 August Swallowfield Open Show (AA)
- 13 June Tameside A.S. (FN)
- 3 September FBAS General Assembly
- 19 June Bristol Tropical A.S. (FB)
- 5 September Alden A.S. (FN)
- 26 June Assoc. Midland Goldfish Keepers (I)
- 11 September Hounslow A.S. (FB)
- 26 June Association of Midland Goldfish Keepers. Open Show. West Orchard Church Hall, Baginton Road, Coventry. Information from Bob Blades, 01827 285930.
- 12 September Cramlington A.S. (FB)
- 27 June St Helens A.S. (FN)
- 12 September Silktown A.S. (FN)
- 27 June A. of A. South Counties Open Show (AA)
- 12 September South London Open Show (AA)
- 4 July TV Cats Open Show (AA)
- 19 September Northern Area Catfish Group Open Show
- 18 July N.E. Goldfish Society (I)
- 26 September Darwen A.S. (FN)
- 25 July Merseyside A.S. (FN)
- 1 August Three Counties Area Group Open Show (AA)
- 3 October Halifax A.S. (FN)
- 1 August Solway A.S. (FS) NEW DATE & VENUE
- 3 October Basingstoke A.S. (AA)
- 23/24 October British Aquarists Festival, Manchester (FN)
- 5/7 November Supreme Festival of Fishkeeping (FB)
- 4 December FBAS AGM & General Assembly