

The NEW

AQUARIST & PONDKEEPER

JULY 1996

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AQUARIST PONDKEEPER

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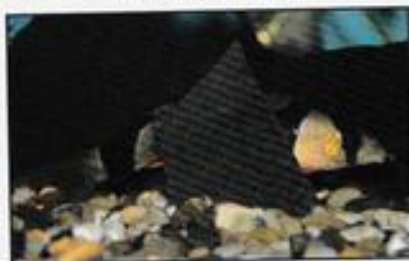
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Comment

At the end of most aquarium books there is usually a helpful section which gives you all the formulae you need for converting such things as volumes from one measurement system into another, temperatures from Centigrade to Fahrenheit, length from inches to millimetres but nowhere can be found information how to get quarts into pint pots!

Fishkeeping is a very broad-embracing interest with many avenues to explore directly, and then just as many that might be called 'fringe interests'. You'd think this would be enough for everyone, wouldn't you, but no, we then go on to erect barriers or separate compartments for our own individually-varied interests too. Take 'coldwater' fishkeeping: it's only people in 'coldwater' climates who have invented this area. Those unfortunate mortals doomed(?) to live in the constantly warm tropics have to make do with keeping their fish in whatever conditions the local climate dictates. Perhaps, come the day of universal global-warming, we'll all be forced to live at some mutually-constant temperature and all this artificiality will be eliminated.

For us at **A&P** this diversity is both an inspiration and a bit of a curse. We, by definition, address aquarists and pondkeepers everywhere and strive to meet everyone's needs and interests. However, we too are affected by the seasons and so the magazine content undergoes swings and changes to reflect this. At the moment the height of the 'coldwater' season has almost been reached (at our warmest temperatures paradoxically) and then it'll be back indoors for our coldweather 'tropical' season. Silly isn't it? All we can do is to provide a 'wide-tank' spectrum of interest aimed at all the main subject matters, with the occasional digression from time to time.

Speaking to visitors at this year's Shows, we have been encouraged by your reaction to the new **A&P** and we're now getting used to the 'Why don't you include ...' and the 'There's too much of ...' to say nothing about the 'Not enough of ...' which come in usually equal amounts no matter where we go! By now, we've got six issues behind us, each with their attendant free Supplement. If you're a new reader, welcome to **A&P**, and should you wish to catch up, then the back numbers are available: if you want to stock up on Supplements then again you can get these easily — from the **A&P** Stand at major aquatic events (even the Hampton Court Flower Show, 2001) or direct from MJ Publications Ltd. Don't leave them laying about, put them in the **A&P** Binder, your own pint pot filled with quarts of aquatic information for everyone.

John Mills

EDITOR

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COVER PICTURES

MAIN PICTURE: BENNETTS WATER GARDENS
INSET PICTURE: MP. & C. PIEDNOIR

Increasing amounts of summer sun brings warmer water to the pond and ensures a vigorous growth of aquatic plants, thus denying vital nutrients to algae. Add to this the abundance of flowers on the Water-lily plants and you have a perfect pond picture for weeks to come. See our Supplement for all-round information on these magnificent plants.

The vivid and varied colours of the Guppy are world-renowned but did you know that these tropical fishes (along with other carefully selected genera) can enjoy a summer holiday outside in the summer sun, too!

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WHERE THE RIVER MEETS THE SEA

PART ONE



For the aquarist seeking an interesting diversion from the standard freshwater tropical set-up, but who is perhaps disinclined to venture into the specialised and more expensive world of marine aquaria, a brackish system may offer the ideal solution.

In addition to those fish that specifically require these conditions in which to thrive, there are a good number of popular varieties that although well adapted to freshwater demonstrate a previously unseen brilliance and zest when gradually introduced to a slightly salty environment.

ROY OSMINT TAKES A LOOK AT THE HABITATS AND FISHES FROM A TWILIGHT ZONE WHERE THE RIVER MEETS THE SEA.

Almost 70 per cent of the globe's total surface is covered by water and all but a minute proportion of it is saline. But although the world's seas and oceans

can vary quite considerably in salt levels, due to their immensity, they present locally an extremely stable and well balanced environment for the life forms that inhabit them.

The component elements of the sea consist of about 96 per cent pure water with the remaining constituents comprising of dissolved minerals — the greater part of which is sodium chloride (salt).

In most marine locations these concentrations can be measured to around 36 ppt (parts per thousand) but this changes in certain areas due to local conditions. In the Caribbean Sea for



instance it is about 37 ppt, while in the Red Sea it rises to approximately 40 ppt. In other situations where greater dilution takes place the levels can be significantly lower.

In estuarial regions, freshwater outflowing from rivers meets and mingles with salt water from the sea, creating a multitude of brackish environments which vary in salt content according to season, climatic conditions and tidal fluctuations. These waters can have levels of salinity ranging from 1 ppt upwards.

These habitats are often very rich in food sources that have been carried down river and they can consequently sustain much animal life — some of which is of considerable interest to the aquarist.

Establishing a brackish aquarium is a fascinating departure from the regular tropical set-up. It can also provide a useful intermediate stage for those fishkeepers who later plan to progress to a full marine system.

Creating and maintaining a brackish water tank is not especially demanding. In the main, the rules regarding management are the same as those that apply to any other branch of fishkeeping, with certain species proving easier and more accommodating than others in terms of feeding, size and compatibility.

The main additional consideration in this type of system is of course the salt content, and to determine this accurately it

Suitable plants shown here for a brackish water set-up are *Microserium pteropus* (above) and *Cabomba caroliniana* (right).

PHOTOS
MR. G. C. PEDNOR

is necessary to use an aquatic hydrometer. This measures Specific Gravity and enables desired salinity levels to be achieved and maintained.

A hydrometer of this type functions by establishing the relative density of salt water against that of freshwater. Using it is perfectly straightforward and a reading quickly and easily obtained.

It is important to ensure that the hydrometer is one that has been specially designed and calibrated for aquatic use. The water temperature affects the reading obtained and an aquatic hydrometer will be manufactured to give accurate information within a suitable range. Nevertheless readings must be taken with the water temperature at the same level.

The hydrometer registers freshwater as having a Specific Gravity of 1.000, and pure sea water as about 1.024, anything between this can therefore effectively be regarded as brackish — very slightly at the lower end of the scale, and increasing in salinity as it rises. Because the salt content of natural brackish water fluctuates so widely an appropriate Specific Gravity reading for a brackish aquarium will clearly depend on the type of habitat to be re-created and the particular species to be kept.

The important thing when obtaining livestock for this aquarium is to discover the circumstances in which it has been kept at the dealer's premises, so that to start with, these conditions can be approximately reproduced at home. Any retail outlet worth its salt (pardon the pun) will be happy to supply this kind of information and also offer helpful advice. Once the fish have become established in the tank they can gradually be acclimatised through partial water changes to higher or lower levels of salinity as necessary.



TROPICAL

Where the River Meets the Sea

The salt content is by no means absolutely critical, in fact it is positively beneficial to vary it a little as would occur in nature with the ebb and flow of the tide.

There are various absorbing and fascinating possibilities for a brackish system, some straight-forward others more ambitious. Plenty of scope exists for some imaginative aquaria to those looking for something a little bit different. As always, prior thought and forward planning helps avoid later problems and disappointments.

One of the first considerations should be whether the intended system is to be a general brackish tank containing a community of compatible fish, or whether the object is to aim for a more specialised theme aquarium which attempts to replicate a specific habitat, or cater for a particular species.

A general community set-up is often the choice of those going brackish for the first time. As in any such arrangement the principal factor must be the compatibility of the intended fish in terms of size, temperament and habit together with the dimensions of the tank in which they are to be accommodated. Additionally they must all be tolerant of a similar level of water salinity.

A suitable theme tank might attempt to concentrate on a specific aquatic habitat and only include livestock from this particular location. Perhaps a Central American Coastal region or a river mouth in South East Asia. It is possible to re-create a section of an African Mangrove Swamp incorporating both shallow water and land areas within the tank.



Periophthalmus varius
PHOTO: MR. S. C. REDDICK

The question of plants should also be considered at this stage. Because varieties that will thrive in brackish water are to some extent limited, and a number of suitable fish are enthusiastic plant eaters, realistic plastic alternatives are often considered a good option. It is important to

remember that just as fish should be acclimatised to changes in water salinity gradually, so it is with plants, and it is here that mistakes can sometimes be made.

By establishing the conditions to which plants have become accustomed at the point of retail, and then slowly making desired adjustments to salinity levels at home, chances of success will be enhanced considerably.

Substrate for the brackish tank can consist of aquarium gravel or sand, but one that is often recommended is a mixture of gravel and crushed cockleshell, which gives a nice effect.

An efficient filtration system is necessary and this is certainly best provided by a power filter. It should, however, be borne in mind that any metal parts will be subjected to the corrosive effects of the salt. Satisfactory results are also perfectly possible with an undergravel filter, particularly if plastic plants are decided upon.

A good brand of synthetic marine salt should be used to produce water to the required level of salinity. This is straightforward to use and also incorporates all the essential trace elements. Always follow the manufacturers recommendations when mixing the salt water, as the procedure and quantities, etc. can differ from brand to brand.

FACT FILE

Plant species which have been successful in brackish conditions.

- Green Cabomba (*Cabomba caroliniana*)
- Twisted Vallis (*Vallisneria spiralis*)
- Elodea Densa*
- Java Fern (*Microsorium pteropus*)
- Vallis (*Vallisneria asiatica*)
- Giant Hygrophila (*Nomaphila stricta*)

IN PART TWO WE WILL CONSIDER THE VARIOUS FISH AND PLANT FORMS THAT DO WELL IN THESE CONDITIONS, AND PROVIDE STEP-BY-STEP DETAILS ON SETTING UP THE AQUARIUM

Pond Diary

JULY 1996

Sun		7	14	21	28
Mon	1	8	15	22	29
Tue	2	9	16	23	30
Wed	3	10	17	24	31
Thu	4	11	18	25	
Fri	5	12	19	26	
Sat	6	13	20	27	

Susan Stephenson says July is one of the best months for showing off the pond.

July is a mixture of hard work and enjoyment for the pondkeeper. Many plants are at their best and the pond will be

a major feature of the garden but there is still a lot to be done in the way of maintenance and upkeep.



PHOTO: KATH LAMBERT

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Biological filters can be under great pressure at this time of year because the biological organisms in them may not be multiplying quickly enough to cope with the increase in algal growth. Clean pre-filters to avoid clogging, taking care not to upset the filter organisms. Avoid overcleaning the media and try to prevent strong medications entering the filter itself as these can upset the delicate balance in it.

This is probably the best time of year to install lighting systems if you have them planned to make the most of the long summer and autumn evenings. It is probably the time when the garden will be used in the evenings as well.

It is still a good time to introduce and divide aquatics as there is enough growing season left for them to thrive. Ensure the plants do not dry out in the sun. Snip off any spent flowers to encourage new blooms and keep the garden looking neat.

New fish will acclimatise well during the summer. Feed them with good quality food to promote growth and tameness but do not be tempted to overfeed as uneaten food can go off quickly.

Clean pump strainers if they become clogged and remove and clean the pump itself occasionally, checking the bearings each time to see if they need replacing.

Continue to spray against aphids and other pests. In warm weather replace water lost by evaporation from a garden hose fitted with a fine spray. Remove large Water-lily leaves hiding the flowers. Cut them well below the surface. Otherwise allow the leaves to decay naturally at the base of the pool during the summer months. Thin heavy growth of oxygenating plants always checking you do not remove young fish with them. Remove weeds regularly from the bog garden.

Continue to keep an eye out

for fish fry and separate them from the parent fish if you wish to keep them.

Water plants will be at their best now and it is impossible to include all the ones which will be at their best. Plants in the pond can be divided roughly into deep water, medium depths, shallow water, moisture lovers (bog garden flowers) as well as oxygenators and floating plants.

Examples of deep water plants to enjoy are *Nymphaea* (Water-lilies) which are generally considered suitable for 1-5ft depths. Some varieties are sweetly scented. Lily-like plants include *Aponegeton distachyos* (Water Hawthorn) which suits water 1-3ft deep, *Nymphaeoides peltatum* which suits 6in to 5ft and *Orontium aquaticum* (Golden Club) which needs 6-9in of water and good deep soil. Oxygenating plants are essential to any pool and encourage the growth of microscopic animal life and supplement the oxygen of the pond and use up some carbon dioxide produced by the other plants in exhalation. They include *Hottonia palustris* (Water Violet), *Myriophyllum* (Milfoil) and *Ranunculus aquatilis* (Water Buttercup). Most like 1-3ft of water.

Floating plants are useful in the control of algae and include *Hydrocharis* (Frogbit) and *Eichhornia crassipes* (Water Hyacinth). Many plants like shallow water and some of the more colourful include *Acorus* (Sweet Flag), *Iris* (Water Iris) and *Mimulus* (Water Musk). Add to this the moisture-loving plants such as *Astilbe*, *Hemerocallis* (Day Lily), *Primula* (Primrose) and Ferns such as *Blechnum spicant* and the choice of plants to enjoy now expands endlessly. Nearly all of these plants will reach their best around July.

With good maintenance on top of the previous month's work July should be one of the best months for showing off the pond and all the plant and animal life it can offer.

Useful July Tips

- (1) Ensure the water in the pond remains clean and clear with frequent use of a pump if you have one or topping up with clean water as water evaporates. This is essential to avoid stagnation and lack of oxygen.
- (2) Do not forget to keep the bog garden moist. Often this can get dry during the hottest days so frequent watering is a must.
- (3) If you can leave a small area completely undisturbed to allow any frogs or other aquatic animals a haven where they can escape any prying eyes or pests and keep pets away from the pond.

LOWDOWN



ON LOACHES

When Loaches are mentioned, the first fish that usually springs to mind is the Clown Loach. This is actually very appropriate as where there are Loaches, there is usually some kind of mischief, as I hope you will see in the following overview.

In general, Loaches can be recognised with ease. If the fish stays near the bottom, has whiskers, but is not a catfish, then it is probably a Loach! They are designed for life on the substrate with inferior (underslung) mouths and a set of barbels with which to feel for their food. Many are nocturnal but many can be persuaded to be more active during the day, especially if given the company of their own kind.

Loaches belong to the Family *Cobitidae* which contains seven genera. Just two of these are well represented in the tropical fishkeeping hobby — *Acanthopoma* and *Betta*.

A member of a third genus —

LINDA LEWIS DIVES DEEP INTO THE AQUARIUM TO UNCOVER LOACH LORE.

● PHOTOGRAPHS BY THE AUTHOR ●

Misgurnus — is sometimes found in coldwater set-ups. This fish, the Weather Loach (*Misgurnus fossilis*) has been kept in captivity for many years thanks to its reputation as a living barometer. It has been claimed that by observing these fish a full day's warning of a coming storm can be obtained. This may be a little exaggerated but certainly, when the

barometer drops, the Weather Loach does become very agitated and may appear to be trying to escape from the tank. At other times the fish remains inactive for long periods and, as it is nocturnal by nature, may not even be seen for days on end, especially if the tank is well planted. They make good scavengers and can thrive in temperatures ranging from 35-75°F. There is a more attractive golden form that is sometimes available but, personally, I think I would rather buy a real barometer!

Of greater interest to tropical fishkeepers is the genus *Acanthopoma*, the most famous member of which is the Kuhli Loach (*Acanthopoma kuhli*) which also goes under the names Coolie Loach, Leopard Eel, Striped Loach, and Prickly Eye (*Acanthopoma* actually means 'spine eye'). Just in front of the eye is located a short, sharp spine which can be erected as a deterrent to predators. Many other Loaches are also protected by these spines making

TOP OF PAGE
Clown Loaches enjoy a squeeze —
room for one more on top?

TROPICAL

Lowdown on Loaches

netting them a potential nightmare. The spines can easily get caught in a net. Disentangling the fish may harm it, whilst the razor sharp spines can injure the fishkeeper, too.

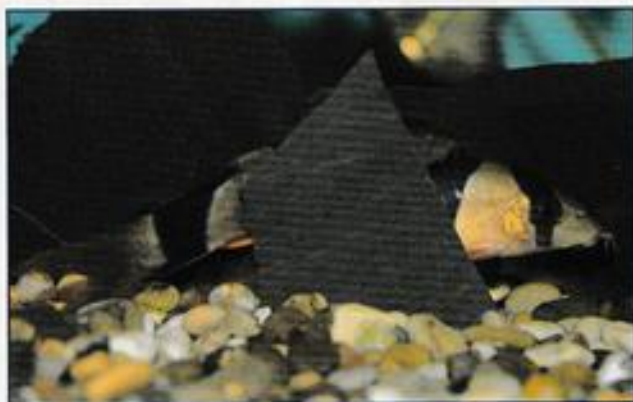
The Kuhli Loach resembles a worm both in shape, and in the way it swims with a wriggling motion. It also enjoys burying itself in the substrate. A friend once emptied a tank, leaving just a layer of gravel in the bottom. When the tank was filled again, several weeks later, a Kuhli Loach appeared seemingly none the worse for the experience. Their ability to supplement their oxygen intake by taking the occasional gulp of atmospheric air also means that given the chance they may even escape from the tank, so covers are essential.

Buying Kuhli Loaches can be hilarious — they are incredibly difficult to catch. They have a surprising turn of speed, and are extremely agile. This, combined with their ability to squeeze into the smallest of crevices, makes them a retailer's nightmare. "I'll have six Kuhli Loaches, please" are probably the words a pet shopkeeper least wants to hear!

There are several different species available, varying in the length, shape and thickness of the bars that decorate the body. There is even a plain black variety. The 'standard' Kuhli reaches about 3.5in in length, and may be very plump at maturity, looking more like a sausage than a worm.

Kuhli Loaches have been bred in captivity, but usually this is accidental rather than planned, with the aquarist concerned suddenly noticing that tiny new Loaches have appeared. Probably the best technique to try is to buy eight or so Loaches and keep them in a species tank. Once mature, condition them with a good varied diet that includes items like bloodworms (frozen is fine) and sooner or later you could be rewarded.

Botias are the other main genus of



Kept alone, Clown Loaches are shy, taking what cover they can find.

Loach that are of interest to aquarists. The group contains a great variety of fish, both in size, and markings. Here we find the Clown Loach, *Botia macracanthus*, a hugely popular fish thanks to its unmistakable appearance. Once seen, never forgotten, the Clown Loach's orange body and reddish fins, contrasted with three black transverse bands give it instant appeal. Clowns are usually seen for sale at about 1.5 to 2in in length. In the wild they can reach 12in or more but in captivity a maximum size of about 6in is more usual.

Clown Loaches suffer from split personalities. Keep one, and you may seldom see it. They do not like bright light and given a place to hide will disappear until nightfall. Kept with the company of its own kind this shy, retiring fish shows the more playful side of its nature that befits the name 'Clown'. The fish will still like plenty of cover but will be much more outgoing and active, especially if there is a degree

of water movement when they may swim against the current, as though taking exercise.

Clowns have two particular tricks that they like to perform. Give them a small cave and as many fish as can possibly squeeze into it will do so, even if they are crammed on top of each other; when small, they may even swim down uplift tubes!

Their second trick can be disconcerting at first. If a fish takes to lying on its side, still, on the bottom, it is usually a sign that all is not well.

Not so with Clowns. They seem to enjoy resting in this odd position. (Some aquarists report that this is actually a reaction to nitrate levels, to which the Clown Loach is very sensitive, so if your fish takes to lolling on its side, take a look at water conditions, just in case.)

Clown Loaches are very susceptible to White Spot and often develop the disease either in the pet shop, or as soon as you get them home. The difficulty here is that because they are not protected with scales chemical cures may irritate their skin. It may be necessary to resort to the old fashioned remedy of raising the water temperature slowly to 90°F.

If a chemical cure needs to be tried, I have heard reports that Myxazin often does the trick without causing harm to the fish's skin. As with all treatments, be very careful not to overdose the tank and be sure to carry out a partial water change once a cure has been effected.

Reports of spawning are rare and



Botia sidikimuyi, Dwarf of Chained Loach.

TROPICAL *Lowdown on Loaches*

details are unavailable, save that very large fish are involved. The main problem seems to be that in captivity Clown Loaches only rarely reach full size, and may therefore not become sexually mature. Despite this drawback, and subsequent high price, the Clown Loach looks likely to maintain its popularity.

At the smaller end of the scale is another charming fish, *Botia sidikimunki*, the Dwarf, or Chained Loach, which reaches a maximum size of just 2in. Although not colourful, the net-like pattern of dark brown bands is very attractive, and the fish's silvery sides often catch the light as it swims. This is a very active fish that again shows different sides to its personality according to whether it is kept alone or in a shoal. A single individual seems (forgive the anthropomorphism) to get bored and will vent its frustration by annoying and pouncing on other fish. Kept in a group this seldom happens, instead they spend much of their time together, chasing as if in play. An endearing habit of theirs is to sometimes rear up as though standing on their tails, then, with their barbels twitching they remind me of Meerkats on sentry duty.

Normal community tank conditions are suitable for this Loach, although acid conditions (pH 6 or less) should be avoided for this distresses the fish. They are less prone to disease than Clowns, and can live for several years.

Other species of *Botia* can also be found. One that is becoming increasingly popular is *B. modesta*. They are generally grey with attractive orangey-yellow fins and remind me of a grey red-tailed Shark. They reach about 5in in length and are peaceful and undemanding. Like Clowns, they also rest on their sides on the substrate.

If tempted to purchase a different *Botia* species it is wise to ask some questions first, otherwise you may end

up with a nocturnal fish that is seldom seen, or find that you have bought several when the species chosen prefers to be kept on its own, eg. *Botia fantasforti*. Check out the potential maximum size as this could be anything from 2 to 12in. Many Loaches are territorial. This may only entail defence of a particular cave, or resting place, but it's best to find out before you get the fish home!

The last fish to take a look at is the Sucking Loach, other wise known as the Chinese Algae Eater or *Gyrinocheilus aymonieri*. Those well-read ichthyologists among you will be shouting "But this fish is not a Loach!" and they would be right, but I'm including it anyway! The Sucking Loach belongs to a different family altogether, the *Gyrinocheilidae*, and is one of only three species in that group, although it was once classified with the true Loaches. Unfortunately, this highly unusual fish does not have the Loaches' sense of fun.

They are often added to a tank in order to eat the algae. This they may indeed do, though not as effectively as other fish like *Otocinclus affinis*. When small they are quite peaceful, but as they get older, and bigger, and stronger, the nasty side of their personality starts to show. They become increasingly aggressive and will chase after other fish, sometimes actually attaching themselves to their victim's side. This can damage the skin, and allow entry to infection. Even if no physical harm is done, the fish will be very unsettled.

I came by my Sucking Loach through an acquaintance who was giving up the

hobby, so Fred, as I called him, was already 4in long when I got him. This meant I missed his good side! I never saw him bother to eat algae. Everything else, from flake to bloodworm, but never anything green!

From the moment he arrived he made it his business to worry his tankmates, particularly the Bronze Corydoras. The Sucking Loach is aptly-named, at least as regards its sucking potential. The mouth is equipped with specially adapted lips that have rough folds on the inside surface. These give the fish a firm grip.

Unlike Suckermouth Catfish, the Sucking Loach does not take in water through its mouth to breathe (take a close look and you will see a special opening just above each gill cover through which water is inhaled). This means that the entire area of the mouth can be kept in contact with whatever the fish is holding on to, be it a rock — or another fish's flanks!

I finally had to get rid of Fred, but catching a Sucking Loach is extremely difficult. They have a remarkable turn of speed and can squeeze through the most inaccessible gaps. I was lucky. Fred had adopted an overturned-flowerpot as his home base. In the end, the only way I could catch him was to enclose the exit side of his pot in a plastic bag, wait for him to return and then chase him out into the bag. He went to live in a tank full of his own kind. I can only hope that his behaviour then improved.

There are not many fish that I have vowed never to keep again but the Sucking Loach is certainly top of the list.

True Loaches are in general captivating fish, and it is easy to fall

under their spell. They are entertaining, seem to have their own personalities and, as they are long lived, will quickly become part of the family, unless of course they decide to escape from the tank, or get wedged down an uplight tube!

Weather Loaches.





The first show of the season has taken place. Held this year in Milton Keynes the International Koi Show provided a platform for Koi dealers to show their wares and for the visitors some really lovely fish to admire. My time, after viewing the dealers' stands, was spent wandering around the competition vats to see if I could pick the Grand Champion Koi. There were several contenders for the title and, on my return on Sunday I found that the judges had chosen Greg Peck's lovely Kohaku for that honour. Another super Koi was the Dealer Grand Champion; this Kohaku, entered by Infiltration has only recently been brought to the UK from Japan where it had been kept in a field pond for some time to improve.

The dry goods section of the show was held in a small room off of the main hall and it was in there that I found John Young with the A&P stand and was introduced to the new owners and Editor Dick Mills, who had only been voices on the telephone up to that time. Nice to have met you all.

Although I called it the 'dry goods' section of the show there, were a couple of very interesting 'wet' demonstrations going on. The Airmaster venturi was blowing a frightful array of bubbles and on the adjacent stand the Bio Bubbler was releasing a steady stream of fine bubbles into the water.

The Airmaster is placed in-line with the pumped water returning to the pond and the Bio Bubbler is attached to an air pump. Both devices are useful additions to any pond system. Other stands were offering everything



TOP OF PAGE The main hall.
ABOVE Best in Variety — John Fallows.
RIGHT Size 3 Tancho — Pete Robinson.

PHOTOS: DAVID TWIGG

from microscopes and test kits to mains water purifiers and another new item featured was the Pond Master, and electronic device designed to prevent the growth of blanket weed.

My return to the Show on Sunday was for the purpose of photographing the winning fish so that those of you who were unlucky enough to be unable to make the show would see some of the winning fish anyway. From a visitor's point of view I was disappointed to find

that the cards detailing the performance of the Koi in the vats were not mounted on the boards behind the vats but in polythene bags attached to the side of each vat; this meant that some of the information on the cards was hidden below the top support ring. Still, progress around the vats was steady and with Lyn's help some lovely shots were acquired. The Judges, having duly deliberated came up with the following results:

Greg Peck — Grand Champion (Size 6 Kohaku), Supreme Adult (Size 4 Kohaku), Best in Size 4 (Kohaku), 1st Size 6 Shows & Size 5 Utsurimono.

John Fallows — Supreme Mature Koi (Size 6 Kohaku), Best in Size 5 (Kohaku) & Size 6 (Kohaku), 1st Size 5 Kohaku & Shows, Size 6 Kohaku & Aagii/Shusui.

Terry Hill — Supreme Baby Koi (Size 2 Kohaku), Best in Size 2 (Kohaku), 1st Size 2 Kohaku & Bekko, Size 3 Koromo & Hikari Utsuri, Size 4 Hikari Moyo & Size 5 Aagii/Shusui.

Maureen Howcroft — Best in Size 1 (Kohaku) & Size 3 (Kohaku), 1st Size 1 Kohaku, Hikari Moyo, Utsurimono & Tancho, Size 2 Sanke, Shows & Koromo, Size 3 Kohaku, Size 4 Tancho & Size 6 Ginrin.

Other first prize winners were:

Pete Robinson — Size 1 Sanke & Bekko, Size 2 Ginrin, Size 3 Utsurimono, Size 4 Kawarimono, Size 5 Hikari Moyo & Tancho; Gary & Barbara Pound — Size 1 Ginrin, Hikari Mui, Koromo, Size 2 Aagii/Shusui, Size 3 Kawarimono, Hikari Moyo & Size 4 Bekko; Geoff & Janet Wilson — Size 3 Sanke & Shows, Size 5 Sanke & Hikari Utsuri; Reg & Gill Coleman — Size 2 Kawarimono, Size 3 Ginrin & Size 4 Shows; Stan Mering — Size 5 Koromo, Hikari Mui & Ginrin; Paul James — Size 4 Sanke & Ginrin; R. Fisher — Size 1 Shows & Size 3 Hikari Mui; Don Shaw — Size 2 Hikari Moyo; Dave Rowell — Size 4 Hikari Mui; Bud & Marilyn Knight — Size 5 Tancho; Jack Howcroft — Size 6 Hikari Mui; David Slater — Size 6 Sanke.



DAVID TWIGG'S

KOI CALENDAR

Regular feeding during the summer months is required to maintain water quality at its highest level. Excellent fish health and maximum growth will be the reward for this attention to these requirements of our Koi. If you haven't tried hand-feeding yet then maybe this is the month to have a go. Lyn and I were advised how best to encourage our Koi to hand feed and I pass it on with the wish that it will work for you too.

Have patience, sit quietly at the poolside and do not move the hand once it is in the water, i.e., let the fish come to the hand not vice-versa. Hold the food (we were advised to start with cockles and found them to be very acceptable to our fish) between forefinger and thumb with the other fingers curled up into the palm. Your Koi may approach and turn away at the last moment causing disappointment, but persevere. If at anytime you want to take your hand from the water please lift it straight out very slowly to avoid frightening the fish and thus having them bumping into each other, or worse into the pond walls. This procedure may take several attempts to be successful and you should not hold onto the food for too long. In the early stages it may be wiser to let the food go when a fish is within an inch or so of your fingers as a reward for coming to the hand.

Do not be frightened yourself. Even the smallest of Koi have a strong sucking ability and will often suck your fingers or the back of your hand rather than take the food. Do not take the hand away quickly when this happens as you will only frighten the fish and set the process back a day or two. Happy hand feeding.

KOI MEETINGS IN JULY

- 3 Leicestershire Koi Section BKKS. Monthly meeting. Contact Mick Reffin, 0116 2712517
 4 Suffolk & North Essex Section BKKS. Monthly meeting. Contact Mavis Carter, 01206 866011
 4 North of England Koi Chapter of Zen Nippon Airinkai. Monthly meeting. Contact John Timmis on 01226 289507
 7 Suffolk & North Essex Section BKKS visit Chiltern Section BKKS ponds. Contact Mavis Carter, 01206 866011
 7 Northampton Section BKKS Visit Norwich Section ponds. Contact Albert Day, 01604 407361
 8 North Lincs Koi Society. Speaking on Pond Construction is Derek York of Klassic Koi. 8pm. Brackenborough Arms Hotel, Nr. Fotherby, Lincs. Contact Secretary on 01472 826605
 8 Northampton Section BKKS. Monthly meeting. Contact Albert Day, 01604 407361
 9 Nottingham & District Section BKKS. Speaker is Vet Chris Marshall. Contact Shirley Hind on 0115 981 0923
 10 Merseyside Section BKKS. Monthly meeting. Contact Phil Adamson, 0151 220 2970
 14 Mid-Somerset Section BKKS visit Wessex & Southern Koi Society ponds. Contact Colin Baker, 01935 840389
 14 Heart of England Koi Society entertain Crouch Valley members around their ponds. Contact David Twigg on 01926 495213
 17 Crouch Valley Section BKKS. Discussion on Pond & Garden Security. Laindon, Essex. Contact Ron Parlour, 01277 840663
 17 Oxfordshire Section BKKS. Monthly meeting at 'The New Club', Wheatley. Contact Kevin Newton on 01865 874008
 21 Mid-Somerset Section BKKS. Avon Section BKKS visit MSS ponds. Contact Colin Baker, 01935 840389
 21 Lea Valley & Harlow Section BKKS. Coach trip to South East Section BKKS. Contact Mick Fabey, 0181 508 5155
 28 Leicestershire Koi Section BKKS. Entertain Lower Thames Section BKKS members. Contact Mick Reffin, 0116 2712517
 28 Northampton Section BKKS. Visit Middlesex & Surrey Borders Section BKKS ponds. Contact Albert Day, 01604 407361
 28 Merseyside Section BKKS. Coach trip to Border Section BKKS. Contact Phil Adamson, 0151 2202970
 31 Ireland Section BKKS. Meet 8 p.m. at the Cregagh Cricket Club, Cregagh Road, Belfast. Contact Secretary on 01247 467171

1996 SHOW CALENDAR

JULY

- 7 South Wales Section BKKS. Closed Show at Pugh's Garden Centre, Morgentown, Nr Cardiff. Koi and Bonsai dealers attending. Contact Keith Horwood on 01222 540775

AUGUST

- 10/11 BKKS National Show. Billing Aquadrome, Northampton. Contact Lou Jackson on 01322 463669
 25/26 South East Section BKKS. Open Show at Ravenswood School, Oakley. Contact Alan Maskell on 0181 6985779
 31/1 September Mid Somerset Section BKKS. Closed Show as part of the Countryside Cavalcade at the Royal Bath and West Showground. Contact Colin Baker on 01935 840389

SEPTEMBER

- 8 Leicestershire Section BKKS. Annual Show at Stoughton Farm Park. Contact Mick Reffin, 0116 2712517
 22 ZNA North of England Chapter. 1st Annual Open Show (Japanese Style) at the Avesta Sports Club, Bawtry Road, Sheffield. Contact John Timmis on 01226 289507
 29 Northern Koi Club. 4th Annual Open Show (Japanese Style). Cascade Water Gardens, Radcliffe Manchester. Preceding this Sunday show on the Saturday afternoon, 3-5pm, is a celebrity speaker. Further details from Tony McCann on 0161 794 1958

My thanks go to all Koi club Secretaries or PROs and others who send me their latest calendar for inclusion in this column. Although I do my best to ensure all events are mentioned it may be that some information, which arrives a little late, misses my deadline. Ideally I need to have information at least 10 weeks before the date of the event to guarantee publication. You may of course ring me direct on 01926 495213 or fax on 01926 403500, which will allow a little leeway. This request also applies to dealers with special events, auctions, etc. I look forward to hearing from you. All Koi keepers are welcomed to the events mentioned in this calendar (an entry fee may be payable). Further details can be obtained from the contact telephone number quoted alongside the diary entry. Please write to me at your earliest convenience via the Editor at MJ Publications Ltd, Caxton House, Wellesley Road, Ashford, Kent, TN24 8ET. Thank you.

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Jackie's Juniors



Hi Junior Fishkeepers, it's time for your page of fun again. It is nice to hear from so many young fishkeepers, please, keep your letters and drawings coming in. This month we have received details of two schools with aquariums that the youngsters look after.



Firstly, Holtsmere End Junior School in Hemel Hempstead (pictured left) have a 36in community aquarium in one of the classrooms. They have formed a Junior Fish Club and about a dozen youngsters give up a lunch-time to maintain the tank and talk over their experiences with their tanks and ponds at home. A group of 9 to 11 year olds set up a 30in tank themselves about 18 months ago. This, they tell me, was great fun to do as they were all involved in the washing of the tank and the gravel and the arranging of the decor. For a background, each youngster drew a fish, rock or plant, which was then stuck on a frieze and stuck to the tank. All was well until the tank was left over the half-term holiday to mature. On arriving back to school, they found it had a small leak. Frantic telephone calls later found a local retailer who was happy to donate a 36in tank to the youngsters. Helpers stripped the old tank and set up the new one after school, having saved much of the maturing water. A week later, the first fish were added.

I hope to be able to tell you more about the aquarium and fun had at Holtsmere End Junior School in future months. In the meantime, enjoy yourselves and happy fishkeeping to you all.

The other school to contact me is Woodside Middle School in Amersham. For some time now they have had a 39in tank in their entrance foyer. This has housed some Goldfish and been maintained by interested youngsters in the school. They have had fun looking after the tank and learnt a lot from it. What they have found is that although air-driven sponge filters are great for maternity tanks and fry tanks, a single sponge filter is not the best in a tank of over three feet with Goldfish in it! The learning increases with the interest taken. Now, the youngsters have persuaded the Headteacher to obtain a complete new set-up to be a magnificent moving picture for all visitors to see. The children of Woodside Middle School will clean and set up the new tank, which will have a heater/stat to enable tropical fish to be kept.

Hopefully, the youngsters will write in themselves to let us know how the new system is going. I would love to see a picture of your new aquarium. Fishkeeping just gets better the longer you do it. Helen Crew is a teenager and she had a great time lending a hand at this year's Grocklemania Fish weekend on the Isle of Wight — don't let the grown-ups have all the fun!

Now for something different. We received a completed Wordsearch for a Master or Miss George of South Norwood (SE25 4EJ) all correctly identified. Well done and thanks for sending it in. Now for the not so good news — our Wordsearches are for your amusement and entertainment and unfortunately correct answers do not qualify for a prize — but we'd like to know all about your aquarium, so write in again please!

Write in with your fun experiences with fishkeeping and tell us all about your fun days out and about. Don't forget your name, age, address and if you belong to a local Society. Remember, these lovely people at John Allan Aquariums are giving a prize for the best received — SO DON'T DELAY.

DO IT TODAY! Please write to Jackie's Juniors, c/o MJ Publications Ltd., Caxton House, Wellesley Road, Ashford, Kent TN24 8ET.



Dear Jackie,
I have drawn a picture of my five favourite fish in my 24in aquarium in my bedroom.
My favourite is my Angel but I have also drawn a Clown Loach, Neon tetra, Swordtail and Guppy.
At the moment I'm saving up for a 36in tank for downstairs and have barely got enough!
Anyway, I hope you like the picture and I will enjoy reading your next column.

Matthew Turl (age 11), Christall, nr Royston, Hertfordshire.

Thank you Matthew, for telling us about your bedroom aquarium. What a relaxing way of going to sleep and an interesting picture to wake up to. Nice to know that your favourite fish is your Angel, they were the first fish my father started me off with. Good luck with saving up for the 36in tank for the lounge. Please tell us when you get it and send another picture too.

WORD SEARCH



WORDS TO FIND

Amazon Sword
Java Moss

Hornwort
Foxtail

Java Fern
Cabomba

Vallis
Hair Grass

The best ever — and I was there!

Waver Crew, Junior Aquarist from the Isle of Wight A.S., remembers Grocklemania '96:

People often think that being a 'Junior' means you're unable to help with the organisation of a major event, but I have proved that idea wrong.

It began on Friday, May 17 found me checking in at Harcourt Sands, Ryde, only a couple of miles from home. Why, I hear you ask, was I staying at the holiday camp so close to home? The answer is simple — I was there to help set up and run Grocklemania, sponsored by Rolf C. Hagen.

By the time I had unpacked it was time for the evening dinner — the waitress must have thought I was half-starved judging by the amount I was given! The large range of foods to choose from included salads, fish dishes, oriental dishes as well as omelettes and much more — compliments to the Chef! As I ate, I was able to recognise quite a few fishy faces arriving for the weekend.

The cabaret provided by the camp's entertainment team was based on the Golden Age of Pop — the swinging 60s to others: surprising as it may seem, I am one of the few in my age group who survives on 60s and 70s music! The Rock 'n Roll Band 'Over the Hill Mob' got many couples jiving on the dance-floor before and after a break during which stand-up Teddy-boy comedian/musical impressionist 'Fred the Ted' had us all laughing, especially with his Cilla Black impersonation.

Saturday morning saw a few hangovers and plenty of black coffee being served at breakfast but by 9:30 the island Club was setting up stalls for the next day. Hagen's team, including celebrity Geoff Capes, soon followed our example — it took our minds off the weather — it rained ALL day! 4pm saw the first lecture, 'Fish around the World', very interesting and informative according to those who saw it — unfortunately I was too busy to join them.

The Thomas Cropper Challenge is one of the many activity highlights each year and whilst 'The Fortunes' were playing downstairs members of Iford, IOW (Cats), Eton, Southend (Monkeys), Portsmouth (Ducks), Island, Scotland (Frogs) had a side-sprinting time competing to take home our renowned Trophy. Erth's team almost had multiple hernias from trying too hard but their efforts paid off as they won for the second year running. Afterwards, to wind down, it was downstairs to listen to the Camp's resident band Marokesh.

Miraculously, us Isle of Wighters were able to get up at dawn next morning to construct the Show Benches; with 12 of us helping (?) each other the job was done in no time and ready for fish at 9am — 212 entries for this year's Open Show. Entertainment during the day was provided by Bill Rundle, FBAS President, with a lecture on 'Aquatic Plants', and Brian Walsh, RNAS Chairman, with 'Fishkeeping — the question Why?'. Geoff Capes kindly judged our Junior Colouring Competition which was organised through the island's schools and businesses.

Our main sponsor, Rolf C. Hagen, generously donated three aquariums of which the lucky Cheswright family won two in our raffles! As well as 'fishy' Stands we had a local firm bring down snakes and other reptiles to be shown — and worn as fashion accessories!

All in all, despite a few hiccups, I think that the whole weekend went well with everyone enjoying themselves. There are, however, a few people I would like to thank on behalf of the IOW Club for making the Show possible: Rolf C. Hagen for donating prizes and giving us so much help and support; Haven head office and their staff for doing everything they could to help us; Barry, the Entertainment Manager, from Harcourt Sands (who came from Darwen, Lancashire and soon got chatting to Darren A.S. people) and his wonderful, top-rate entertainments team for doing an excellent job; Geoff Capes for coming along and being so patient with the children who tried to maul him constantly; and all of the island businesses who were good enough to support the Show.

The main winners in the Open Show were: Best in Show — Sans orientals (Class M) Paul Whidett, Mid-Sussex A.S.; Best Coldwater — Goldfish (Class U) Les Pearce, IOW A.S.; Championship Class '0' — Celebrated Guooy, Alan Stevens, Eastleigh A.S.; Championship Class N 6m — Bob Elliot, Welland Valley A.S.; Aqua-Champ semi-finalist — Alan Stevens, Eastleigh A.S.; Thomas Cropper Trophy — Erth A.S.

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ROCKPOOL FISH

The seas surrounding the British Isles provide a home for a large number of different fish. Although not so varied as tropical seas, at least 50 different species of fish can be discovered in pools at low tide. Many of these fish will be young of larger fish or others that get trapped by the ebbing tide.

This article will explore the fish that are often found in pools and under rocks on the shore.

BLENNY – LIPOPHRYS PHOLIS

This little green fish is found on rocky shores the length of the British coastline. It is a very common fish that hides under rocks and in crannies when the tide is out. It is called by other names as well, and is well known as the Shanny and the Sea-frog. The latter name may be because of its habit of basking on weeds out of the water and jumping back into the pool with a plop when it is disturbed.

The Blenny has slime-covered skin. It also has sharp comb-like teeth which it uses to crunch barnacles off rocks and to attack dead crabs and pieces of carrion that it cannot swallow whole. The adults are up to 16cm long and they come inshore to breed during early spring, where the adult male can be found

ANDY HORTON AND JANE LILLEY DISCOVER PLENTY OF FISHES IN THE SUMMER ROCKPOOLS.

● PHOTOGRAPHS BY ANDY HORTON ●

guarding eggs in the large pools. However, it is the young fish that are much more common under rocks and even in holes in the rocks. Blennies swim with an undulating snake-like motion. They can be distinguished from the gobies by a continuous dorsal (top) fin that runs the length of the body.

There are two other Blennies that can be found between the tides. The larger and fiercer Tompot Blenny, *Parablennius gattorugineus*, is brownish-orange and has two distinct tentacles on its head. The Montagu's Blenny, *Coryphoblennius galerita*, is similar, but is covered in pale blue dots, and has a flap of skin on its head. Montagu's Blenny is only found in the south-west of Britain.

The Butterfish will not tolerate temperatures in excess of 21°C.

ROCK GOBY – GOBIOUS PAGANELLUS

The Gobies are the other family of fishes that are common on the shore. There are several species, but the Rock Goby is the one that is often discovered under rocks when the tide goes out. The adults grow to 12cm long and are almost black in colour. However, if they are living on sand they may be much lighter. Young fish are much more common than adults on the shore and may only be 45mm in length.

All the Gobies have two dorsal fins and a pelvic (underneath) fin that is fused into a weak suction cup. They have small scales. The Black Goby, *Gobius niger*, looks very much like a Rock Goby. The Rock Goby is not found on the east coast.

Rock Gobies eat tiny shrimps and worms and rarely tackle anything they cannot swallow in one go.

COMMON GOBY – POMATOSCHISTUS MICRIPS

Drop a pebble into a shallow sandy pool and lots of very small fish will dart rapidly in all directions before coming to rest. They are difficult to see because they are coloured to blend in with the sandy bottoms on which they rest.

The Common Goby will be found on rocky shores where there are sandy pools. It is a small fish that only attains a length of 64mm. Like all gobies it has two dorsal fins. It feeds on small crustaceans.

The Common Goby only lives for one year and the male guards the eggs that will be deposited on the underside of a rock or seashell. This fish also lives in estuaries. There is an almost identical, but larger, fish called the Sand Goby, *Pomatoschistus minutus*, which is found in pools nearer the low tide mark. It comes inshore to breed in the late summer.

BUTTERFISH – PHOLIS GUNNELLUS

Even longer and thinner, the Butterfish or Gunnel looks like a snake and swims, or rather wriggles



COLDWATER MARINE

Rockpool Fish

The Five-Bearded Rockling is sensitive to poor water conditions.

along the bottom, in an undulating snake-like fashion. During spring and autumn small specimens of this orange-brown fish can be discovered in small water-filled hollows under rocks when the tide recedes. It can be easily recognised by about 13 large spots spaced out along the top of its body. These are false-eye spots, and may fool hungry fish into thinking it is a much bigger fish and not a tasty worm.

The Butterfish gets its name because it is so slippery. It is almost impossible to pick up in your hand and it is best to use a net. Butterfish reach a length of 25cm, but shore specimens are usually smaller and feed on small crustaceans. The adults eat worms. The male fish guards the eggs that are laid in shallow water.

FIVE-BEARDED ROCKLING – CILIATA MUSTELA

The bronze-coloured Rockling is unusual in several ways. The first dorsal fin consists of a single small ray, followed by a fringe of tiny rays in a slot. These rays vibrate and may help the Rockling to find its food. This rockling has five barbels on its head that it uses to find worms buried in the sand. The Five-Bearded Rockling grows to 25cm long, although fish found on the shore are usually smaller. It can be discovered



both in pools and under rocks.

Eggs and sperm are released into the sea where fertilisation takes place. The larvae are silver and live with the surface plankton. They are known as 'Mackerelmidges'. In midsummer they move inshore and change colour from silver to brown.

Several other species occur, of which the Shore Rockling, *Gaidropsaris mediterranea*, has only three barbels.

BULLHEAD – TAURULUS BUBALIS

Seen from above, this fish looks like a rock, while it waits in ambush for a prawn or small fish to swallow in its

expandable mouth. In the larger pools, this fish can be a very common predator. It is known by lots of different names like Rockfish, Clobberhead and Sea Scorpion in different places. It can be many different colours to match the background where it lives. However, the most usual is a patchwork brown and cream.

Adults grow to 18cm long. Fish of this size will only be found in the large pools. Smaller and younger fish are common during the summer months in the company of the prawns on which they feed.

Like most of the shore fish, the Bullhead lacks the buoyancy organ called the swim bladder. It is heavier than water, so when it stops swimming it must rest on the bottom.

GREAT PIPEFISH – SYNGNATHUS ACUS

With their trumpet-like snouts, all Pipefish suck in their food of fish larvae and crustaceans. The Great Pipefish can be recognised quite easily by its brown and white banded body. During the late summer they follow the tide in.

The Worm Pipefish, *Nerepis*

Avid predation by the Great Pipefish on small prawns may mean that feeding this fish may be too difficult for the home aquarist.





Corkwing Wrasse are highly aggressive and territorial in captivity. They tolerate high summer temperatures. Fish reared to adult size in captivity need to be kept in tanks holding at least 50 gallons.

TWO-SPOT GOBY - GOBIUSCULUS FLAVESCENS

This small Goby is unusual as it does not rest on the bottom but hangs motionless in midwater on the fringes of the weeds. Small shoals can be found in intertidal pools, and if there are no large fish present they can be seen in the clear water.

It is the most attractive of the common gobies of the shore. In some areas it is an orange colour. It is only 6cm in length when fully grown. There is a clear black spot just in front of the caudal fin; the second spot on the side is less clear.

SEA STICKLEBACK - SPINACHIA SPINACHIA

As thin and as long as a pencil, the Sea Stickleback is very fierce and may attack fish larger than itself. It reaches 15 cm long and has a pointed snout with sharp teeth. There are 15 spines in front of the single dorsal fin.

The Sea Stickleback is brown on the upper side, silvery underneath, and has a prodigious appetite for small crustaceans and fish larvae. It can become trapped in the larger pools at low tide. The male builds a nest of weed in summer.

laxetriclorwis, can be easily mistaken for a thin strip of brown weed wedged under a rock and needs a practised eye to spot it, but in the south-west it is a common fish at low tide. However, it likes warm water and is absent from the north and the east coasts of Britain.

This fish is the smallest of the six species of British Pipefish and will not grow longer than 15cm.

Pipefish feed only on live food like small crustaceans and larvae which they suck in through their trumpet-like mouths.

Like the Sea-horses, which belong to the same Family, it is the male Pipefish that looks after the young in a special pouch along his belly.

In the shallow seas where the bottom is sandy, the Lesser Pipefish, *Syngnathus rostellatus*, is common.

in scales. The colour is greenish-brown with black horizontal lines and a black spot just in front of the tail fin. However, when resting, or caught in a net, the lines and spot are obscured by black vertical bars.

In late summer the young are very common in the lower shore pools feeding on tiny crustaceans. The adults are aggressive with sharp teeth to attack hard-shelled crabs and prawns. Corkwing Wrasse can grow to 25cm in length. The Corkwing is found all around the coast of Britain apart from parts of the east coast. It could be mistaken for the much rarer Rock Cook, *Centrolarus exoletus*, or confused with very young Ballan Wrasse, *Larax ferrugata*, which are about one in every hundred of the young wrasse caught inshore.

CORKWING WRASSE - CRENILABRUS MELOPS

The Wrasse are a large family of colourful fishes. Five species breed around Britain. Of these it is the Corkwing that lives in the shallow water offshore where it breeds, building a nest amongst weeds.

Most rock pool fish are squat or elongate, and adapted for a life in among the rocks, but wrasse are ordinary-looking fish and are covered



A prodigious appetite for live food means the Sea Stickleback can be a difficult fish to keep. Its short lifespan and intolerance of high temperatures present further problems.



Corkwing Wrasse are highly aggressive and territorial in captivity. They tolerate high summer temperatures. Fish reared to adult size in captivity need to be kept in tanks holding at least 50 gallons.

TWO-SPOT GOBY - GOBIUSCULUS FLAVESCENS

This small Goby is unusual as it does not rest on the bottom but hangs motionless in midwater on the fringes of the weeds. Small shoals can be found in intertidal pools, and if there are no large fish present they can be seen in the clear water.

It is the most attractive of the common gobies of the shore. In some areas it is an orange colour. It is only 6cm in length when fully grown. There is a clear black spot just in front of the caudal fin; the second spot on the side is less clear.

SEA STICKLEBACK - SPINACHIA SPINACHIA

As thin and as long as a pencil, the Sea Stickleback is very fierce and may attack fish larger than itself. It reaches 15 cm long and has a pointed snout with sharp teeth. There are 15 spines in front of the single dorsal fin.

The Sea Stickleback is brown on the upper side, silvery underneath, and has a prodigious appetite for small crustaceans and fish larvae. It can become trapped in the larger pools at low tide. The male builds a nest of wood in summer.

lucanicornis, can be easily mistaken for a thin strip of brown weed wedged under a rock and needs a practised eye to spot it, but in the south-west it is a common fish at low tide. However, it likes warm water and is absent from the north and the east coasts of Britain.

This fish is the smallest of the six species of British Pipefish and will not grow longer than 15cm.

Pipefish feed only on live food like small crustaceans and larvae which they suck in through their trumpet-like mouths.

Like the Sea-horses, which belong to the same Family, it is the male Pipefish that looks after the young in a special pouch along his belly.

In the shallow seas where the bottom is sandy, the Lesser Pipefish, *Syngnathus rostellatus*, is common.

In scales. The colour is greenish-brown with black horizontal lines and a black spot just in front of the tail fin. However, when resting, or caught in a net, the lines and spot are obscured by black vertical bars.

In late summer the young are very common in the lower shore pools feeding on tiny crustaceans. The adults are aggressive with sharp teeth to attack hard-shelled crabs and prawns. Corkwing Wrasse can grow to 25cm in length. The Corkwing is found all around the coast of Britain apart from parts of the east coast. It could be mistaken for the much rarer Rock Cook, *Centrolabrus exoletus*, or confused with very young Ballan Wrasse, *Labrus bergylla*, which are about one in every hundred of the young wrasse caught inshore.

CORKWING WRASSE - CRENILABRUS MELOPS

The Wrasse are a large family of colourful fishes. Five species breed around Britain. Of these it is the Corkwing that lives in the shallow water offshore where it breeds, building a nest amongst weeds.

Most rock pool fish are squat or elongate, and adapted for a life in among the rocks, but wrasse are ordinary-looking fish and are covered

A prodigious appetite for live food means the Sea Stickleback can be a difficult fish to keep. Its short lifespan and intolerance of high temperatures present further problems.



COLDWATER MARINE *Rockpool Fish*

LUMPSUCKER – CYCLOPTERUS LUMPUS

By far the largest of the shore fishes that visit the intertidal zone regularly, the football-sized and shaped Lumpsucker moves inshore in February to breed on the shore. This is a northern fish and is common on Scottish coasts where it is eaten by Otters, but the Lumpsucker also lives in the English Channel.

During the early months of the year the shore zone can be very rough. The male fish guards the eggs on the shore, sticking himself to the rocks with a strong sucker on its belly.

Adult Lumpsuckers spend most of their life in deeper water. Their diet includes Comb-jellies. The young hatch from an orange egg-mass and by March in the English Channel they appear as pea-sized blobs in brown and green living in the mid-tide pools. They are the first fish larvae of the year to be found on the shore.

LESSER WEEVER – ECHIICHTHYS VIPERA

Beware! The black dorsal fin of this fish contains a poison that if touched or trodden on can cause a painful sting. Fortunately, it is not very common on the shore and usually lives below low water mark in the sandy shallows. It



The Lumpsucker is beyond the facilities of the home aquarist to keep it for the whole of its natural life span. The small pea sized juveniles have been grown up to a weight of about 1 kg. The tank needs to be cooled to 15°C.

buries itself completely in the sand.

Adult Weevers reach a length of 14cm. They possess very sharp teeth and eat Worms, Shrimps and small fish.

OTHER ROCKPOOL FISH

The larvae of almost any fish can get trapped in pools as the tide goes out. Adult fish that live in the shallow water often venture into the lower pools, and adult specimens of the sandy coloured Dragonet, *Callionymus lyra*, the orange Montagu's Sea Snail, *Liparis montagu*, and the Cornish Sucker, *Lepadogaster lepadogaster* are all part of the shore fauna. On the east coast the Eelpout, *Zoarces viviparus*, hides under rocks at low tide. It gives birth to live young instead of laying eggs. A small flatfish called the Topknot, *Zoarces punctatus*, clings to the underside of rocks in pools in the south-west.

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Field Key to the Shore Fishes of the British Isles, Alwyn Wheeler (Field Studies Journal, Vol. 8 No. 3, pp 481-521).

Key to the Fishes of Northern Europe, Alwyn Wheeler (Warne, 1978).

If you are interested in the marine life around the British Isles and wish to find out more, please write to: British Marine Life Study Society, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex BN 43 6PO enclosing stamps to the value of 59p.



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Growing Tips

BY BARRY R JAMES

Plant Diseases

Plants are living organisms and as such have a complicated structure and metabolism. Each and every species has evolved over millions of years in particular habitats to which they have become adapted. Every individual niche in the environment has its own unique set of conditions and variables. Imagine the contrast between a creature living on the sea floor at the bottom of the Mariana Trench some 36,000ft below sea level and a lizard living at Assize in the Libyan Desert where the temperature can rise to 136°F. Such a disparity of living conditions is almost unimaginable.

It is therefore not surprising that the plants in our aquarium having been uprooted from their home in a tropical stream have problems in surviving in a home aquarium. Of course we do our best to provide them with all the essentials for their growth and survival but with the best will in the world we are

bound to get it wrong sometimes, whether it be all the various species or just one to whom the conditions are inimical.

Poor growth, rotting, discoloured or damaged leaves and roots are usually the result of an imbalance in the water chemistry. Plant epidemics which are pathologically caused by viruses, bacteria, or other organisms seldom occur in aquaria. Attacks by insect pests are equally rare. Rotting leaves occasionally hold increased amounts of bacteria, this however is not the cause merely the results of plant damage.

The causes of poor performance and complete or partial damage to leaves is either the result of a high pH value caused by an excess of bicarbonate or an a deficiency or oversupply of nutrients.

In attempting to make a diagnosis the aquarist should first check whether the damage may have been caused by snails or fish. For this you will

need a good magnifying glass. It may reveal areas of the leaf surface where the epidermis has been removed by the grating action of Sucking Catfish or Loaches, which will result in yellow or brown patches. Also tiny snails may be seen which have been overlooked by the naked eye.

Most plant diseases may be prevented by regular water changes and a well balanced and complete programme of fertilisation. Attention should also be given to the lighting. Fluorescent tubes deteriorate after a certain time and the spectrum of the light emitted will change. It is important to replace these at regular intervals according to the manufacturers instructions.

Heating is also a frequent cause of trouble. Without an interleave heating system temperature stratification of the water will occur — the gravel can be several degrees cooler than the water sometimes leading to poor root growth. Gravel can often be polluted leading to an extensive decay in the root system. Any damage to the root system will normally be reflected in the leaves and stems. Often the abnormalities in the growth pattern will indicate a lack of a certain mineral.

An element commonly showing an insufficient concentration in the home aquarium is Carbon. This manifests itself by stunted growth of all or some of the plants. I have seen stands of Vallisneria only an inch or so high. The plants produce runners normally but the progeny are equally dwarfed. Sometimes this can look very attractive but nevertheless is a tell-tale sign of deficiency. Cabomba, Hygrophila and Sagittaria as well as Vallisneria are particularly prone to this problem. This lack of carbon is often accompanied by an

abnormally high pH value. The remedy lies in boosting the CO₂ levels by installing a Carbon Dioxide diffuser system, and maintaining a lower pH level.

Lack of Iron is another very common problem. In this case the leaf tissue is pale yellow. By contrast lack of manganese leaves the tissue yellow but the veins are a dark-green colour. Strangely enough there may be adequate Manganese in the system but it is inhibited by an oversupply of Iron. This situation often occurs when Iron only fertilisers are used. A combination of trace-elements in the correct combination will solve the problem. Incidentally an oversupply of Iron will also inhibit the action of other elements particularly Phosphate. The Iron is in fact reacting chemically with these elements to form insoluble compounds such as Iron Phosphate. It is for this reason that basic fertilisers, ie Nitrate, Phosphorus and Potassium should only be administered during water changes and Trace Element solutions administered on a daily basis.

Alleopathy probably has a considerable part in certain species dying whilst others thrive. Sometimes this is the result of one plant exuding a substance into the water which is inhibitory to the growth of the others. Another situation is that which can arise when Cabomba and Elodea are grown together without the benefit of CO₂ diffusion. Here both plants can take their Carbon from the free CO₂ in the water. When this is exhausted Elodea can use bonded Carbon present in Carbonates. This results in a biogenic decalcification of the water with a corresponding rise in pH of over 9. Cabomba is now at a disadvantage as it is unable to thrive at a pH greater than 7.5, and therefore begins to degenerate whilst Elodea thrives as before.

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Sitting here looking at prize certificates going back over 25 years brings back all the memories of shows Pat (my Mother) and I have competed in. There are the F.B.A.S. Championship Classes we have won, the "Best in Shows" and "Highest Pointed Exhibitors" awards and all the rest but the very first Certificate won at an Open show takes pride of place. Taking all this into account the question I ask myself is "Why show fish?" This is particularly true after all this time for who, in their right mind, wants to wake up at the crack of dawn on a Sunday, catch up a bunch of fish, transport them half the length of the country to exhibit them in an old Church Hall?

The answer I am afraid to say is I still enjoy it and how long Pat and I have been showing and how much we win has absolutely nothing to do with it.

In its essentials, showing fish is just how I have described it above, but the reality is far more than that. Going to Fish Shows gives you the chance to meet lots of other aquarists just like you. Some of them will be highly-competitive exhibitors who care greatly about how their fish do in the Show. The vast majority of people are there just to meet other people with the same interest as them and talk fish all day.

In the north of England and Scotland Auctions are almost always associated with Shows and it is here that the exhibitors gather to talk fish and keep a wary eye open for the bargain of the day. In the South, auctions have never been a key element to fish shows and whilst many organisers would like to have an Auction as part of the show, very few are



Tableau designed to look like a filter.

DEREK LAMBERT EXPLAINS THE FASCINATION AND FUN OF THE SHOW SCENE.

● PHOTOGRAPHS BY THE AUTHOR ●

more than half-heartedly supported. Here exhibitors tend to gather round the judging sheets and discuss fish, fishkeeping and the exhibits.

Many people who consider themselves serious aquarists tend to think of Shows in a rather a negative way, yet these are the places where fish which have been

raised to their very peak can be seen on display. All the new and rare species come out of the woodwork at these events and knowledgeable aquarists work their way through reams of aquatic literature to try to find the correct name for a new fish.

Fish shows are held throughout the UK on most weekends from March to early November and many thousands of aquarists participate (check out the Show dates each month in the Society World pages of **AGP**). There many organisations around the country which draw up Rules, train and appoint Judges and it is important to look at the Show Rules that apply in your area before you show fish.

The smallest Shows are Table Shows (they're called Bowl Shows in America, I believe) which are held by local Clubs in an evening and this is the best place to start, as here you will pick

up good tips and be given pointers to where you are going wrong.

Tableau Shows are held at Festivals such as Yorkshire Aquarist Festival, British Aquarist Festival and Scottish Aquarist Festival. The fish are displayed in tanks in an enclosed environment which is externally decorated to look attractive. As these shows take place over a weekend, the tank temperatures need to be controlled and aeration and filtration can be installed for those species that need it.

Open Shows, however, are the commonest type of show. These, as the name implies, are open to all exhibitors whether they are members of the host Club or not. The competition here can sometimes be very tough. There are many single fish Classes as well as

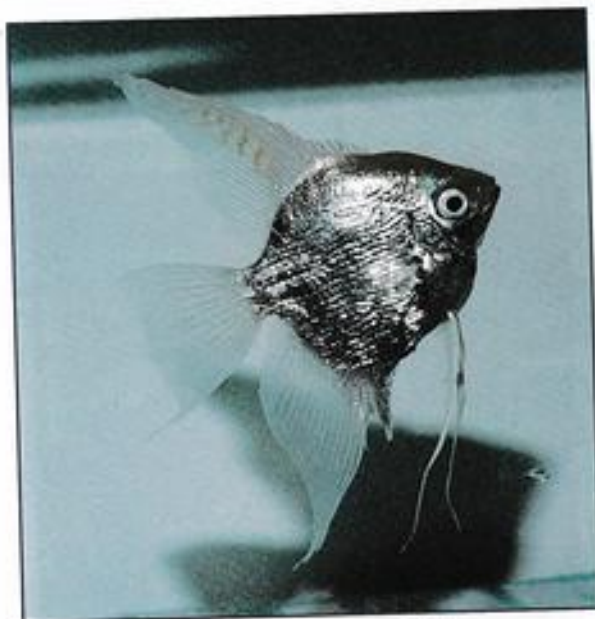
THE SHOW SCENE

Classes for Pairs of Fishes and Breeders teams. Points are awarded for size, colour, body, fins, condition and deportment. Pairs and Breeders should be well matched and in the latter case achievement and quality are important. (There may well be extra Classes for Plants, Furnished Aquariums and Aquascapes — plus any other Special Class the organising Society wishes to feature, but we will be concentrating on just exhibiting fish in this article).

If you are showing fish for the first time the following hints may be useful.

The tank you select for your exhibit should be large enough for the fish's comfort but not so large that the species is lost in a corner. The tank should be of a neat and clean appearance. The bottom may be clear or painted black on the outside. Some Shows allow gravel in the tanks but not all — check your Rules first. The tank should have a tight fitting lid.

The water you use must be clear and free from floating particles of food (and fish waste!) as possible. Technically floating pieces of plant could lead to disqualification (unless they're in the Plant class of course). Never use water from the taps at the Fish Show, the pH



Angel fish need tall tanks to extend their finnage and show to their advantage.

and hardness may be very different from the home aquaria. Be warned, drastic changes in pH can kill fish and I have seen this happen to the exhibitor's dismay. Take water from the fish tank, or fresh water drawn from your home tap which has stood in the fish room for a few days for the escape of gases and equalisation of temperature to occur.

Some fish can be transported to the

Show in their Show Tanks but scatty species should be taken in polythene bags placed in a black dustbin liner to keep the fish tranquil on the way. Medium to large Barbs (amongst other groups) can suffer scale damage if they are not kept calm.

All exhibits should be transported to the Show in a polystyrene box to keep them warm. Never leave the box in a car or boot on a sunny day as the temperature may reach critical level.

When you arrive at the Show, entries will have to be booked in by the Show Secretary, each entry is given a number and this, together with a label giving the scientific name of the entry, should be stuck on the tank. The entry is placed in the appropriate

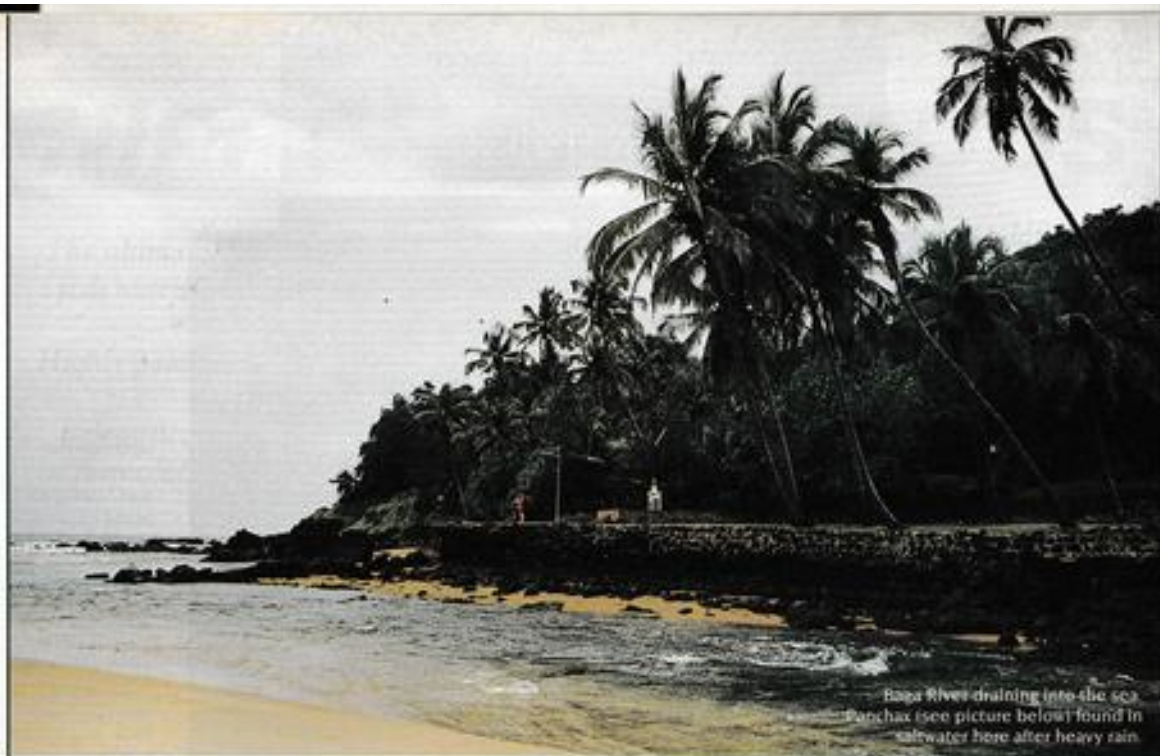
class and any waste products removed with a fine-meshed net. It is very important not to feed the fish for 24 hours before the Show as this can lead to messy tanks. Clean up the outside of your tanks to show off your fish to best advantage and you have done your best — the rest is up to the Judges!

The results, as they come in, are prominently displayed in the hall. The losers think the Judges need glasses (or white sticks) whilst the winners are happy (this time). When it is time to debench, the Show Manager will announce it. (It is bad manners to debench earlier, as the waiting public will want to view the exhibits before prize-giving occurs too). If it is your first Show you will find many people willing to help with any problems you may have.

One final point should be noted: some fish dislike being shown and will never make good show fish, others love it and display to all the other fish around. These are your Show-winners and they stand out a mile. If you have such a fish which scores high on all the other points too, you may have a Best Fish in Show, a Trophy highly prized by all showmen.



This tableau entry had tanks specially designed to fit the Sputnik.



Bapa River draining into the sea.
Panchax (see picture below) found in
saltwater here after heavy rain.

GOAN FISHING

IGGY TAVARES, PHD, FULFILS A DREAM WITH A TRIP TO GOA.

• PHOTOGRAPHS BY THE AUTHOR •



Goa lies on the west coast of India, about 500 kilometres below Bombay. This one time Portuguese colony is only 3,700 square kilometres in area, but is packed with sun-drenched beaches and swaying palms.

Add to this a unique cultural heritage which has left Goa with magnificent churches dating back to the middle ages, a Portuguese influenced delicious Goan cuisine and a warm friendly welcoming people, and you have a holiday made in paradise. I am not saying all this just

Striped Panchax (*Aptichthys lineatus*).

GOAN FISHING



St Alex Church, Calangute (typical of Goan churches), 1/3rd mile from the stream.

because I am originally from Goa, but rather because it is true, as I found out on visiting again after 21 years. I stopped in Goa in October 1995, on the way back to England from Hong Kong where I had attended a Cancer

Conference. I had come to Goa not only to

enjoy the sunny beaches, the food and drink, to visit relatives and to remind myself of my cultural background, but also to try and do some fishing for aquarium fish.

Goa has three main river systems which are estuarine. However, there is an abundance of small streams and ponds which I was hoping to sample. As it turned out, I came with only a 9in aquarium net, as my local London shop was unable to provide the ordered nets in spite of several promises. Moreover, a combination of a tropical storm and family commitments made my 12 day stay much too short. In the end I was only able to sample one small stream a couple of times.

GOAN AQUARIUM SHOPS

Not having the necessary nets and not knowing where to start my fishing exploits, I decided to make enquiries at a fish shop that I heard about. This shop was located near the market in Candolim village and had a few aquariums containing imported Angels and Swordtails. It also did a more successful line of business in telephones, and they were unable to help me.

Following my first fishing trip, I heard of another Goan fish shop, the Bis-Lin in Mira Mar, near Panjim which is the

capital town. This business, which was set up in a large outhouse, had a lot of aquariums nicely set out containing Singapore imported fish. They did have a huge pair of 'sharks' (30in long which were, in fact, *Pangasius satoki*) in a very large floor standing aquarium which also contained a good selection of other large cichlids and catfish.

Prices of Barbs, Angels, Swordtails and others were very similar to what we pay in England, which makes it a rather expensive hobby in Goa since everything else is 1/4 to 1/2 the UK price. I explained my interest in local fish to the owner. He did not stock any because his customers only wanted imported fish, but I was able to buy a large net. There was another fish shop in this area, but I did not have time to visit it.

THE STREAM

The fishing location was a small stream half a kilometre from the Church of St Alex in Calangute village. The stream was bush lined and ran through the rice paddy fields, narrowing a little before running under the bridge across the road to Mapsuca town.

Three young local Goan lads had not needed much persuasion to accompany me on this expedition. My band of helpers and I fished at this bridge location and did not explore further

upstream on this visit, as I was hoping to come back on another day. At this location the adjoining paddy field, that had already been harvested, was flooded from rain a few days back, and water was flowing slowly from the field into the stream.

Water depth in the main

stream was between a foot and two feet while in the field it was only a few inches. Water temperature was probably the same as the ambient temperature at around 27 to 30°C in October.

PANCHAX

When I first got down to the stream, I was elated to see that there were fish swimming around. The first thing that caught my eye was small shoals of surface swimming fish with a golden spot on the head. These turned out to be a Panchax species and with even my small net, they were relatively easy to catch.

Shoals of small panchax swam together while larger fish also in shoals were more elusive. I was fortunate that my band were able to capture a mature male and female as well as several young fish. In full sunlight in my small aquarium, young Panchax (1in TL) glistened golden green with little sign of black bands. Adults (2-2.5in TL) had six or seven vertical black bands on their posterior body. Male adults had more colourful unpaired fins, with their yellow black spotted dorsal, anal fin and caudal fins also having a touch of blue.

Moreover, the dorsal fin had a prominent black spot at its base while the anal fin had three. This Panchax is probably *Aplochilichthys lineatus*.

GOAN FISHING



A small barb similar to *Capota semifasciatus*.

BARBS

I now turned my attention to a small under water shoaling fish. These were much more difficult to see and catch as the water was getting muddy. However, with our small net we were lucky enough to catch just two, which were probably a male and female. These fish turned out to be a small Barb (c 1in TL). When placed in a small aquarium in full sunlight, the Barbs were a lovely golden colour with a small black spot on the base of the caudal peduncle. There was a black spot lined with red on the dorsal fin which was noticeably a male. I was unable to identify this Barb. However, in size and colour it appears to be similar to *Capota semifasciatus*, except that it lacked all the other black spots associated with the species.

CATFISH

I had noticed that there were many catfish around particularly in the shade under the bridge which were far too quick for my young companions to catch. In my rubber sandals I stepped onto some submerged rocks under the bridge. Suddenly I felt a funny sensation around my feet and could just about see several catfish nibbling at my sandals.

One scoop and I had captured several catfish but retained only one for photography. The others were freed with some difficulty because their spines got entangled in the net. This grey-coloured catfish (c 3in TL) looked similar to *Anias gnaffel*, but I must admit that my knowledge of catfish is limited.

Grey coloured Catfish.

ANABANTOID

I now decided to sit quietly under the bridge and fish in the shade. All I could see was occasional movement but it was difficult to see any fish in the shade. Minutes later, I came up with what I considered to be the prize of the catch, a small anabantoid fish. This pale brown fish was about 1.75in TL and had reddish brown unpaired fins with the caudal fin being comb tailed.

We only caught one specimen despite spending some time looking for more. Identification from one specimen alone and a photograph at that is always difficult, especially as the species may be displaying fright colours. This anabantoid could possibly be either *Parosphromenus paludicola* or *Pseudosphromenus capensis* both of which

are of a similar size and colouration with comb tails and a dorsal fin with a wide base.

PHOTOGRAPHY AND IDENTIFICATION

All the captured fish were placed in a plastic jar and I hurried back to my uncle's house to photograph the fish. My previous fish photographs have always been done indoors with flash (see Snap-Happy Fish Photography, *A&P*, August 1995), but here in bright sunlight I set my Pentax Z-20 with macro lens to automatic and shot some good photograph in natural light.

Tentative identification of the fish was made when I got back to London by comparing my photographs with those in Dr Axelrod's Atlas of Freshwater Fishes. No Luck. But ...

Another planned fishing expedition to the same site a few days later, towards the end of my holiday, was ruined because of 12 hours overnight torrential rain. In spite of the rain I was feeling confident because I had secured a largish fishing net some 30cm square from Bis-Lin Aquatics. Returning to the same location I found the water surging along with water depth now around one metre and the surrounding area a mud bath.

There was some evidence of Panchax, but I had come looking for anabantoids in particular and left disconsolately. I



dropped off my fishing gear and went to Baga Beach, near Calangute, to sun myself instead. River Baga feeds into the sea here and is fairly estuarine with the salt sea water going up the river during high tide. I started investigating fish life on the banks of the river outlet and was surprised to see small shoals of surface swimming fish with golden spots on their heads fighting the strong current and trying in vain to swim upriver. Many of these fish were in full salt water.

I managed to catch some young and adults by hand, to confirm that they were in fact Panchax. Following the heavy rains the strong water flow in flooded streams had carried their fish into the river and then on towards the sea. However, there was no sign of Barbs or Catfish at this location.

CONCLUSION

My fishing expedition was disrupted by rain, and not having an adequate fishing net to begin with, among other things. Although, I was not able to properly sample the stream I was very lucky to come up with four different

species with a 9in net!

I had the intention to look for aquarium fish in some of the many small ponds in the middle of rice fields well away from flowing water, and also use a fishing rod for game fishing on the estuarine river systems in which Goa abounds. Although this was not to be I did have a wonderful holiday.

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I will have to go back to Goa myself, and maybe next time I will bring back some live fish to study, breed, photograph and properly identify.

A small comb-tailed Anabantoid.



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AQUARIST AND PONDKEEPER

TECHNICALITIES for beginners

Many a budding Freshwater or Marine Aquarist has succumbed to the relentless proliferation of undesirable forms of Algae, albeit to the extent that he or she, gives up the hobby for good, but hopefully help is at hand by approaching this problem from a different standpoint.

All forms of algae need food to grow, so by not feeding the algae the problem should disappear; simple, eh? But how do you know that you are not feeding the algae? Good question! Let's expand on this.

The water used in our aquariums nine times out of ten comes from the tap (cold supply); this water is full of various minerals and chemicals added by the water authority and whilst this water seems nice to taste and looks clear, unfortunately it is not always suitable for our aquariums. This water needs to be filtered by the use of an R/O or Deionisation filter; only then will the nitrates, phosphates and silicates be reduced sufficiently. This treated water can then be stored in a non-toxic container for top-ups and water changes.

The next consideration is good filtration and the use of phosphate and nitrate removing media in conjunction with a good quality activated carbon to lower the organic load on the system. If you have a Marine or Reef tank an efficient Protein Skimmer is a must, but you must change the airstone once a month or check the venturi valve on a regular basis along with the pump running the skimmer. You should aim to turn the tank capacity at least 1.5 to 2 times per hour through the protein skimmer for optimum results.

Proper lighting of the correct spectrum is essential for growing desirable algae, but the opposite is also true. Correct photo-period (time the lights are on) and replacement of bulbs/tubes (normally every six to eight months) is important.

The next step is to examine the 'inputs' (food,

Peter Moon looks at the Algae Menace



Keeping an aquarium algae-free is well worth the trouble. PHOTO: MR. & C. PEDGARI

supplements, etc). Most commercial dry foods contain small amounts of nitrate/phosphate, whereas frozen foods are specially treated, but either way the amounts of nutrients present are very small and not likely to cause any problems, but overfeeding can increase the organic load on the system very quickly. The use of supplements (additives) or water conditioners is commonplace, but choose products that do not contain phosphates or nitrates (this should be written on the bottle) as this somewhat, 'defeats the object'.

The 'outputs' need to be maximised and evolves around the efficiency of the filtration, but this can be aided by periodical syphoning of the substrate as detritus builds up, especially along the back of the tank and in the corners. Media used for adsorbing nitrates and phosphates needs to be changed or re-charged periodically for peak efficiency.

The use of Redox enhancers (see TFB A&P, May) can work well if the instructions are followed correctly, but you would still require a Redox meter to measure the potential. It has been established that certain forms of slime and hair algae will not grow at elevated redox readings (tapwater typically has

a redox of around 300mv).

I receive many calls from frantic aquarists trying to combat nuisance algae, so this leads quite nicely into this section of the article called:

The Systematic Approach

Check the quality of your tap water (better still obtain a water quality report from your Water Authority); this will give you some idea of the levels of Nitrate, Silicate and phosphate present.

If you can purchase an R/O unit or De-ioniser and use this for all water used in your aquarium. If not most good aquatic shops sell R/O water ready to use.

Do not overstock your tank, this only increases the biological load on the filtration system.

Maintain your filtration system regularly and change carbon and other filter media accordingly. Assist your filtration by syphoning detritus from substrates. If you have a Marine aquarium/Reef Tank, obtain the correct sized protein skimmer and pump for the tank and change airstones monthly or check output of venturi valve weekly.

Install the correct lighting for the species of fish/inverts being kept and change tubes every six to eight months or as recommended by the manufacturer. If your aquarium's water depth is over 20in, consider using metal-halide or mercury-vapour lamps and install a timer to turn your lights on/off and preferably in sequence (this also avoids stressing the inhabitants); light duration should be between 10/12 hours per day depending on species kept.

Most of the above suggestions will increase your tank's redox potential, monitor this if you can. (Unfortunately these meters are fairly expensive, but are a worthwhile investment);

also, check your water parameters with good quality test kits frequently and, above all, do not overfeed the tank, as opposed to the fish! Only use additives that contain no nitrates, silicates or phosphates.

To Conclude

Algae problems occur because there is an abundant food source (organics) available in closed system aquaria. What we have to do to combat this is limit the supply available and this can only be achieved by supplying the aquarium with the best water quality possible combined with the most efficient filtration.

There is another factor, particularly applicable to freshwater aquariums, that I have not really covered and that is why not provide competition for the consumption of any extra 'nutrition' in the water in the way of sufficient number of aquatic plants? This will deny any algal growths of their 'growing fuel'. In the marine aquarium most 'plants' are in fact macro-algae so you must learn to tell the difference between what's a desirable decoration and what's not!

Until next month,
Happy Fishkeeping.

Supplement



PHOTO: KEITH LAMBERT

***WATER-LILIES
& WATERFALLS
& Pond Accessories***

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& PONDKEEPER**
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The pond's crowning glory. 'No pond is completely without it.' The king of the aquatic plants, have all been used to describe or introduce articles or books about the Water-lily. It is not surprising, for what other aquatic plant thrusts up its magnificent flowers so conveniently above the water for us to enjoy throughout the summer with such guaranteed regularity? However, it wasn't always thus.

To put it bluntly, today's universally-popular hardy Water-lily could be described as a man-made feature — especially for pondkeepers living in temperate zones where Water-lilies from naturally warmer climes would not last from one season to another. Whilst it is true to say that the Water-lily is as old as aquarium-keeping itself (both appeared to get going around the 1850s), when compared to the rest of the natural aquatic plants, Water-lilies can still be regarded as 'modern.'

In this Supplement, we bring the world of the Water-lily to you: take a look at the 'birthplace' of hardy Water-lilies at Le Temple-sur-Lot in France where the majority of the hardy hybrids first felt the first wet of pondwater. Let Philip Swindells guide you towards the correct variety for your own pond's individual needs whatever its size or water depth. John Rundle explains how you can increase stocks of your favourite varieties without too much effort and Harry Hooper re-assures that whilst setbacks can, and do, occur there is nothing too much to be overly-troubled about. There are details too about the



PHOTO: M.P. & C. FREDNOR

Specialist Society — the International Water-lily Society — for those needing to delve deeper.

If you have a pond and want further ideas about introducing Water-lilies, then there's no better place to see them: in the petal that at one of the five Water-lily National Collections situated around the country. These range in size, and approach, to the display and culture of Water-lilies from water garden centre to stately-home proportions; from commercial outlets to scientific research and cultivation. At any Collection centre you will find excellent

and expert advice — all you have to do is ask. But before you hit the road, two pieces of advice — phone ahead first to check on flowering (our weather is so unpredictable) and sit back and read this Supplement first!

Before anyone gets in touch to tell us 'Waterfalls and water-lilies don't make the best of pondmates, yes, we appreciate that fact but we also know that many people want to add a bit of vertical water movement to their ponds; Susan Brewer has been doing fancy things with paving stones so we thought we'd let her share her experience with you. (By the way, if you pump the water up to the waterfall from as near to its re-entry to the pond as possible your Water-lilies won't get too disturbed by spray or cross-pond water currents). Just to ensure that Susan's not the only fall-person in this section, we've added a Pond Accessories item too — to make your water garden truly complete!

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Gladstoniana
PHOTO G. WICKS

HARDY WATER-LILIES

Water lilies are the most spectacular pond plants; available in hardy varieties in white, yellow, red and pink, often with attractively-marked foliage, they provide a wonderful show from late June until the first autumn frosts.

There are pygmy kinds for 15cm of water and really vigorous sorts which can grow in 2m or more. There is a waterlily

IN THIS SURVEY
PHILIP SWINDELLS
FINDS SOMETHING FOR
EVERYONE'S REQUIREMENTS,
WHETHER IT BE A PARTICULAR
COLOUR OR FOR ANY SIZE OF
WATER CONTAINER — TUB OR LAKE.

to suit every garden pool. The only exceptions are where there is heavy shade or very turbulent water. Waterlilies dislike both, and in the latter case may even die out. Remember that in nature they are plants of still ponds and quiet backwaters

GROUPS

The main groups of waterlilies are the *Laydekeri* and *Marliacea* hybrids. They are not exclusively

the best for the garden pool, but they do form two divisions which, if planted in the right depth of water are most satisfactory and a very convenient starting point for newcomers to water gardening who are looking for a reliability.

Named after the famous, French hybridist Joseph Bory Latour-Marliac, and his son-in-law Maurice Lay-deker (see separate article in this Supplement) these waterlilies are tough, reliable and free-flowering. The *Marliacea* hybrids require between 45cm and 1m of water, while the *Laydekeri* varieties are more comfortable in 30 to 45cm. Each has a spread that is consistent and compatible with the depth.

HYBRIDS

Of the *Marliacea* hybrids one of the best known is the bright yellow *Nymphaea x marliacea* 'Chromatella'. This produces masses of blossoms amongst dark green or purplish-green foliage which is heavily speckled and splashed with maroon. Unquestionably in our fickle climate the best yellow variety of all. *Nymphaea x marliacea* 'Albida' is the finest white of conventional appearance. A very reliable character that should fulfil the requirements of those who love our native white waterlily, *Nymphaea alba*, and want to grow it in their pool. Apart from the fact that there is a great danger of inadvertently buying plants which have been gathered from often diminishing wild populations, true *N. alba* prefers 2m of water rather than the 1m in which *N. x m.* 'Albida' is happy.

The soft pink flowered *N. x m.* 'Carnea' will grow in deeper water but in 60cm to 1m it is perfectly content. This is one of the loveliest waterlilies, flaunting beautifully-sculptured vanilla-scented blossoms which with freshly-transplanted plants sometimes flower white for the first-season. Its foliage is dark green with a purplish cast.

Other *Marliacea* hybrids include the bright red *N. x m.* 'Flammea' and *N. x m.* 'Rosea', commendable waterlilies, but

not as widely available as their stable mates. All *Marliacea* hybrids were raised around the turn of the century and have become regular inhabitants of our gardens a great testament to their quality.

LAYDEKERI HYBRIDS

The *Laydekeri* hybrids have also stood the test of time, but



ABOVE
Nymphaea x marliacea 'Carnea'.
PHOTO: G. WILDING

BELOW
N. odorata 'Sulphurea Grandiflora'.
PHOTO: AGP LIBRARY



they are not as diverse and interesting. Apart from the tea-scented *N. x laydekeri* 'Alba', which has become difficult to get hold of in recent times, the others are either pink or red. There are no yellow flowered *Laydekeri* hybrids. *Nymphaea x laydekeri* 'Fulgens' is probably the most widely-grown, a plant with dark green leaves strongly suffused

in the early stages of growth with purple or red and producing the most magnificent red blossoms. Its pink compatriot is *N. x l.* 'Rosea', while *N. x l.* 'Purpurata' is a deep wine colour.

There are many other varieties which will grow in 30-45cm of water and are perfect for the modern small pool. I particularly like the orangey-red 'Graziella'. This is one of what the Americans call changeables, a plant with blossoms that pass through several shades of colour. In this case from cream in bud to orange-red before it fades.

It is not quite as good a changeable as 'Aurora', for this small growing kind which does not prosper in more than 30cm of water goes from creamy-white in bud to deep port wine by the fourth day. A remarkable little plant with the boldly spotted green and maroon leaves which are typical of all the changeable varieties.

The foliage of the best of the smaller yellow varieties is very similar. *Nymphaea odorata* 'Sulphurea Grandiflora' produces upstanding canary-yellow blossoms with a hint of peach above dark olive green leaves with deep maroon spots. Not typical of the *odorata* waterlilies, it is the only one of this North American group which could be considered for the average garden pool. The other varieties are much too vigorous, except for *N. odorata* var. *minor*. This is one of the smaller growing kinds which is not often seen, mostly being replaced by the true pygmy waterlilies, especially where tub or sink culture is desired.

PYGMY WATER-LILIES

All the varieties of *Nymphaea x pygmaea* are excellent for miniature water gardens. Indeed they are best grown in such, for they are mostly ill-suited to the average garden pond having to live in the shallows of the margins amongst the reeds and rushes.

Without doubt the bright yellow *N. x pygmaea* 'Helvola' is the best. A free-flowering little fellow with handsome coppery-green leaves with purple splashes and stains. It is virtually

WATER-LILIES & WATERFALLS

Hardy Water-lilies

weather proof, doing equally well in sun or rain and blossoming from June until taken by the first frosts of autumn.

Nymphaea x pygmaea 'Alba', now believed to be a form of *N. tetragona*, is the tiniest waterlily of all with flowers scarcely the size of a 20p piece. It has plain green leaves and looks most contented when

established in a sink garden. In anything much more it will tend to sulk.

The reds, known as *N. x p.* 'Rubra' and *N. x p.* 'Rubis' are more vigorous than the white variety, but are much shyer flowers. They are also extremely slow to produce eyes or division and are consequently comparatively expensive. However, if a pygmy red waterlily is your desire you should be happy to be patient — and to also pay the price!

WATER-LILIES

At the other end of the scale there are very vigorous waterlilies of surprising cheapness. This latter is associated with their vigour and ease of propagation, which means that they often end up in tanks in the water plant departments of garden centres. They look excellent, but as they are very vigorous kinds, you would expect them to be fresh and leafy. Watch out for the white 'Gladstoniana' and pink flowered 'Collosea'.

N. Rose Arley
PHOTO: AGF LIBRARY



N. Escarboucle
PHOTO: G. SACCHI

green leaves and snow-white tulip-like blossoms it is a perfect centre piece for the smaller pool. This is one of the best waterlilies for planting in the unbroken mirror-like surface of a formal pool. A waterlily of quality.

So is 'Arc-en-ciel', a

medium-growing kind that until a few years ago was believed to have been extinct. It was rediscovered in Japan by an American enthusiast who gave a piece to Denver Botanical Gardens. Here it prospered, everyone believing it to be a strange tropical variety. Ultimately its identity was uncovered and it proved to be the old French 'Arc-en-ciel', a remarkable plant with flesh-coloured blossoms, but green and purple foliage which is heavily splashed and stained with maroon, blue and cream.

Another well restrained kind for a similar situation is 'Hermine'. With dark beautiful waterlilies, but for lakes rather than garden pools.

'Escarboucle' is another vigorous kind which you should consider carefully. This has bright red flowers with central golden stamens and is very well loved. It much prefers in excess of 1.5m of water, although it will flower and perform tolerably well in less than a metre. I would always prefer to choose a red flowered variety like 'Ellisiana' which is a natural for the shallower water.

Another well restrained kind for a similar situation is 'Hermine'. With dark

medium-growing kind that until a few years ago was believed to have been extinct. It was rediscovered in Japan by an American enthusiast who gave a piece to Denver Botanical Gardens. Here it prospered, everyone believing it to be a strange tropical variety. Ultimately its identity was uncovered and it proved to be the old French 'Arc-en-ciel', a remarkable plant with flesh-coloured blossoms, but green and purple foliage which is heavily splashed and stained with maroon, blue and cream.

FINAL PERSONAL CHOICE

Of all the popular waterlilies it is 'Rose Arley' that I favour. A conventional looking and very reliable pink flowered sort with a rich, aniseed fragrance. It grows freely and needs lifting and dividing every three years in order to retain its vigour. It quickly reverts to its free-flowering rhythm. In a practical sense it is the perfect waterlily, offering everything the connoisseur could desire along with reliability and ease of culture for the beginner.



THE NATIONAL COLLECTION OF WATER-LILIES

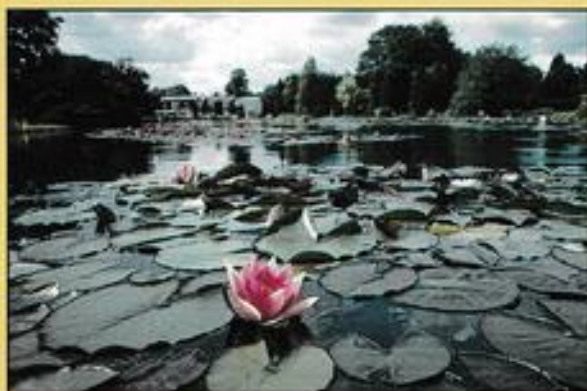
WATER-LILIES & WATERFALLS

Just as horticultural circles have National Collections devoted to certain genera or groups of flowers, trees or shrubs distributed around the U.K., so Water-lilies can also be found. Fortunately, there is no single Water-lily

Collection which means that most people will be able to find a Collection of Water-lilies not too far away — or at least making a longer, day-trip worthwhile. Obviously, the geographic location of each of the currently five Collections will determine

the 'opening hours' of the flowers, as much depends on temperature, length of sunshine and so on. Speaking to all the locations listed here, the flowers are now opening regularly (or are likely to be doing so by the time you read this).

Furthest north is **BURNBY HALL GARDENS** at Pocklington, Yorkshire (tel 01759 302068) 14 miles or so east of York just off the A1079 York to Beverley road. Burnby Hall has been described by the International Water Lily Society as having the largest, and highest quality, public display of hardy Water Lilies anywhere in the world in a naturalistic setting and the two lakes (originally dug to keep trout) now hold over 80 varieties. The Water Lilies at their best between July and September.



Over 90 per cent of the Gardens is wheelchair accessible and wheelchairs are available should you not be able to walk all the way round the extensive grounds. In addition to the obvious natural beauty of the floral displays there are special events by visiting bands throughout the summer to delight the ear as well. Opening times are 10am-6pm April to 29th September 1996. There is a £2.10 admission charge with concessions for parties, Senior Citizens etc.

THE NATIONAL COLLECTION OF WATER-LILIES



The name Reg Henley is a familiar one to Water-lily keepers as Reg has done much pioneering work on the cultivation and propagation. At the **ODIHAM WATER-LILY COLLECTION** at **WYCHWOOD CARP FARM** (tel: 01256 702800) at Farnham Road, Odiham, Hook, Hampshire RG29 1HS

(Junction 5, M3) can be found hundreds of varieties all displayed to allow close inspection of the plants under optimum growing conditions, even by disabled people. The aim of the Collection is to permanently maintain every species and variety of Hardy Water-lily that will grow and

survive in this part of the hemisphere. Whilst the Collection has no commercial interests and does not sell Water-lilies (exchanges between other Collections and private collectors do occur) there is a sales area on the nursery where the Collection is housed. Reserving a plant of your choice is however possible for future availability. The Collection also operates a Water-lily Identification Service. Opening times are: 10am to 5pm May to October. There is an admission charge.



Right on the south Dorset coast is **BENNETT'S WATER LILY FARM** (tel: 01305 785150), at Chickerell (B3157, Weymouth to Portesham road). Of equal

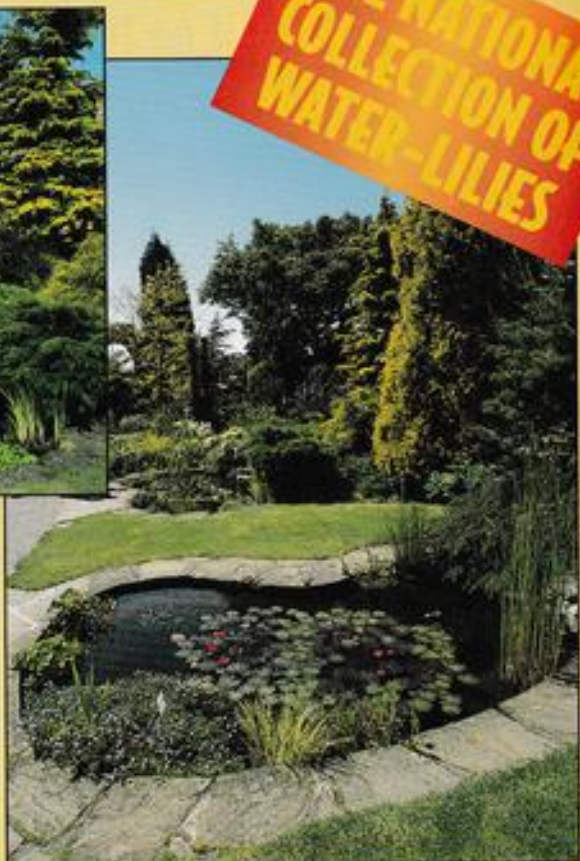
importance to the culture of Water-lilies this is probably the first place in the country to get its flowers showing, so is well worth a visit early in the season. Opening times are 10am-5pm and the Farm is open April to August (Tuesday-Sunday), September (Tuesday-Saturday) and October (Tuesday-Friday). Additionally, the Farm is open on Bank Holiday Mondays. There is an admission charge.



THE NATIONAL COLLECTION OF WATER-LILIES



With their connections as new owners of Latour-Marliac in France (see elsewhere in this Supplement), it should come as no surprise to find another National Collection at **STAPELEY WATERGARDENS**, Nantwich, Cheshire (tel: 01270 623868). Here, at the world's largest Water Garden Centre, you will find so much of interest to the water-gardener and pondkeeper that there simply isn't room to describe it all here. Stapeley is easy to find, it's got its own brown 'place of interest' sign at the relevant exit (junction 16) on the M6. One can't get much more famous than that! Opening times are: 9am-6pm daily (9am-5pm in winter) closed Christmas Day.



The most recent centre to be granted 'National Collection' status by the National Council for the Conservation of Plants and Gardens (NCCPG) is **KENCHESTER WATER GARDENS**, Church Road, Lyde, Hereford (tel: 01432 270981) situated two miles north of Hereford on the A49 road. The Gardens (and many other aquatic interests too) are open from 9am-6pm 1st March to 30th September with winter opening times (1st October to 28th February) 9am to 5.30pm. The current 157 varieties of Water-lily in the Collection is about to be increased by a consignment of new, lesser-known varieties en route from the USA. During the weekend of 27th-28th July, Kenchester are hosting an Open Weekend; enthusiasts will have an opportunity to view the display (weather permitting) and to discuss Water-lilies and water plants generally in the setting of the display gardens. Guided tours of the Water-lily propagation area will provide a marvellous opportunity to photograph different varieties, some of which have never been displayed in this country before. For further information contact Malcolm Edwards at Kenchester Water Gardens (see address above).



Although the above addresses are specifically designated 'National Collections' please bear in mind that other Water Garden Centres will also be having their summer stocks on display and will be only too pleased to help you select the correct Water-lily for your pond.

WATER-LILLIES, LOTUSES AND ... PRUNES



No Supplement on Water-lilies would be complete without more than a mention of France's contribution to their present universal popularity. Until the late 19th Century Water-lilies as we now know them simply didn't exist; the natural *Nymphaea* species were simply restricted to where they grew, usually in the tropics.

However, Monsieur Joseph Bory Latour-Marliac changed all that when he successfully produced a hardy hybrid — reputedly between a red-coloured sport of *N. alba* from a Swedish lake and a *N. mexicana* from America. Just as all thoroughbred racehorses are descended from a single pair of

**THE EDITOR GOES
'SUR LE CONTINENT' TO THE
BIRTHPLACE OF MODERN,
HARDY WATER-LILLIES.**

● PHOTOGRAPHS BY DIKK MILLS ●

Arabian horses, so too, it might be assumed our present day Water-Lilies have almost a similar, common single parentage.

In 1991, ownership of Latour Marliac Etablissement Botanique passed to Stapeley

Water Gardens who, over the recent years, have restored the nursery to something approaching its former glory. The concrete pools are still laid out in the original design and looking at the plant labels, many of the original hybrids are still going strong. The quest was on for a centenarian Water-lily — and who cared there were so many to search amongst?

The gardens were resounding to the chorus of frogs, lazing on lily-pads or on pond edgings; encouraged by the warm morning sun the flowers opened offering both colour and, in some cases, scent to the air. Overhead, swallows, house martins and micro-light aircraft dashed about in enjoyment whilst the staff busied



CENTRE PICTURE Monsieur Joseph Bory Latour-Marliac, founder of Latour Marliac Etablissement Botanique.
1 N. 'Eliisiana'; 2 N. 'Celebration'; 3 N. 'Fabiola'; 4 N. 'Ray Davies'.

themselves preparing new ponds with barrow-loads of local earth — the loamy-clay mixture being exactly right for Water-lilies.

Continuing on from the original pools, newer rectangular ponds hold thousands of water-lilies of all colours and sizes. A separate area has other aquatic plants together with some young Lotus plants gradually developing in shallow trays. The difference between Lotus and Water-lily leaves is easy to spot — no 'split' in the Lotus leaf which is also adorned with veins radiating from a central pale spot. However, Lotus cultivation is more complex and not quite so predictable (even in southern France's warmer climes) as that of the Water-lily but they're working on it.

A small museum on the site pays tribute to M. Latour-Marliac and also his son-in-law Maurice Laydeker who carried on the work following the death of Latour-Marliac by displaying many of

his hard-earned Diplomas and some of his early tools, plant labels and equipment. A small, round room attached was originally a prune-drying chamber (the area is highly productive in Prunes, having its own Prune Museum too!).

Not only are hardy Water-lilies to be found at Le Temple-sur-Lot, for in the large tropical greenhouse more exotic blooms can be found including the giant *Victoria cruziana* from the Amazon (yet to get going in middle-May) and wondrous yellow, blue and purple tropical species of *Nymphaea*.

But back to the search for that 1896 Water-lily. Looking through the catalogue there were several popular hybrids 'born' in 1895 but only one listed for 1896 — N. 'Eliisiana' — would it be here? Saying it was a red-pink variety hardly narrowed the search at all for such colours abounded in many pools and in many sizes of plants too. But, no

problem, there it was, looking as fresh as ever — almost half a pond of them — just getting into regular, daily flowering. Happy Centenary! Does it qualify for a telegram from Monsieur Chirac? On the other hand, it was very pleasant to see a mere stripling nearby of some 11 years christened 'Ray Davies' in honour of Stapeley Water Garden's owner.

Having spent a few hours moving from bloom to bloom, the subtlest variations in form, colour, number of petals, variegations in leaf colouration soon began to make one realise the huge potential that Latour-Marliac unlocked for the future benefit of water gardeners everywhere.

This seat of French aquaculture heritage could not be easier to find. It is about 1 1/2 hours by road from Bordeaux (try to get there quicker and you'll be automatically fined for speeding if you use the 'peage', the toll motorway — the ticket shows entry and exit times and

WATER-LILIES & WATERFALLS

Water-lilies, Lotuses and ... Prunes



Grove, the largest collection in the world, back to the Museum. It is obvious that M. Latour-Marliac's interests were not entirely focused on Water-lilies.

AGP is grateful to Chris Farmer, resident Stapeley Water Garden 'curator', for taking time to explain the workings of the centre and to point out all the important factors. If you're in the area then not only will you enjoy the flowers but Chris is an Englishman so no language problems either! Several airlines flying onto Bordeaux-Mérignac offer excellent discounted fares (usually under half price) if you stay over a Saturday night.

Hotel accommodation is not expensive but you should 'negotiate' for the best car hire terms before settling for a Rolls-Royce!

If you're under the proscribed time they know you've been overdoing things!). Leave the A62 motorway at junction (Sortie) 6 and follow the gentle road through the Lot Valley to Le Temple-sur-Lot where excellent signs direct you to Latour-Marliac. The nursery is open from mid March to the end of October, from 9am to 6pm.

Situated on a plateau of land above a small river the nursery is but part of a pleasant garden scene with extra attractions. A 'walk-behind' waterfall hides a small artificial grotto which in turn gives a view into the tropical greenhouse to view the large Amazonian lilies; a bridge is thoughtfully provided with seats so you can admire the view of the riverside garden and the National Collection of Water-lilies in the water. Further along the bank, crossing another Monet-like, Japanese style bridge, brings you via a Bamboo

The modern scene (above) still features the original lily ponds (below).



CULTIVATING WATER-LILIES

Many times I have been told by friends that they have just completed a spring-clean of the pond, during which they have lifted and removed the water-lily baskets for inspection. What follows often brings tears to my eyes. They say that the lilies were bulging in their baskets, so they removed all the excess thick root like material and threw it away. What they do not realise is that from this so called rhizomes or tuber material new young lilies could be raised. So to readers who also do the same, here is a simple method I use to propagate a few extra water-lilies by using these fat rootstocks that are often thought of as surplus to requirements. I will say at this stage that the main ingredient of any water-lily propagation project whatever method you use (rootstock or seeds) is 'patience'. For it can be a while before you actually see the fruits of your labour, that is the flower. Patience and time are the controlling factors when propagating water-lilies whoever you are. Professional grower or just a hobbyist like me.

METHOD OF PROPAGATION

We will only be looking at hardy water-lilies, and in my case the hardy hybrids. From that standpoint the only method that I use is propagation from rootstock; this allows me to raise enough young plants that I can handle with the limited space that I have.

JOHN RUNDLE
EXPLAINS HOW EASY IT IS TO
INCREASE YOUR STOCKS.

• PHOTOGRAPHS BY W. RUNDLE •

PROPAGATION BY ROOTSTOCK

Before we look at the actual mechanics of the method, let us clear up a few facts about the material we are going to use.

It can be comforting to pondkeepers when they read various water-lily literature and find the words 'rhizomes' and 'tubers'. Words that are often mentioned with conflicting ease but without definition.

A rhizome is defined as a horizontal underground plant stem lasting more than one season.

A tuber is defined as an underground swollen portion of stem or root of one year's duration.

By being able to produce rhizomes/tubers serves the plant in two ways:

- (1) It is a means of surviving during adverse conditions.
- (2) It is also a method of multiplying.

It is also possible that you have in your pond hardy water-lilies that have rootstocks that differ in shape and form. You could have plants from the

tuberosa group with its rootstock that grows horizontal. Long and fleshy with hairy roots and somewhat broom handle shape. It is from this section that new plants are obtained. This tuberosa group of lilies can be very vigorous growers and more suited to very large ponds or even lakes. An example would be *Nymphaea alba*, not one for the small pond.

On the other hand many of the colourful hybrids that are suited for the average garden pond could have another shaped rootstock. Take for example the 'Marliac' hybrids. These rootstocks grow perpendicular. Again this is the source of new plant material.

OBTAINING THE NEW PLANTS

It would be the norm to lift and divide a water-lily after three or four years, for smaller varieties it could be longer. Even if you did not want to increase your stock this would be done and the established plant divided. This helps to maintain its vigour and attractiveness. During this operation some of the old inner plant that is generally of no use is discarded and the new fresh divisions replanted.

If, however, you have come this far why not propagate a few new plants from the rootstock. The selected lily is lifted from the pond and removed from its basket. This could mean heaving to sacrifice the basket, as often the only way to remove the plant is to cut away the basket's plastic side panels. Once



TOP LEFT & RIGHT Shows vertical Marliac type rootstock with eye on the left and tuberosa rootstock on the right.

BOTTOM LEFT Shows 'eyes' Marliac on the left. Note vertical growth. On the right is 'eyes' of tuberosa.

BOTTOM RIGHT Shows four first year plants of Mrs Richmond.

removed the plant can be washed to remove any surplus soil. For this work I place a sheet of polythene on the ground for it can be a bit messy. Also a watering can to occasionally sprinkle the plant if there is a chance of it drying out.

The plant will be seen to have a main rootstock and if of the 'tuberosa' group thick branch like side growths, on which round nodules bearing what is called 'eyes'. Sections of this long fleshy rhizome 1in long that have an 'eye' and roots can be cut off and used for new

that all cut areas on both eyes and rootstock can be dusted with powdered charcoal. This helps to prevent infection. I dust sulphur on the cut sections on the 'eyes'. Once you have gathered enough new plant material for your requirements the parent plant can be replaced back into the pond.

The new plant sections that should bear an 'eye' and of course a root can now be potted if large enough, individually into a 3in pot or three or four small ones to a larger pot for

enough to give a water level that will cover the rims of the pots. They should at this time be placed in an area where they can obtain full sunlight.

As this project is carried out in early May I often use the greenhouse to give the plant a head start. You can of course use a coldframe. The water levels in the containers are raised and the young lilies grow and even repotting may be necessary. In the summer the young lilies can be kept outdoors in the winter I move them to the greenhouse to save them from freezing solid in their pots. Remember I did say that patience is a keyword in propagating water-lilies, for it can be up to a couple of years or longer before you may see a flower.

Having said this the wait is well worth it and when it does flower you can say to your friends that you grew that beautiful plant from a small section of rootstock. Just think, you used to throw it away!



plant growth. 'Eyes' can be best described as growing points, similar in form to eyes on a potato. In a more advanced state juvenile foliage can be seen or just starting to show. On plants of the hybrid Marliac group when removed from the basket a more compact form will be found from which sections of rootstock can be cut off bearing 'eyes' and roots. A little more care is needed with this group when collecting new plant material. It is said

growing on. Use a good loam compost for this job, and I push a proprietary brand fertiliser tablet into the soil at this time when potting. I then stand the pots in containers or trays that are deep





Distorted, three-centred flower.



This almost totally white *Nymphaea* 'Vesuve' flower should be totally red!

PESTS, DISEASES AND DISORDERS

Diseases and ailments of true aquatic plants are relatively few and far between (probably being immersed in water has a lot to do with it) but the Water-lily might be considered different. Firstly, although an aquatic, its leaves and flowers share above-water air-space and so come into contact with other 'contaminants' that their below-surface counterparts do not; secondly, if there is to be trouble you can bet that it will be your most-prized plants that will be affected and, with their fabulous flowers, Water-lilies surely fall into this category!

Treating of any disease is straightforward once a remedy is found but, again, there could be complications — it's all very well fighting off a disease successfully but not if it's at the

HARRY HOOPER IS PLEASED TO SAY THAT THERE'S NOT TOO MUCH TO WORRY ABOUT.

● PHOTOGRAPHS BY THE AUTHOR ●

expense of other pond-inhabitants, such as fish! Always take great care when using any chemicals near ponds.

INSECT ATTACK

Flowers are always attractive to insects who normally do great service in the fertilisation process and the Water-lily flower with its first day supply of nectar is no exception; as with the terrestrial flower-bed, there is a

downside with the attraction of less-desirable visitors, in this case aphids who will cause extensive damage to the leaves

Long, hot, sunny days seem to encourage infestations of aphids just as much as it encourages Water-lily growth and flowering. Aphids spend the over-winter period in plum and cherry trees quietly gathering in numbers for the summer onslaught on our gardens (and ponds); to lessen this outbreak of aphids you can spray the trees (pick a calm, non-windy day) with a suitable preparation during the winter. However, should the worst happen, as soon as you see the little pests on the leaves you can get rid of them both easily and beneficially — either dunk the leaves below the surface or wash off the aphids with a jet of water; in either instance the fish in the pond will appreciate this

MAKING A S

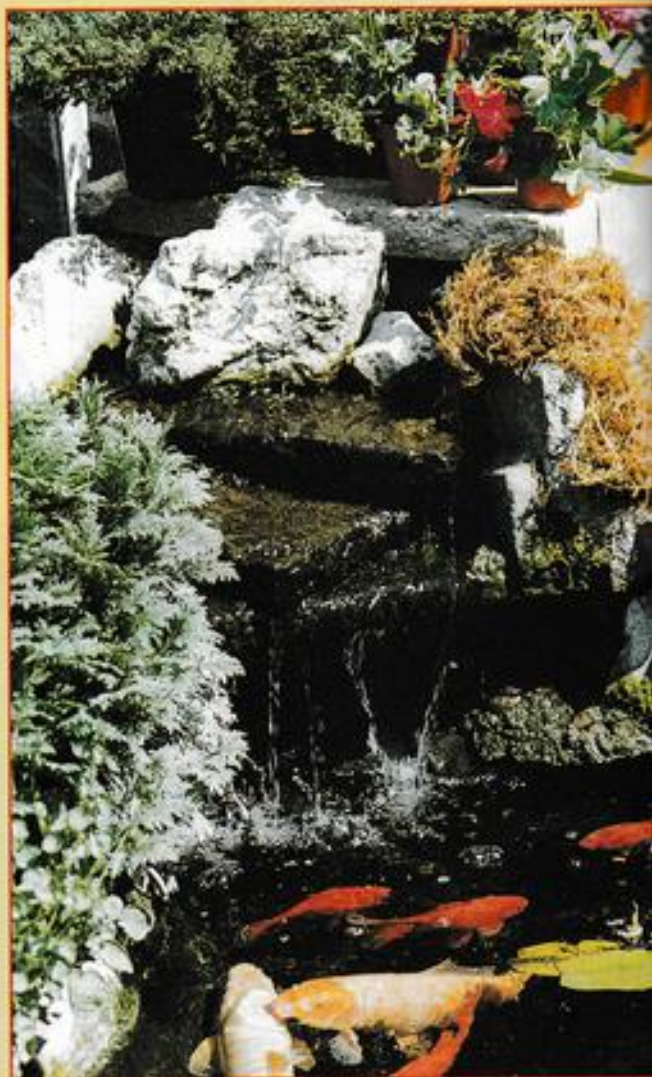
SUSAN BREWER BUILDS A WATERFALL.

• PHOTOGRAPHS BY THE AUTHOR •

It was the visit to Wales that did it — my husband was unusually quiet on the way back from Swallow Falls. Knowing how his mind works, I wasn't in the least surprised when he started measuring the area at the back of our pond and making various calculations on scraps of paper.

Once he had assured me that, no, he wasn't intending to actually recreate a waterfall 75ft high in our back garden but was thinking along more modest lines, I was quite enthusiastic about the project. I've always been fascinated by waterfalls; one of my favourite water garden centres has a magnificent one, and though I knew ours would only be a fraction of the size, I still thought it would be a welcome addition to the garden. Our 8x4ft pond had a bubble-type fountain already, but it was very quiet. I hoped that the sound of constant trickling water down mossy stones on a hot summer's day would provide an illusion of coolness and peace in the garden. I'd be able to close my eyes and imagine I was back in Wales — in fact, a few sheep, a Welsh choir, some daffs, and we wouldn't have to travel again!

At first we considered using one of the pre-formed waterfalls, made of plastic, fibreglass or concrete, which come in so many shapes and sizes. We visited numerous water garden centres, checking out these watercourse features. Unfortunately, they didn't come



ABOVE The waterfall now in its matured state.

RIGHT Building the retaining wall of the waterfall.

in the shapes and sizes we actually needed. Our pond is raised, surrounded by a 18in wall, and with a conservatory at one side. Consequently we were limited by space and by the fact that one of the purposes of the waterfall was to hide the large filter box, which was such an eyesore at the back of the pond. Therefore it wasn't really possible to compromise on the shape we needed. (Actually, this

filter works wonderfully — as my husband's a bit tight-fisted, he decided to economise on the cost of a filter unit when we built our pond several years ago. He

PLASH!

bought a large overflow header tank from our local DIY store and some 1 in plastic piping to connect it to the pump. Then he built a breeze-block wall to enclose the whole thing, and made a wooden lid for access to the filter. One day, after he'd been racking his brains about the best filter medium to use, I discovered him in the kitchen furtively contemplating my nylon pot-scourer. A trip to a local 'cheapo' hardware shop produced an enormous bag full of the things, but we did get some funny looks from the cashier — we pretended we did a lot of washing up! Still, the scourers do the job wonderfully, trapping all the gunge, and only need a quick swill under running water every so often. It was a shame that we couldn't use one of the moulded waterfall products, as many of them are excellent, and extremely natural-looking. They would obviously have been a lot simpler to install than the method we finally used.

Once we realised that we had to abandon the ready-moulded idea, it was a question of 'back to the drawing board'. My husband remembered that we had some Cotswold stone paving slabs, left over from our patio, which had been weathering quite nicely in the

garden. He wondered if it would be possible to utilise them in some way, perhaps as the steps of the fall, thinking that once they had a few months growth of algae and moss, they should look very natural, almost as good as a Welsh waterfall!

The first problem to solve was how to make the water run exactly where we wanted it to, and not cascade all over the patio, path, and conservatory. We knew that we needed to form some kind of chute, and after much thought, and several visits to water garden centres and DIY shops, the obvious answer suddenly dawned. With a cry of 'Eureka' we hurried to our local dealer and bought a 6x4ft offcut of butyl rubber pond-liner.

A few happy hours were spent placing the butyl in position at the back of the pond-surround wall, and artistically arranging the paving slabs on top of the rubber before my husband turned on the pump to see if we now had a cascade. We had — all over the aforementioned patio, path and conservatory! Time for a rethink. After considering making a wooden slide, or stiffening the butyl in some way, we eventually reasoned that some kind of retaining wall was necessary. If one was built alongside the butyl chute, before the paving slabs were laid in position, then hopefully, the wall would guide the water down to where it



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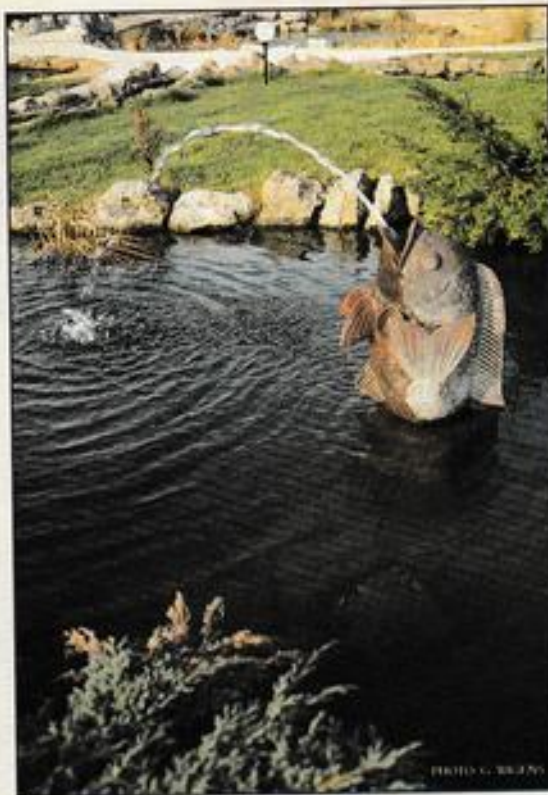
Pond Peripherals

another one do give this aspect a serious thought.

On the other hand, the majority of pondkeepers do get round to installing some form of water movement such as fitting a FOUNTAIN, CASCADE or WATERFALL: all of these are readily available as 'off the shelf' products easily viewed at your local water garden centre. Such is the technological advance in most things aquatic these days that low-voltage pumps can easily equal the performance of mains-operated models; that antiquated, well-weathered cascade is just as likely to be made from reconstituted materials or fibre-glass than the 'real stuff.' Any water movement provides extra aeration during the warm summer months and many pond owners invest in a VENTURI device or maybe a specialised POND AERATOR to maintain adequate dissolved oxygen levels.

The 'upgrading' of a pond with a FILTRATION SYSTEM may be the next logical step (maybe after a season or two of green water?) and it can quite easily be integrated into the existing water movement scheme of things, after all, why not pump the water through something useful on its way to something decorative? Of course there are filters to suit all requirements and the latest units have an integral ultra-violet lamp to combat that green water already mentioned. Usually the spur to fit a filter is to make use of that extra outlet on the fountain stem but, looking on the practical side, a proper 'sump type' pump is probably better at delivering 'dirty' water to your external filter than a small fountain kit pump.

Still within the pond's perimeter (and in the water) contoured or curved, hessian-free PLANTING BASKETS make the planting, and easy management, of marginal



plants a doddle. Should your fish wish to spawn and there aren't enough floating plants to safely contain the scattered eggs then SPAWNING MATS and ROPES are the answer — there's even one that you can turn outside-in once spawning's over, to protect the



fertilised eggs from the attentions of the egg-hungry adults.

Earlier, the words 'labour-saving' were used and a good example of this is the automatic FISH FEEDER which saves you the effort of rising from your poolside lounge to tend to your charges. However, you have to put some muscle power into working the manual version of the POND VACUUM CLEANER to remove silt from the pond base unless your budget can run to a pump-powered model.

POND NETS may look intrusive but they serve a good purpose by protecting the fish from herons and also (if the mesh size is right) collect falling leaves in autumn, again making the autumn clean-out a little less burdensome.

Even extending the pond is no longer the daunting task it used to be: an extra pond can be built alongside an existing pond and by judicious planting of marginals, you won't even see the join! Similarly, any pond can be augmented to include a BOG GARDEN for further interest although we are now beginning to encroach into terrestrial, rather than fully aquatic, interests.

Never the one to put a damper on anything pleasant, mention must be made accessories that come into their own during the autumn and winter months.

TEMPORARY POND COVERS can be used to prevent excessive leaf-falls from entering the pond, a BUBBLE-WRAP cover can keep a pond a few degrees warmer and a FLOATING POND HEATER will keep a section of the water surface ice-free.

POND ENHANCERS

POND LIGHTING lighting can serve two purposes — it can lend an extra dimension in the pond from where the submerged lamps will light up the fountain most

dramatically, or else it can add more subtle lighting effects to the pond surrounds and lend a colourful atmosphere to evenings spent outdoors (don't forget, a well-defined poolside is a safer place at dusk). Always be sure to use correct electrical cable (armoured and buried deep for mains voltages), weather-proof junction boxes and switches and protect the whole thing with suitably-rated Residual Current Devices.

Safety and security around the pond are of paramount importance and ALARMS can be fitted to cope with almost anything. A recent device, floated on the water surface, will emit an alarm signal should the surface be disturbed by anyone falling in — obviously it would be removed (or switched off) during any Koi-spawning activity! Infra-red activated lamps can be used to light up the pond surrounds when approached (either by friend, foe, cat or heron) and there seems to be a new heron-detering device on the market almost every week!

Looking in the reverse direction, a plant-clad PERGOLA over the pond could be seen as a light-deterrent, doing an extra service by shading the pond from green-water encouraging sunlight and also hiding the pond from the view of any passing Heron. Should the water garden design be ambitious with ponds connected by a meandering stream, then a most natural thing to include would be a BRIDGE allowing access to other parts of the garden, to other parts of the pond

or even to a small GAZEBO.

Depending on the size, shape and design, there are many STATUARY designs which will add further attractiveness to the pond and its surrounds but you must be careful to keep within the bounds of proportion and good taste! DO be careful only to choose statues and ornament that use non-toxic materials in their construction; some metal-based design may be of dubious safety from the fishes' point of view.

One accessory group that serves both the pond and the surroundings are the MARGINAL PLANTS. As an earlier article showed (Under-Rated Marginals by Philip Swindells, **AGP** June) these useful plants help the pond to naturally blend in with its surroundings and also provide ideal sanctuaries and perching places for animals, insects and birds visiting the pond. Again, judicious choices must be made about size and height of marginals, as in windy weather they can easily topple into the pond and undo a lot of your hard, artistically-based work — to say nothing of the extra load placed on the filter trying to clear that resulting load of muddy water.

For the Koi pond, it is an easy progression to make the pond surrounds oriental in design to tie in with the oriental beauties swimming in the pond, here you can really let your artistic mind have a free rein — Pagodas, Snow-lanterns, Deer-scarers, Conifers, Maples, huge Boulders can all be incorporated into your Grand Plan.

ESSENTIAL POND EQUIPMENT

Perhaps the most overlooked piece of equipment, or pond accessory, is the WATER TEST KIT. Nowadays, there is a much more general understanding about the mysteries of water chemistry and a good test kit will allow you to monitor the most important of the water quality parameters easily. All test kits are accompanied by instructions both giving guidance on how and what to test for as well as how to interpret the results and what to do should rectifications be needed.

Sturdy NETS are also essential for day-to-day pond use and a LAWN RAKE or a piece of twisted stick will be ideal for getting out that excessive Blanket Weed before reaching for one of the many REMEDIES for this pest.

Finally, the most useful piece of pond equipment isn't available from the aquatic dealers but is provided free of charge to all pondkeepers — it's your own eyes. Use them to get the feel and rhythm of the pond's life; look out for abnormalities, as well as the good signs and you won't go far wrong.



TOP LEFT A selection of hardware, bottom drains, valves, pumps, connectors, etc.

BOTTOM LEFT Aerator venturi (left), flowmeter (right).

ABOVE Low voltage fountain pump.

BELOW External filtration unit.

TOP RIGHT Pool heater

BOTTOM RIGHT Submersible pump with extra large pre-filtering strainer.

PHOTOS: AGP LIBRARY



DEVELOPING DISCUS

In last month's article we discussed very basically what happens during the first few weeks in the life of Discus fry. We will continue from there, as these formative weeks are probably the most important time in respect of feeding and caring for your Discus.

The most popular size that Discus are sold at is between 3cm and 6cm. I have already explained in previous articles that it is of extreme importance to make sure that your newly acquired Discus are of perfect shape, and to the best of your ability you should make sure they are feeding, and are otherwise healthy. I have given you pointers to look for in previous articles. At this point I feel obliged to point out, that to keep Discus disease-free (it isn't impossible), I feel they should NOT be kept with other large fish such as Oscars, Angel Fish, etc. You would be amazed how many phone calls I receive asking what can be done about a certain ailment, and it often prevails that there are Angel Fish in the tank (they are notorious carriers of Hexamita). As well as the disease side of things, other boisterous fish cause Discus stress and this should be avoided at all costs as stress can make the Discus more susceptible to many diseases.

Discus only breed effectively in soft water. This has its own problems, associated with the chemistry remaining stable. Extremely soft water does not carry the trace elements that are absolutely essential in the successful raising of Discus.

My advice to anyone raising young Discus to maturity would be to raise them in water of medium hardness up to 10 GH, and then to add trace elements to that. It will be found that problems with pH will be vastly reduced, as harder water is much more stable than soft water, due to the buffering capacity. To give some perspective to this, I breed fish in water with a TDS (Total Dissolved Solids)

**BRIAN MIDDLETON
TELLS HOW TO RAISE IMMATURE DISCUS
TO 'SCHOOL AGE'.**

• PHOTOGRAPHS BY THE AUTHOR •

reading of 40ppm or 80µ Seimens, but I raise my fish from the age of 10 or 12 weeks in water of much higher T.D.S. values (in actual fact up to 250ppm or 500µ Seimens) and I achieve this by the addition of Trace Elements which are specifically manufactured for use in soft water, and contain approximately 90 safe and essential Trace Elements.

The other obvious criteria for Discus health is a correct feeding regime. This is much more important than many hobbyists realise, for instance 'Hole-in-the-Head' disease is caused far more

often by a feeding deficiency than by the flagellates. Hexamita and Spiroplasma which usually get the blame, in fact at 30°C which is the recommended maintenance temperature for Discus the Hexamita flagellate has great difficulty surviving. To give Discus a comprehensive diet they need to have access to carbohydrates, fats, proteins, minerals, vitamins and trace elements.

It is also extremely important to feed a correct balance of these. It is also just as important to feed as varied a diet as possible to prevent boredom and malnutrition, which is probably the cause of most Discus ailments that I see.

CARBOHYDRATES

The main function of carbohydrates is to serve as a source of energy. Energy being required for all bodily, physical and chemical processes. Energy is derived from Glucose. The glucose usually remains at a constant level in the blood. The glucose level increases after feeding, and to restore the blood to its normal level, the glucose is converted into glycogen in the liver. This glycogen may be converted back into glucose if the glucose blood level should be allowed to drop (for instance if a feed is overdue). However, if the fish is fed too much carbohydrate, and the glycogen store is 'full', these

excess carbohydrates will be stored as fat in the body.

Another contributing factor to nutrition is roughage as it stimulates stomach and intestinal movements. Roughage can be derived from cellulose or chitin (skeletal substance of Arthropoda, i.e. Mysis, Artemia, etc.), as well as from other sources. Carbohydrates are also required as they are part of the substances which make up bones, cartilage, tissue and mucous substances (which are needed for the transport of food through the digestive system).

Hungry young Discus on the lookout for food.



TROPICAL *Developing Discus*

DEFICIENCY

This can result in nervous disorders and intestinal blockage. If only beef heart is fed, this will result in a carbohydrate deficiency as it does not contain any carbohydrates. However, when prepared with other ingredients, it is a most valuable source of other essential nutrients.

EXCESS

Too much carbohydrate or roughage can also lead to malnutrition and will produce digestive disorders.

FATS

These are the storage substances and food reserves. They are called 'essential' as they must be taken in with food, and are required if the uptake of fat-soluble vitamins is to occur.

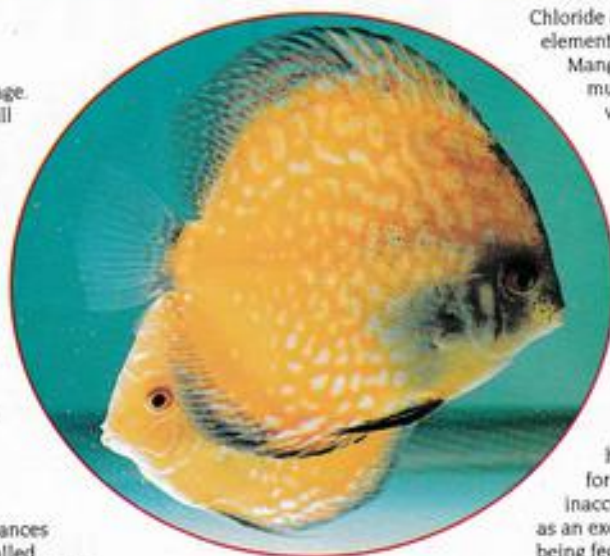
PROTEINS

Proteins are present in all organs and are involved with most functions. Proteins are made up of chains and mixtures of over one thousand amino acid groups. Each chain comprises of numerous combinations of over 20 individual amino acids, producing an almost infinite number of possible sequences (each sequence being called a protein). Proteins are also 'essential' as they must be taken in the diet. When proteins are eaten they are metabolised into their amino acid groups. These groups are then reconstructed to form those different proteins which are required for bodily functions, and adequate nutrition. Some amino acids can be synthesised in the body, but those which cannot be are termed 'essential'. These essential amino acids must be part of the diet, otherwise the proteins will not be able to function effectively. Therefore it is common sense that a diet should comprise of all the required amino acids in adequate amounts (or in excess if necessary).

To prevent any form of deficiency the answer is to always provide a varied and comprehensive diet.

VITAMINS

Vitamins are required by the body in minute amounts, and are essential for



Excellent adult fish are only achieved by getting everything (including diet) right.

the efficient metabolic action. First and foremost let me dispel a myth: it is of no benefit to add vitamins to your aquarium. The fish are very unlikely to derive any nutrition from this method as the vitamins do not last in these conditions. Vitamins are quickly broken down in conditions where light and oxygen are prevalent; or where there are particularly acid or alkali environments.

Vitamins should be a constituent of a combination food rather than a separate diet item.

Whilst a number of diseases can be a result of vitamin deficiency, there are also an equally large number of diseases that can be caused by an excess of vitamins. Therefore you should not rely on the addition of supplementary multivitamins to an already adequate diet. This is because, although you will be providing those vitamins which may be deficient, you are also in danger of overdosing with those vitamins which are already provided in adequate amounts in the diet.

MINERALS AND TRACE ELEMENTS

Minerals and trace elements are also important for healthy fish nutrition. The best known minerals are Sodium, Potassium, Calcium, Magnesium,

Chloride and Phosphate. Important trace elements are Iron, Copper, Zinc and Manganese. Minerals are required in much larger quantities than vitamins, whereas trace elements are required in barely detectable amounts (i.e just a trace!).

PREPARED FOODS

Many Discus keepers prepare their own foods from beef heart and other ingredients, but it should be remembered that beef heart is not a natural ingredient in the Discus diet, therefore food based on beef heart should not be the only diet for a long period of time. It is inaccurate for a food to be described as an exclusive diet. Can you imagine being fed a diet of just beef heart and spinach for every meal of your life! I think it is worth remembering that your Discus will have no choice, they rely on you for their food. In my experience Discus do get bored and should be fed as varied a diet as is possible. My prepared food has varied over the years but I now follow the recipe recommended by Dieter Untergasser in his excellent book on Discus Health. The ingredients include beef heart, spinach, carrot, parsley, egg yolk, yeast, prawns, together with a binding agent. This food is prepared with great care using only the freshest of ingredients; it is then frozen immediately in slabs. It must be taken into account that even a food with many ingredients such as this is only a supplementary food and should only form a part of the Discus diet.

I also use frozen Bloodworm, Earthworms, Mysis Shrimp and Tetra Prima. It is not advisable to feed frozen adult Brine Shrimp, Mysis or Krill as the Discus metabolism is not equipped to cope with the salt these creatures contain; recently I have been using a revolutionary new high-vacuum freeze-dried food from Germany called DISKUSIN. It is a food that contains no added chemicals, it is a completely natural biologically balanced diet of worms of different sorts, vegetable matter, and a variety of different insects and their larvae and, extremely important, roughage. Due to the special production techniques and high-vacuum drying process, no chemical additives for preservation or drying are necessary but

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it still contains all of the important nutrition components.

I must say, it has produced a phenomenal growth rate in my fish, and what is more, they love it.

The bottom line to feeding Discus is to feed them as varied a diet as possible. Under no circumstances feed them live foods that have been retrieved from water that contains other fishes.

TROPICAL Developing Discus

Feed them as often as they will eat the food you are offering them. Remember, Discus cannot over-eat, but you can overfeed, so clean up any surplus before it has a chance to 'go off'.

FEEDBACK

I received a letter from Mr Fred Collier of South Shields enquiring about Discus Nutrition and in particular, amino acids. (It shows that we do take notice, and try and please when we can). I hope this article has been of help to you, Fred. In answer to your question, regarding adding 'over-the-counter' amino acids, I personally do not think they would do any harm, but, unless they are added in the correct proportions, they probably will not do much good. I would go so far as to say that if you are feeding a varied diet that includes fresh ingredients of protein and vegetable matter, and you supplement that with dried food such as Diskusin or Prima, and also the occasional feed of a live food such as Whiteworm or Earthworm, you will have Discus that will want to start fighting you, they will be so fit!

My next article will be covering the subject of how to go about finding breeding fish. And a few tricks you can try to obtain your goal. Any suggestions you may have for future articles on Discus will be considered, so get your thoughts down on paper and send them to me.
c/o Aquarist & Pondkeeper.

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frogs & friends

By BOB and VAL DAVIES



Prices of mutations

Looking at some retail price lists from dealers in the USA we were struck by the high prices of various mutations. A new albino form can fetch huge financial rewards although prices will fall as more are bred, as in the case of albino Burmese pythons (*Python molurus bivittatus*) — current prices 8-10ft (2.5-3m) females \$450, males \$300, a substantial drop from initial prices of this species when it was first bred. Albino horned frogs (*Ceratophrys*) now only fetch \$20 (normals \$15) — again a reduction from original prices.

Some recent developments: albino ball (royal) pythons (*Python regius*) cost \$7,500 (normals \$50); albino Colombian boas (*Boa constrictor imperator*) \$5,500 and one of the latest, albino Kenyan sand boa (*Eryx colubrinus loveridgei*) \$3,250 per pair (normals \$75 each for captive bred babies). The profit motive was highlighted by one item — albino green iguanas, "inquire on price — could make someone a small fortune breeding".

Whatever one's views on breeding more and more mutations the potential profits will ensure that it continues — as prices fall another mutation is sought to maintain a high income.



Albino *Ceratophrys* more highly priced than the normal form.

PHOTO: BOB & VAL DAVIES

Subjects for the vivarium

Frequently offered for sale and relatively cheap long-tailed lizards (*Takydromus sexlineatus*) make interesting

subjects and are fairly easy to keep and breed. They are sometimes labelled (incorrectly) as long-tailed skinks. As the name implies the long whiplike tail is almost three times the length of the body (total length up to 25cm/10in). The

background colour is brownish with narrow yellowish stripes along the body — the scales are keeled.

The genus contains some 12 species distributed mainly in Eastern Asia to Indonesia. Frequently seen for sale in Hong Kong markets

Takydromus sexlineatus — a long slender species at home in tall grass.

PHOTO: BOB & VAL DAVIES



as bird food they are mostly imported from China.

T. sexlineatus is found in relatively open grasslands — they are said to run 'on top of the grass'. The long tail is thought to assist balance when moving in this manner.

A vivarium containing a layer of coarse sand and small gravel furnished with dried grasses, twigs or dried, undyed flowers for climbing and kept at 24-30°C (75-86°F) falling to 20°C (68°F) at night is suitable. A clump of moss will help retain moisture in one corner where eggs can be buried. A piece of cork bark makes a suitable hiding place. A daily spray is useful but provide a water dish as well — very damp conditions must be avoided. Food is the usual insect fare, small spiders are particularly appreciated. Males are recognisable by the swelling at the base of the tail. Some writers claim up to 10 eggs per clutch with some species producing up to six clutches per year — our specimens produced only two clutches of three eggs in a year. Eggs are incubated at approx. 26°C (77°F) and will take some 60 to 70 days to hatch.

Herp health warning

No doubt some readers saw the series 'Hollywood Pets' (ITV April) and will have experienced the same mixed reactions as we did at some of the odd ways in which pets are treated. We could not help but be amused at the reptile-keeper who had changed his surname to 'Lizardlover' — despite our long fascination with reptiles and amphibians there are limits!

The same gentleman was seen kissing his iguanas and a prehensile-tailed skink. This is not recommended. All animals (not just reptiles) carry germs which can be passed to humans and such close contact should be avoided — after handling the hands should be washed. The lizards featured were obviously tame and used to such treatment but the prehensile-tailed skink (*Corucia zebrata*) has a powerful bite (as we know), and it is foolish to tempt fate in this way. No matter how 'silly-tame' an animal is there is always the possibility it may bite even after several years of regular handling.

HERP FACT FILE — TURTLE NECKS

According to the fossil record turtles (Order — Testudines or Chelonía) have been around a long time, the modern forms since the Cretaceous, which means they were contemporaries of the dinosaurs. Their success has been due, in large part, to the development of the distinctive shell which has provided effective armour plating. This basic feature has permitted only limited adaptation and although some variations such as shape, hinges and leathery shells have developed, all turtles have a basic 'design' and are easily recognisable as such.

The shell has provided a unique refuge into which the vulnerable head and limbs can be withdrawn when threatened. Not all species possess this ability. The Order is divided into two sub-orders Cryptodira (hidden-necks) and Pleurodira (side-necks). The former contains some 244 species, the latter 61. The side-necks fold the head and neck sideways under the front edge of the shell whereas hidden-necks mostly withdraw the head completely, simultaneously pulling in the forelegs to give further protection. During this operation the neck is pulled into a vertical 'S' shape within the body. Among the hidden-necks complete withdrawal of the head and limbs is possible, the hinged plastron (lower-shell) effectively 'sealing'

up the shell as in some box turtles (Terrapene). Snapping turtles (Chelydra) can withdraw the head with jaws still agape, a useful defence. This is facilitated by the small plastron and the relatively flexible bridge between plastron and carapace. The large-headed turtle (Platysternon megacephalum) cannot withdraw its huge head which has developed a bony covering as protection and Marine turtles, although Cryptodires, are able to only partially retract the head.

The side-necks possess long necks. In some species the head and neck are as long, possibly slightly longer, than the body — this is especially noticeable in the snake-neck turtles (Chelidae). Their relatives the helmeted side-necks



African Side-neck turtle (Pelusios species).

PHOTO: BOB & VAL DAVIES

(Pelomedusidae) can retract the anterior part of the neck before folding it sideways. The long necks of these species are used to forage among sand and for snorkelling but the head is less well protected when folded.

Snorkelling is seen also in softshelled turtles (Trionyx) although they are Cryptodires. The Pleurodira are restricted to the Southern hemisphere and are totally or partially aquatic. No terrestrial species are Pleurodires.



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The 'miracle' lizard

The amazing ability of the Plumed basilisk (*Basiliscus plumifrons*) to run on water at, according to reports, speeds of up to 12km/hr and for distances of 400 metres, has confounded scientists for some time. This feat is accomplished by standing upright and running on the hindlegs only. Other lizards use this bipedal gait — the frilled lizard (*Chlamydosaurus kingii*) of Australia is one example and we have seen a young iguana use it when it escaped from its vivarium, but only the basilisk is known to run on water.

Flaps of skin along each margin of the toes (on the hind feet) increase their surface area, which must help, but the mystery was solved recently by two scientists at Harvard University. Television reports showed footage of a plumed basilisk running on water in a long tank. Slow motion revealed that as the feet hit the water surface air is pushed down providing support for the lizard's weight for just time enough to stop it sinking — the basilisk actually runs on air!

TOMORROW'S AQUARIST

BY GINA SANDFORD



Getting your fish to breed is one thing; raising the fry to maturity is just as big a challenge.

One of the major reasons for fry loss is lack of food. Sounds a simple enough problem to rectify — feed more and more often — but is it really that easy? In theory, yes. In practice ... let's just say that things don't always go according to plan.

The problem with fry is that, like fish in general, they come in all shapes and sizes so no single food will suffice for all fry. Just as we provide vegetarian foods for herbivores, high protein meaty foods for carnivores, a selection of invertebrate foods for the insectivores and a combination of all three plus flake and pelleted foods for the omnivores so we must cater for the specific requirements of fry. But exactly when do you feed them?



Daphnia.

PHOTO: M. SANDFORD

Hatching times can vary considerably between species; for example, some Tetras have eggs that hatch in a matter of hours whereas some Loricarid Catfish eggs take a week or more. On hatching, the fry may still have their yolk-sac and will not feed until such time as this has been absorbed. During this

period they may hang from plants, rest on the substrate or dangle from the sides of the aquarium. It is up to you to judge when you should begin feeding, and then make sure you have a ready supply of the right food. Most books which have a breeding section will give you an indication of the time span between hatching and feeding but be sure to bear in mind that this is only a guide — you must watch the fry and, when their stomachs are flat, offer food.

Once we have established the nutritional requirements of the fry our next hurdle is to determine the size of that food. If a fish can't get the food into its mouth it will starve, so if it requires newly-hatched Brine Shrimp that is exactly what you need to feed — Brine Shrimp that is 12 hours old is too big! Be prepared to have a series of hatching containers for the Brine Shrimp, four is about right. Start one in the morning, another that evening, the third the following morning and the fourth that evening. Number the bottles! It saves confusion especially if they are lined up in the kitchen and someone moves them to get to a cupboard! The first bottle will be ready for use the morning after you set up the fourth one. Feed the fry and then set the bottle up with another batch of eggs. Feed the newly-hatched Shrimp from the second bottle that evening and replenish it. Using this system you always have Brine Shrimp of a suitable size ready for your young fish. There are various grades of Brine Shrimp but, if you choose one that has a very small nauplii it will be suitable for the

majority of the egg-layers. As the fry grow, so the size of the food needs to be increased — larger Brine Shrimp, Daphnia, Microworms and later White-worms are all suitable. More importantly, they are also easily cultured.

For herbivorous fishes the process is easier. Lettuce leaves may be crushed in the hand and planted in the gravel or weighted down with a clean pebble so that the fish can graze on, or nibble at, them. Frozen peas are also a Godsend. Thaw them out and squash them between finger and thumb to remove the seed coat leaving the soft insides for the fish to eat. Make sure you throw the empty seed coat away as small fry have been known to die when they become trapped in them.

Another cause for concern is the build-up of mums and uneaten, decaying food in the breeding aquarium. Fungal and bacterial build-ups are deadly to fry, especially those fry that spend much of their time on, or near, the substrate. This state of affairs usually becomes most apparent when you are feeding dried foods such as sieved, hard-boiled egg yolk and powdered, or crushed, flake all of which, if left unattended, can quickly get out of control.

Develop a routine which involves the removal of uneaten food before you offer the next meal. Using a piece of airline, siphon off all the waste and uneaten food from the bottom of the breeding tank then top up the tank with some aged water of the correct pH, hardness and temperature. For herbivores it is still necessary to siphon off the mums in the bottom of the tank but the left-over peas and lettuce can be removed by hand or with a small net.

Just out of interest, you might like to try testing the bottom of the tank to see how clean it is. When first set up you can run your finger over the bottom glass and there is a very slight but steady drag. However, as the bacteria or fungus starts to accumulate you can feel your finger slipping over parts of the glass, a clear indication that, just because you can't see the bacteria/fungus, it doesn't mean it isn't there.

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Pettex

Pettex Ltd have announced the introduction of two new floating fish foods for ponds — PETTEX PREMIUM POND STICKS and PETTEX PREMIUM POND PELLETS.

The Premium Pond Sticks contain stabilised Vitamin C that is only released when eaten by fish. This helps to protect fish against disease, whilst a full complement of trace elements increase health all year round. Also included is spirulina, to enhance colour.

The Premium Pond Pellets have the same ingredients but contains a higher protein content to encourage faster growth.

Premium Pond Sticks (in distinctive bright orange livery) are marketed in 5 Kg



Two new floating fish foods —
Pettex Premium Pond Sticks and
Pettex Premium Pond Pellets.

bags and retail at £13.50. Premium Pond Pellets are supplied in 10Kg (bright green) bags and are priced at £17.50. Both prices include VAT.

For more details contact:
Debbie Shimman, Grayling,
Europa House, Queen
Square, Bristol BS8 1EE.
Tel: 01179 239143.

Middleton Discus

In response to customers requests for a large capacity sponge filter, Middleton Discus have produced the MEGABIO range. These filters are ideal for use in breeding tanks. Power is supplied by any good quality air pump, although it should be possible to use a powerhead with a suitable

adaptor. The sponge has a surface area of 74 square inches. There are two models in the range: the single sponge 25 gallon model retails for £15.00; the double sponge 50 gallon model retails for £25.00. Trade enquiries are welcome.

Further details from: Mr Brian Middleton, Middleton Discus, Upper Berilwyd, Bettws Newydd, Usk, Gwent. NP5 1LB. Tel: 01873 880 658. Fax: 01873 880 646.



Interpet

Interpet have several new and re-packaged items being launched this month.

Their new DOUBLE-SIDED WATERSCAPE BACKGROUND for aquaria features a coral reef on one side and freshwater tropical scene on the other. Made of durable, wipe-clean waterproof material it comes in rolls 450mm in width and retails at 99p per 300mm length.

The second introduction is a TOTAL AQUARIUM FILTER MEDIA SOLUTION. The component products are: Activated Filter Carbon, Ammonia Remover, Nitrex and Bio-Media and they are designed to work in a variety of Marine and Freshwater filters.

Ammonia Remover consists of an exceptionally pure source of zeolite.

Activated Filter Carbon is a unique blend of coal, bone and coconut carbons.

Nitrex is an established synthetic filter medium which biologically removes nitrate from aquarium water.

Bio-Media is a sintered-glass media designed to produce a massive surface area up to 800m² per 400g. The equivalent of 1.5 tennis courts!

Interpet is the UK's biggest supplier of Freeze-Dried Fish Foods. The entire range has been re-packaged in bright, attractive and clearly-labelled containers. The range comprises: River Shrimp, Brine Shrimp, Daphnia, Tubifex, Krill, and Blood Worm.

Smaller packs contain 4-7gm and the larger tubs 15-40gm. For further information contact: Adrian Bell, Interpet, Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 01306 881033. Fax: 01306 885009.

Certikin International

Certikin International has added a new pump to its range of six external models suitable for larger pools. The new pump has a 1/3 HP (.25 KW) motor and is manufactured for maximum performance with minimum maintenance. The features include: rapid self-priming, integral overload cut-out, totally enclosed fan-cooled unit built to IPX5 protection, over-sized bearings with lifetime lubrication. The price for a pump of this type is very reasonable and retails at just £132.30 plus VAT. The price includes connecting lead and half unions.

Further information from:
Dene Shadbolt, Certikin
International on 01993
778855.

Tetra

Tetra would like to remind customers of the value of regular water testing to assess the quality of their pondwater. Poor water conditions are easily corrected as long as they are correctly identified. The TETRAPOND TEST KIT range offers customers an easy and accurate method of checking their water quality.

Every kit is complete with easy to follow instructions, advice, and guide-lines on the action to take after testing. The range includes tests for: pH values within the range 6.5-8.5. Ammonia, Nitrite and Nitrate.

Further information from:
Tetra Information Centre,
Lambert Court, Chestnut
Avenue, Eastleigh, Hants SO53
3ZQ. Tel: 01703 620500.

Continued on page 89 ▶

BUY LINES

Extra information from Phoenix



The Phoenix range of Koi food is now well established as a market leader. The proven Phoenix track record of attention to Total Quality has not just produced a world beating range of Koi foods but it has also produced a significant body of experience and expertise. This experience has been used to launch a booklet crammed with practical information addressing some of the most common Koi food questions.

In an understandable form — and just like PHOENIX KOI FOODS, the information is highly digestible.

The ten questions are:

1. Are all fish foods the same?
2. What makes a good fish food?
3. What does metabolism and energy mean?
4. What is protein? Why are high quality proteins so important in a Koi's diet?
5. What is ash? Why are there varying levels of ash in different foods?
6. Why are minerals and vitamins so vital, in a fish's diet?
7. Why do Koi need essential fatty acids?
8. Why do you need colour enhancers in your fish's diet?
9. High digestibility, what is it?
10. Do you need to feed Koi in winter?

If you know the answers, we can only come to two conclusions: you already work for Phoenix 2000 or you should be writing for A&P!

If you want one of the new Phoenix 2000 booklets contact your local Koi dealer who will be pleased to let you have a free copy; if you want to know more about Koi nutrition in general, or about the Phoenix Koi food range in particular, contact Kerry Brookes or Howard Lilly at:

Phoenix 2000, Enterprise House, Wharf Road Industrial Estate, Plaxton, Nottingham NG16 6LE. Tel: 01773 580501. Fax: 01773 580264.

We are indebted to Nishikigoi International, Koi Business Information Services (Nigel Caddock. Tel: 01942 726864, Fax: 01942 723914) for the provision of the above Koi Media Information release.

The Nitritech Trickle Tower complete with Hi-Blow for counter-current flow.



Nitritech News

Bristol-based Nitritech have recently announced the launch of their latest filtration system innovation the NITRITECH TRICKLE TOWER. Trickle Towers are widely recognised as having some major operational benefits:

Highly Efficient, Compact, Flexible, Economical, Easily Installed. The Nitritech Trickle Tower offers a truly aerobic filtration environment; whereas most conventional filters operate by water flowing over submerged filter media the Nitritech Trickle Tower operates by trickling controlled volumes of water through filter media, located on media trays that are NOT submerged in water. This subtle but fundamental difference in operating modes ensures that the filtration environment is oxygen rich, thus providing the ideal filter system. Because the units are so efficient they are also much more compact than conventional filters.

The major inherent benefits of Trickle Towers have been significantly enhanced in the Nitritech unit by advance design: in addition to traditional conventional Trickle Tower filter media Nitritech have developed a high-performance sintered glass compound media called Syn-Tec which has been designed and manufactured specifically as a Trickle Tower filter media.

The Nitritech Trickle Tower's advanced design and new generation media developed specifically for this application provides Koi enthusiasts with the most advanced, high performing, 'off the shelf' Trickle Tower ever produced.

The Nitritech unit has three high performance internal stages facilitating a variety of media selections if required. The unit also includes built-in provision to introduce counter-current flow using a Hi-blow or similar air pump. The unique recessed lid design offers neat fit for the Hi-blow and has also been designed and built to ensure no leakage into or out of the unit. This is especially important in Trickle Towers as the highly aerobic filtration chamber often generates condensation, which in this system is contained in the chamber and so does not leak out.

Finally, economies of scale due to the major pre-launch success of the new unit have enabled Nitritech to offer their units at a very competitive retail price of £295 (price excludes Hi-Blow air pump and carriage). Add to all this exceptional product build quality and there is no doubt that Nitritech have another serious winner.

More information is available from: Nitritech, Sunbeam Nurseries, 119 Bristol Road, Frampton Cotterell, Bristol BS17 2AU. Tel: 01454 776927. Fax: 01454 250753.

We are indebted to Nishikigoi International, Koi Business Information Services (Nigel Caddock. Tel: 01942 726864, Fax: 01942 723914) for the provision of the above Koi Media Information release.



Qu Art

Qu Art Products has launched an 'All in One' MARINE CHEMICAL FILTRATION SYSTEM.

The new filter, using a continuous high quantity of ozone, is particularly aimed at marine reef tanks. The system is driven by an air-pump, ozoniser and a water pump. The system works as a protein

skimmer, an ozone reactor, a sterilising unit and a biological filter. Ozone (25 or 50mg/h) is mainly used to sterilise the water and to help the skimming process, but also for the chemical transformation of ammonia and nitrite to nitrate.

However in very highly populated aquaria an additional biological filter may be needed. At the moment the system is made available directly from the manufacturers by mail order at special introductory prices which may have terminated, after this a new price list will be compiled.

All enquiries to: Mr L. Mattioli, QuArt Products, 114 Edith Road, London W14 9AP. Tel: 0171 371 3965.

◀ Continued from page 87

Hozelock

Hozelock are giving a kick-start to the season with promotional offers to

purchasers of selected products.

Customers spending a minimum of £10.00 worth of goods in any participating outlet will receive a free 110g drum of HOZELOCK POND FOOD

STICKS. These provide a highly digestible diet for Koi and Goldfish. The sticks have a rate of digestibility of over 90 per cent according to independent nutritionists. They also contain a colour-enhancer and stabilised Vitamin C. Hozelock Pond Sticks are available in 110, 200, and 500g sizes. Koi Pellets are in 400g, 900g and 1.5 Kg sizes whilst Flakes come in 100, 200, and 500 gram packs.

The second promotion is centred around the re-launch of Hozelock's range of CASCADE PUMPS. Cartons containing a 'Cascade' pump incorporate a coupon which enables the purchaser to claim one of four free gifts. The gift items are a hose spray gun, a rotating lawn sprinkler, a waterproof cable connector or a pond pre-filter.

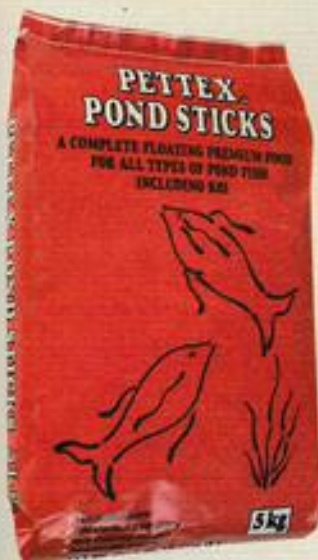
The SUPER CASCADE range of pumps has eight models from 100-6000. The Micro 600 is for indoor use. All pumps in the range have the following benefits and features: Three year guarantee, manufactured to meet CE requirements, 10m fitted cable and ceramic shafts on most models; a range of fountain heads are included with all models. The range is complemented by a further five low voltage models.

Further Details from: Richard Bradley Hozelock Ltd (Aquatics Division), Haddenham, Aylesbury, Bucks HP17 8JD. Tel: 01844 291811. Fax: 01844 290344.

Cichlid Posters

If Cichlids are your thing in general and African ones in particular then two wall posters could very well make your day. Each poster, approximately 23x34in (58x86cm), features a number of 'varieties' and species within a single genus against a suitably authentic underwater backdrop of the fishes' natural home. In this instance, the posters separately feature *Aulonacara* and *Tropheus* species and 'varieties' and thus, at a glance, many of the subtle differences in appearance between fishes, say from differing localities, can be easily appreciated. The posters cost £6.50 each or both for £12 (postage and packing included in both cases) and are obtainable from: Cichlid Press UK, 1 Copper Oak, East Village, Crediton, Devon EX17 4DW.

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Ash 8%

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Ask at your local pet or aquatic store or contact Pettex on 0181 501 1033

COLDWATER JOTTINGS

BY
STEPHEN J. SMITH



They say a problem shared is a problem halved. I'd like to add an alternative version to this — happiness shared is happiness doubled. This month's Coldwater Jottings is, coincidentally, a good example of both of these attitudes and I might as well get the 'problem' one over with first of all.

SVC Alert

The Ministry of Agriculture, Fisheries and Food has confirmed an outbreak of Spring Viraemia of Carp (SVC) in a pond in Kent. SVC is a notifiable disease under the Diseases of Fish Act 1937, and can have a devastating effect on fisheries. SVC has no implications for human health.

The affected site is undergoing clearance and disinfection. MAFF is investigating the source

of the outbreak and will trace any fish which might have come in contact with the infected fish at the site, currently no contact has been identified.

Spring Viraemia of Carp is a contagious viral disease which affects common carp and its ornamental varieties, in addition to other species including Goldfish, Tench, Pike and Wels catfish. It often results in significant death rates. The clinical signs of SVC can include darkening of the skin, swollen eyes, abdominal swelling, pale gills, trailing faecal casts and protrusion of the anus. Infected fish may be lethargic and show areas of bleeding in the gills and skin.

The last major outbreak in England and Wales occurred in 1988, when 40 sites were affected. Only four cases had been recorded in Great Britain prior to 1988.

All fisheries managers, and

fish importers and dealers, are reminded of the need to take strict precautions against the spread of this disease (copies of the booklets "Guide to Importing Fish", "Combating Fish Disease" and the leaflet "Don't Import Disease" are available free of charge from the Fish Disease Laboratory, Ministry of Agriculture, Fisheries and Food, The Nothe, Barrack Road, Weymouth, Dorset DT4 8UB. Telephone: 01305 206673/4. Fax: 01305 206602).

Imports of SVC susceptible species from elsewhere in the European Union must meet strict conditions designed to prevent the introduction of SVC into Great Britain. Such fish must come from premises which have tested negative for SVC for two years, which only accept fish with a similar health

status, and which do not hold species susceptible to Viral Haemorrhagic Septicaemia (VHS) and Infectious Haematopoietic Necrosis (IHN). Imports of SVC susceptible fish from third countries must also be licensed. Movements of fish into waters other than registered fish farms require the prior consent of the Environment Agency under Section 30 of the Salmon and Freshwater Fisheries Act 1975.

I have reproduced the above almost word-perfect from the official Press Release from MAFF so that there can be no ambiguity about the disease, nor of the utmost importance of reporting any outbreak. It is in all our interests to keep our fishes 'clean' and not subject any stock anywhere to any further risk of infection whatsoever.

More from Marianne

Now for happier news. Readers of this column will know that through the medium of electronic mail I have been receiving regular correspondence from Marianne in Sunnyvale, California (even her address sets the scene!). Now, using 'snail mail' she's sent me (and you the readers) more news both in words and pictures.

Hello Stephen! Well, I finally got some pond pics although pond photography is not

so easy. In the fish photo you can see my white American Fantail, Jedzia; he got stuck between some rough bricks I used to raise up some bog plants and struggled until his two side fins were worn to stubs and a large hole appeared in his side. Well, that was on May 13 but he's still going strong! The hole is closing and he looks happy even though he looks like he is 'armless'. According to Greg Tong (a man who writes about Goldfish on 'The Net') says the fins 'might' grow back.

The kids (son Shakin, ten, and daughters Sheela, eight, and Shauna, four) are in love

with the pond as much as I. We take our dinner plates out and sit at the edge to eat. The fish love to share our food, too!

The filter is doing great, as well as the 'shishi-odoshi' (thanks for telling me the name!). I took your advice against using

copper in the pond but now have a copper wind-chime hung up above.

Thanks for the mail, Marianne — it often takes an outsider to find the nicest things in our hobby; usually we are too busy moaning and groaning about our failures to remember all the better things!

I have to apologise to the readers that this month's Jottings is not as fulsome as usual but I have been away and there's no way of avoiding the deadline when you're the other side of that 'pond'.



Finally, if you feel that it's only me and Marianne keeping Jottings afloat at times there's no need to be jealous — you can write to me too using whatever method you care to choose (sorry, I can't operate a pigeon mail service), so limit yourself to conventional post to me at Coldwater Jottings, A&P, MJ Publications Ltd., Caxton House, Wellesley Road, Ashford, Kent TN24 8ET, or by e-mail at jottings@sjspr.demon.co.uk. Soon we'll be looking back at a coldwater season all too speedily gone by, so get those notes down, before you forget your happy memories and share them with us!

Books



Reviews

American Cichlids I: DWARF CICHLIDS — A Handbook for their Identification, Care and Breeding

Authors: **Horst Linke and Wolfgang Staack**
Publisher: **Tetra Press**
ISBN: **1-56465-168-1**
Price: **£14.95**

Ever since my first pair of *Apistogramma cacatuoides* spawned back in the 1970s, I have been fascinated by South American dwarf cichlids. I remember back in those days, peering into dealers tank looking for *Apistogramma* which were difficult to obtain in those days, and buying books with only a small section on these cichlids. Finally, the definitive book on South American Dwarf Cichlids is available in English in the UK, courtesy of Tetra Press.

Horst Linke and Wolfgang Staack start the book off with three short chapters on Introduction to Cichlids, Dwarf Cichlids from South America and Suitable Tanks. The rest of this colourful 232 page book is stacked full of colour photographs and descriptions of 50 dwarf cichlids in 11 genera, several of these now becoming available at specialist fish shops.

The description of each species is fairly comprehensive and usually covers Specific Traits, Similar Species, Natural Habitat, Care and Breeding. Most species do have a photograph to help identification, but a big bonus is that 25 out of the 75 species have photographs of female fish as well as the male. Distribution of most species is easily located by a red dot on a map. The section on specific traits and similar species should prove very useful in helping to distinguish these beautiful cichlids. Other genera with a fewer species are *Apistogrammoides*, *Biotocus*, *Crenicara*, *Crenicichla*, *Dicrossus*, *Laetacara*, *Nannacara*, *Papiliochromis*, *Taeniacara* and *Teleocichla*. The book is a must for all cichlid fans but I am sure that it will also draw many more aquarists to this interesting group of fishes.

IGGY TAVARES

Water Gardening, Water Lilies and Lotus

Authors: **Perry D. Slocum and**

Peter Robinson with Frances Perry

Publisher: **Timber Press, c/o Silent Books, 10 Market Street, Swavesey, Cambridge CB4 5QG**
ISBN: **0-85192-335-4**
Price: **£45.00**

The name of the late Frances Perry is synonymous with water-gardening and especially the Water-lily. This new book carries on her association with the subject since she gave specific instructions to the publishers about the form the book should take; for instance, she wanted to include species (available only in limited numbers at the time) as they would probably be easily available in the future. This book does include all the 'latest' species.

However, it would be wrong to praise Frances Perry alone, for each of the co-authors has contributed immensely to it in their own individual right.

Like a football match, the book is clearly of 'two halves' with the first part dealing with Water Gardening whilst the second half covers Water-Lilies and Lotus. Peter Robinson, now a freelance horticulturist and water gardener designer, was for many years Principal of the Capel Manor Horticultural College for North London, and brings much expertise to the design and construction of the water- and bog-garden, their stocking with aquatic plants, marginals, moisture-loving trees, shrubs and grasses together with suggestions for fish and other creatures. Looking after the Water Garden naturally deals with water clarity, weeds, diseases, pests and seasonal changes — especially winter.

Perry Slocum's credentials are no less impressive; he is Founder of Slocum's Water Gardens and Perry's Water Gardens in America and is one of the century's most important breeders of aquatic plants, gaining a Water Lily Hall of Fame Award from the International Water Lily Society in 1986. His contribution provides the book with its crowning glory — spectacular Water-Lilies and Lotus. All species and major cultivars — hardy, tropical day and night-blooming plants too — are

included with details of their cultivation and suggestions for their best usage. *Nymphaea* and *Nelumbo* receive the most emphasis but others such as *Nuphar*, *Victoria*, *Euryale*, *Barclaya* and *Ondinea* are also included.

No less than 445 colour photographs make up the book plus many line drawings and maps. A feature of the book is cultivation information for Water-lilies in any area of the world, together with what species are especially suitable for the varying climatic seasons found there. Another most interesting chapter deals with the Water-lily and Lotus flowers throughout history, tracing their importance as a religious symbol for instance; and the lengths that people went to to grow or exhibit them; the magnificent building built by Joseph Paxton to house Water-lilies is an excellent example.

One slight surprise in the first half of the book was the omission of the latest technology for dealing with green water, other than the natural way using growing plants and restricting sunshine; there was no mention of ultraviolet lamps used in conjunction with filters, nor chemical or magnetic means of dealing with blanketweed. However, the main thrust of the book remains unaffected and it should quickly become a standard reference book and remain so for many years to come.

DICK MILLS

(See Special Offer to A&P readers on page 101)

Pond Doctor

Author: **Helen Nash**
Publisher: **Tetra Press**
ISBN: **0-8069-0687-1**
Price: **£9.95**

Planning and Maintaining a Healthy Water Garden (also this book's sub-title) is something that everyone should know. Within this book the author has gathered together almost every conceivable viewpoint and practical suggestion from most of the world's foremost water-gardening experts.

The constructional aspect includes judicious sitings, prevailing winds and maybe poisonous trees. Water quality and filtration not only cover

familiar ground in theory but also offer some slightly different approaches to achieving the desired end results; typically useful are the hints on controlling algae! Although most of us pay some kind of lip service to safety, here the author tends to detail things that may not have been anticipated with excellent advice on keeping the pond hazard-free.

Plants (mainly Water-lilies) are given good coverage and it was refreshing to see excellent pictorial guidance on re-potting several marginal plants. Fish descriptions are almost minimal, but their care, treatment of disease and counteracting poor pond conditions is comprehensively dealt with; again, there is a cautionary warning about *Koi* in an ornamentally-planted pond!

Other visitors to the pond such as insects, crustaceans and birds, together with some of the more unexpected larger animals found in other countries, make for interesting reading. It comes as no surprise when 'regional' advice pops up; a case in point is the discussion on winter maintenance under Canadian conditions.

The two Appendices are excellent. The first shows off (in the nicest possible manner) the Michael Duff Collection of Water-lilies and the second is a collection of 'must know' facts and figures, conversion tables and even what size pump to use for various 'heads' and pipework sizes.

The production is excellent with superb colour photographs and line drawings; one quote I liked best of all is 'it takes less effort to prevent a problem than it does to solve it'. With its widespread base of information, this book will certainly be all things to all pondkeeping people.

DICK MILLS

Keeping and Breeding Snakes

Author: **Chris Mattison**
Publisher: **Blandford (1988 hardback) reprinted by Cassell (1996 paperback)**
ISBN: **0-7137-2579-6**
184 pp
Price: **£9.99**

This latest reprint of the 1988 original is in paperback which makes the price very attractive. Thirty nine colour plates are together in one section. Numerous black and white photos and line-drawings

▶ Continued on page 94

◀ Continued from page 92

are provided.

The first six chapters give general information on the captive care of snakes covering such topics as housing, environmental factors, health and management, feeding and breeding. Chapters 7-11 cover the various families of snakes providing specific information on conditions required, breeding data from various sources with a key reference to the appropriate literature.

Chapter 12 deals with the venomous species, again with specific requirements and

breeding data — obviously not for everyone but people do keep them. The Appendices at the end of the book give various useful addresses of societies, legal aspects, etc.

Certain aspects are now slightly 'dated', but the basic information should help the reader to select, successfully keep and breed many of the species available today; it is a good buy.

BOB & VAL DAVIES

The Encyclopedia of Snakes

Author: **Chris Mattison**
Publisher: **Blandford (1995)**
ISBN: **0-7137-2380-7**

256 pp
Price: **£25.00**

The author is well-known in herpetological circles having already published several titles. For this book, information has been gathered from numerous sources on practically every aspect of snakes from their origin and evolution to their relationship with humans providing a fascinating insight into their lives. Although not primarily a book on how to keep snakes there is a section on this subject which is useful for the would-be keeper.

The ten chapters are well-

illustrated with colour photographs (many of which we had not seen previously), diagrams and maps. Particularly interesting is chapter 10 on classification which lists the various families, genera, etc., of snakes together with brief comments on their potential as captive subjects. The text is interspersed with 'fact boxes' which highlight certain aspects. A useful bibliography is provided. The easy to read format and wealth of information make this a useful book.

BOB & VAL DAVIES

On Saturday 27th and Sunday 28th July the East Pennine Section of the BKKS will be holding its 11th Open Koi Show, in the picturesque village of Wentworth, South Yorkshire. This will be one of the largest Koi shows in Europe with all the top dealers within the UK attending, plus a Craft Fair and provides a rare opportunity for the general public and most Koikeepers not only to be able to purchase many high-grade Koi, but to see some of the finest collections of Koi ever assembled in one place.

Other attractions outside the Show includes Elsecar Heritage Centre (five minute drive away), a large complex converted from old mining workshops into a museum-style setting housing several cottage workshops including the National Bottle Bank, the only fully-working Newcome pump plus many interesting bric-a-brac style shops. The recently installed steam railway takes passengers on a two mile ride and back along picturesque countryside.

Another five minute drive will also take you to Europe's premier shopping complex, Meadowhall. So, if you're looking for an excellent weekend break, Wentworth is definitely the place to be.

The East Pennine Section (started some 16 years ago) is now one of the largest Koikeeping gatherings anywhere in the world and certainly at the forefront of the hobby of keeping Koi.

The Section meets on the second Thursday of each month throughout the year at the Phoenix Club, Wombwell Road, Platts Common, near Barnsley, just five minutes from Junction 36 off the M1 motorway.

The cost of membership is £27 Single £29 Joint per year. This includes membership to the National Society (from which you will receive a monthly magazine) and membership to the East Pennine Section from which you will receive the Section's own magazine, a monthly Newsletter plus many benefits — i.e.,

beginners' seminars, an extensive library of books and videos all about Koi-keeping, a supplies shop where members can buy Koi-related goods at discount prices, Fish Draws and Koi auctions. Several coach trips are organised throughout the year visiting other Sections and Koi Clubs including buying trips to Koi dealers all over the country. Guest Speakers regularly attend meetings, talking on all aspects of Koi-keeping. One other benefit that all members enjoy is the availability of our medical team, a highly-trained unit ready and willing to assist you with any problems you might have with your Koi. Couple all this with many other activities that the Section undertakes with being among fellow Koikeepers, and there is no doubt that your social life will be transformed when you decide to join!

For further information about the Show or Section meetings telephone Sheila Sanderson on (01226) 740577.

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TRICKLE FILTER

The impression often given about trickle filters is that they are infallible and have no faults or disadvantages whatsoever. Whilst the truth is far from doom and gloom, there are a number of points that the marine aquarist should be aware of and suitable compensations must be made, or at least taken into account. First of all though, let's remind ourselves of the good and bad points (and as Wimbledon is upon us, in a suitable style):

'ADVANTAGE' TRICKLE

(1) Heavily stocked (but not over-

stocked) aquaria are observed to fare better, especially fish-only.

NICK DAKIN CONTINUES WITH TRICKLE FILTRATION AND SUGGESTS SUITABLE LIVESTOCK.

● PHOTOGRAPHS BY THE AUTHOR ●

(2) There is potentially a vast range of associated equipment that can be installed as one large, complete unit, or singly at convenient intervals.

(3) Medications should be more effective as there is little interference from inert filter media (plastic shapes, etc.).

(4) Automatic and semi-automatic water change systems can be easily accommodated.

(5) As water moves through the system, dissolved oxygen levels are elevated considerably.

(6) Total water volume is increased.

(7) No space is lost to filter media.

(8) Efficient pre-filtering removes

A good trickle filter system, used in conjunction with the correct lighting, can support almost all commonly available livestock (if it is capable of being kept) and the following are just a selection of animals that should do well.

THE MANDARINFISH (*Synchiropus splendidus*)

The beautifully cryptic markings and interesting behaviour of the Mandarinfish make it an ideal candidate for the mixed invertebrate aquarium. A pair can easily be distinguished as the male possess a greatly extended first dorsal ray that is lacking in the female. Most pairs will reward the mariner with a fascinating mating ritual practically every evening at dusk, but extra males or females are to be avoided if chasing and fighting is not to be the order of the day! Also worth considering is the closely related Psychedelic Fish (*Synchiropus picturatus*) which, at first glance, can look much the same. Refuse any Mandarinfish with pinched-in stomachs, they tend to do very badly.

FEEDING: Mandarinfish require a well-established invertebrate tank with plenty of living rock over which they can browse for microscopic organisms. Live brine shrimp (adults and nauplii) as well as rotifers are much appreciated. They do very poorly in barren fish-only tanks.

THE SCARLET HAWKFISH (*Neocirrhites armatus*)

This is an expensive fish with stunning coloration and so it worth protecting the investment by giving it the best conditions possible. Numerous 'perching' places are required so that the fish can sit and observe the rest of the aquarium panorama. It is a peaceful species that rarely disturbs any other fish apart, that is, from its own. Therefore, one specimen per tank is the order of the day.

FEEDING: As with all other Hawkfish, this is a predator that loves crustacea, especially shrimps. Live river shrimp are a great favourite, although most other marine fare is accepted greedily.

THE KORAN ANGELFISH (*Pomacanthus semicirculatus*)

With a potential maximum tank size of around 15in in length, the aquarist must be prepared to eventually offer a very large aquarium to accommodate this species. It grows very well in response to the improved water conditions that trickle filters can usually provide. A



fish-only aquarium is essential as any invertebrates will be regarded as food and ceaselessly nibbled at. Whilst the adult is not as unattractive as some larger angels, many consider that the juvenile blue/white livery is also worthy of much appreciation. Purchase as a juvenile and enjoy the steady but dramatic transformation from immature to adult coloration.

FEEDING: All meaty marine fare, e.g. cockle, mussel, squid and lancefish is greedily taken. Some greenstuff must also be provided in



ER LIVESTOCK

detritus and suspended solids.

(9) Enormous bacterial colonies are created owing to the large air/water surface area ratio.

(10) Natural displays are easily created as nearly all equipment is concealed.

(11) Many maintenance tasks can be performed easily and with little disturbance of rockwork or livestock.

TRICKLE 'FAULT'

(1) Almost daily attention must be given to pre-filters if overflows are to be avoided.

(2) Inert biological media such as

plastic 'shapes' provide no buffering to pH, KH or calcium levels.

(3) Additives to buffer pH, KH and calcium will probably be required on a regular basis.

(4) Overflows and weirs can often be the cause of lost livestock.

(5) There is a real risk of flooding owing to leaking joints etc.

(6) Trickle filter overflows and spray bars can cause a great deal of noise.

(7) Aquaria require drilling or other 'fail-safe' overflow devices.

(8) Equipment can be expensive as much is imported from abroad.

(9) There is a limited range available in the UK.

(10) Newcomers may find the installation and assembly of some models rather difficult.

(11) Back-up service can be very limited.

(12) Main pumps can be difficult to replace/repair through most retailers.

NEXT MONTH:

I WILL BE INVESTIGATING LESS TRADITIONAL METHODS OF FILTRATION SUCH AS THE SO-CALLED 'BERLIN SYSTEM'.

the diet and if *Caulerpa* is not available, then blanched lettuce or spinach will do just as well.

THE POWDER BLUE TANG (*Acanthurus leucosternon*)

Here we have another fish suitable exclusively for the fish-only tank and one that responds particularly well to the benefits of trickle filtration. It is a species that is prone to Whitespot, especially where space is restricted or the filters are not efficient enough. A large tank, offering optimum water quality brings out the best in this fish, leaving its owner with a pleasant feeling of satisfaction, rather than a sigh as another Whitespot cure bites the dust!

FEEDING: Most marine fare is tackled with enthusiasm although algae or other green foods are essential to good health. Marine algae or blanched lettuce/spinach should be offered daily if possible.

INVERTEBRATES

HARD CORALS

Hard corals demand the best water conditions possible for long term survival. They can be kept in well maintained undergravel systems but usually last only a few short months. The best chances are provided with more sophisticated trickle filters and adequate metal-halide illumination. Some of the favourite and most readily available species include: *Goniopora* spp., *Euphyllia* spp., and *Heliopora* spp. Being territorial corals, they require plenty of space to expand if other nearby species are not to be stung.

FEEDING: Usually unnecessary but small offerings of cockle or mussel can be made to those species willing to accept it, e.g. Tooth Corals (*Euphyllia picta*).

TUBEWORMS

Most marine aquarists consider Fanworms and Tubeworms to be

relatively straightforward, and this is probably true of the *Sabellastarte* spp. These possess a parchment-like tube made from mucus and muddy particles. On the other hand, *Serpulid* spp. provide much more of a challenge! Often referred to as Coco Worms (although the reason is a mystery) they have brightly coloured spiralling crowns emanating from a large, hard, calcareous tube. Keeping these beyond six months requires water of the utmost cleanliness at all times.

FEEDING: Regular feeding with live rotifers is essential for long term survival.

ANEMONES

Whilst Anemones are widely available and one of the most popular invertebrates, it does not make them the easiest to maintain. Far from it, for these are very sensitive creatures that often demand the best water conditions. They can certainly be kept using undergravels but often thrive noticeably when trickle filters are used. **FEEDING:** Largely unnecessary where lighting is intense. A small piece of squid or mussel can be offered fortnightly if desired.



DON'T PUT YOUR FOOT IN IT!



Litter awareness display at Southend Sealife Centre.

It's a beautiful summer's day and there you are, ambling along the beach, licking your ice cream. Wavelets tickle your toes, the sun warms the back of your neck and the sound of lapping water is pleasantly soothing. You're happy and contented, with not a care in the world. Suddenly — Yuk! You feel squelchy round your feet, gooey, gluey, slimy and sticky. Shuddering, you look down. Yes. You've just trodden into a mass of untreated sewage!

Unhappily, this scenario is still common on many of Britain's beaches, with sewage, sewage-related items, chemicals, industrial waste, plastic, litter, oil and rubbish dumped from ships contaminating much of our shores.

Basically, water pollution occurs when sewage or other effluent — ideal food for bacteria — enters the water. The bacteria consume oxygen from the water more quickly than it can be replaced. Consequently other water organisms, including fish and invertebrates, will suffer and maybe die. Litter and various debris, in water and on the shore, affects waterlife in other ways. Abandoned fishing nets and lines, glass bottles, plastic containers and tins kill when they become entangled around, trap or are

SUSAN BREWER TREADS CAREFULLY BUT HOPES TO TURN THE TIDE ON POLLUTION.

● PHOTOGRAPHS BY THE AUTHOR ●

swallowed by various creatures.

Not all is 'doom and gloom', however. A few years ago the EC passed a legislation (EC Bathing directive 76/160/EC) regarding the quality of seawater and disposal of sewage to try to improve our shores, and, very gradually, it seems they are succeeding although there are still many problems. Unfortunately in some areas our seas are still extremely polluted and many resorts fail to reach even the EC's minimum acceptable level of contamination.

By now you're probably thinking that this is all quite interesting — but what has it to do with an average aquarist with a few tanks of tropical fish and a pond full of Koi or Goldfish? Surely pollution doesn't affect me? Well, not directly perhaps, but my point is — if

you care about fish (and as you're reading *Aquarist & Pondkeeper*, I'm sure that you do), you'll certainly feel some concern for the way the fishes' natural watery environment is being contaminated.

Why is sewage still dumped into the sea? Cost is probably the main reason. In many places the original plumbing is still in use. Installed at the turn of the century when people didn't realise the dangers, it's often just an outfall which dumps raw sewage into the sea at the low-water mark. The water authorities don't seem to have the funds to invest in new sewage plants: the cost of installing drainage is prohibitive, and even though the EC demands these measures, if the money is not available, then up-to-date treatment plants can't be installed.

Recently reports were coming in from various British resorts that great quantities of the sewage and other refuse being washed ashore was in fact drifting across the oceans from North Canada and the USA. It seems amazing — and disturbing — that Britain not only pollutes the sea, it attracts other nations' waste as well. We all know of the risk, both to human and marine life. Untreated sewage is not only hazardous, it is unpleasant and unsightly when it

DON'T PUT YOUR FOOT IN IT!

swirls around as you try to bathe in the sea or sweeps an expanse of beach, creating a hideous brown blemish far into the distance. One recent beach survey found 1,389 pieces of sewage related debris along a stretch of beach measuring just 300 metres.

Sewage can contaminate shellfish, and a couple of years ago a British Mussel Farm had to close because of contamination. It was an old family firm. No doubt there are others in the same position. Think of all the shellfish around our coasts — how many of them have already been poisoned? There are areas where shellfish gathering is not permitted because of the pollution risk.

According to a spokesman for the Devon Wildlife Trust, sewage isn't such a great problem for crabs, anemones, urchins and the like; in fact, providing they are not too near the outfall, they can obtain nourishment through the nitrates, though if there's too much nitrate, excessive algae growth will swamp everything. Oil is a much greater hazard to all marine life and the World Wide Fund for Nature (WWF) are presently funding research into the effects of oil on the immune systems of fish.

Everyone knows how oil clogs bird's feathers and chokes sea-creatures, but it wasn't till recently that the damage to the nervous systems of sea-life became apparent. Another recent danger was caused by an anti-fouling substance used on ships, Tributyltin, which was polluting much of the marine environment around our coasts and was especially harmful to Dog-whelks and Oysters. This substance is now restricted and gradually the Whelk population is returning to normal.

Few surveys seem to have been conducted into the effects of pollution on invertebrates, but during the Beachwatch campaign of 1993 it was noticed that large quantities of dead Sandhoppers were trapped in rubbish, and so it is fair to assume that other micro-organisms would be similarly affected.

So, how else does our marine life suffer? There have been reports of Whales swallowing oil drums, fish entangled in discarded netting, Dolphins



Items found in sharks' stomachs — display at Southend Sealife Centre.

and Whales ingesting plastic, and Turtles swallowing polythene bags (apparently they confuse them with their favoured diet of Jellyfish). Monofilament fishing lines are another hazard; many entangled creatures have been discovered, including a Turtle, Lobster, Lizard and a Stingray.

The contents of one abandoned drift net included over 200 Salmon and 99 seabirds. Crabs have been trapped in bottles, and an Octopus was found ensnared in an old car tyre. (Many car tyres are abandoned on Britain's beaches — over 3,000 were discovered in one recent survey.) It has been estimated that 100,000 marine mammals and Turtles die each year from ingestion of plastics or entanglement in various forms of rubbish.

The Sea Life Centre in Southend has two eye-opening displays — one shows the foreign objects found in the stomachs of various Sharks, including floats, boxes, polystyrene cups, ropes, nets and even a car number plate. The other display is a vast pile of litter; tins, crisp packets, plastic bottles and the

like, which was collected by just one person during a morning's walk along one stretch of beach. It's appalling, and a dreadful reflection on the uncaring attitude of many people today.

The Marine Conservation Society also lists another, rather surprising hazard — balloons. Frequently these are mass-released in vast numbers to celebrate various events, but unfortunately people tend to forget 'what goes up, must come down.' Balloons often fall into the sea, either partly inflated or burst and they can choke to death many species of marine life. In the USA and Canada there is a high awareness of this problem and many organisations now refuse to release balloons. Sadly, in Britain we are more complacent.

Many British Councils have introduced beach-cleaning projects, however, priding themselves on being able to offer unpolluted sands. To take one example, the resort of Littlehampton, in Sussex, has a team of cleaners known as 'scavengers,' which scour the beaches for litter and debris every day. All the litter is collected by hand because, as yet, no machine has been invented which will effectively vacuum a beach.

Littlehampton has a policy of providing plenty of litter-bins, along both beach and promenade, and also works in close collaboration with local schools by sending an instructor to encourage youngsters to care for their environment and to try to interest them in waste management problems. Naturally it is in the interest of the local seaside authorities to augment cleaning schemes; as clean beaches encourage tourists who then spend their money with the local traders. Any scheme to encourage clean beaches must be a good thing for the beach fauna, and should be fostered.

Many other authorities provide similar services to Littlehampton and often these efforts are rewarded by the Tidy Britain Group, who have introduced award schemes, entitling selected beaches to declare themselves clean and safe. Flags are awarded to beaches reaching certain standards relating to water quality, beach cleanliness and

DON'T PUT YOUR FOOT IN IT!



Shrimping on an unpolluted Cornish beach

facilities. The flags take into account the nature of the beach — whether it is 'resort' or 'rural' and it's heartening to note that they found 165 beaches to recommend last year.

However, many of the flags are awarded to resorts which only scrape through with the minimum EC water quality levels, and according to the Marine Conservation Society, these levels are not good enough, or safe enough. They demand a much higher standard of water quality before they will wholeheartedly recommend a beach. Even so, in their latest guide they managed to find 100 beaches which reached their far-more exacting standards, although they announced in January that 'Britain's beaches are dirtier than ever.'

The National Rivers Authority recently tested the sea-water from some of the most popular resorts and discovered that 82.5 per cent now meet with European minimum standards, an improvement of 3.1 per cent since 1993. Coastwatch UK reports that although pollution levels are considerably down from 1993, the 1993 survey gave

much higher than average readings, and so, in fact, any improvement is marginal. Totals are pretty much the same since the first survey was made in 1989.

It seems that, because surveys are made by different organisations, on different stretches of coast, at different times of the year, using different methods of collecting and recording information, no true comparison can be made. Another problem is that a beach can appear

beautifully clean and litter-free, yet its sea could be heavily polluted, and if there is no visible sign of sewage or other contamination, it is virtually impossible for the holidaymaker to gauge the water quality.

So, to sum up — yes, very gradually water quality around Britain does seem to be improving, and, in addition, many seaside authorities are making a determined effort to clean beaches. Although their reasons for doing so may be for monetary gain (ie to attract tourists), rather than true environmental concern, the end result will be the same — safe, unsullied beaches.

There is, however, still an awfully long way to go — it needs more enforcing of existing acts and more public awareness before we'll see any dramatic changes. Maybe a bit of MP lobbying by **Aquarist and Pondkeeper** readers wouldn't go amiss!

If on your holidays you encounter beach litter or sea sewage, then inform the local council immediately and shame them into action. If the council are unhelpful, then contact the Marine Conservation Society who will advise you on further steps to take. Under the Environmental Protection Act of 1990, local authorities have a legal duty to keep public places litter-free, and this includes beaches.

One day, let's hope we'll all be able to meander along that beautiful beach without putting our feet into anything obnoxious, enjoying the feel of nothing more than fresh, clean sand between our toes!

facts & figures

Around 300 million gallons of raw sewage are pumped into the sea each day in the UK.

Up to 30 per cent of fish in the North Atlantic and Mediterranean have plastic in their gut.

Over 50 per cent of debris collected in a recent beachwatch campaign was plastic.

Last year a total of 197,346 items were removed from beaches, compared with 114,880 in 1993.

Thanks to Tony Hammond of Arun Council, Melissa Martin of the Marine Conservation Society, Richard White of the Devon Wildlife Trust.

USEFUL ADDRESSES

Marine Conservation Society,
9 Gloucester Rd, Ross-on-Wye,
Herefordshire HR9 5BU

Coastwatch UK, Farnborough
College of Technology,
Boundary Road,
Farnborough, Hampshire,
GU14 6SB

Tidy Britain Group, Lion
House, 26 Muspole Street,
Norwich NR3 1DI

Sea Life Centre, Eastern
Esplanade, Southend on
Sea, Essex SSI 2ER

World Wide Fund for Nature,
Marine Unit, Panda House
Weyside Park, Godalming,
Surrey GU7 1XR

.. News Desk .. News Desk ..

A very special exhibition

Valde Filley, of The Palms Oasis, reports on an extraordinary aquatic Art Exhibition not to be missed.

Last summer, I met one of our visitors, Ian Parker, who accompanied by his wife Mary seemed to be studying our tropical Marine displays in the greatest detail.

Ian, originally from Crawley in West Sussex and now living in Stoke on Trent, explained that he found great inspiration in our displays. He had been sketching and painting for as long as he could remember and tropical fish were among his favourite models. I found this amazing, since this was to prove my first conversation with a mouth-painter! Ian, who is 26, suffers from Arthrogryposis Multiplex Congenita (and you thought fish names were complicated!). This is a rare condition in which the joints are totally, or partially, fixed so Ian has little use of his arms and legs and is confined to a wheelchair. He paints holding the brush between his teeth and has enough movement in his neck to tackle a wide range of canvas sizes. Working only 6in away from his painting, he needs to take a break every half an hour or so to assess his work, and plan the next moves.

"I work unaided, but do have to be rescued by my wife when I occasionally drop my brush or the canvas falls off the easel. Brushes have good capillary action and it's not uncommon for me to end up with a mouthful of painty water!"

Ian and Mary were aware that I had organised many exhibitions in The Palms, and asked if his work could be exhibited this summer. I thought this would be most interesting and 'something completely different' so we agreed some possible dates. Ian and Mary have been regular visitors ever since, and he has worked on a series of 18 paintings — all aquatic animals, ranging from tropical marine and freshwater fish to Penguins, Dolphins and Sea-Lions.

Three years after attaining a BA Hons in Fine Art at Staffordshire University, Ian was accepted as a student member of the Mouth and Foot Painting Association (MPPA), which brings such people together, offering moral (and often financial) support, and helps disabled artists to attain self-respect, creative fulfilment and financial security. Each year they organise an exhibition of the best of their members' works at venues throughout the UK and all over the world. Stapeley Water Gardens are delighted to give Ian this opportunity to exhibit his work at a local venue and wish him every success in the future.

Ian's paintings will be exhibited in The Palms from Sunday, July 28 until Sunday, August 11 with Ian demonstrating his amazing technique on Saturdays, August 3 and 10.

The Palms open daily at 10am and, for the uninitiated, comprises 1.3 acres of fascinating displays of fish, reptiles, birds and mammals amidst luxuriant plant displays, tropical lily pools, fountains, cascades and an impressive 13,500 gallon Kol pool. The world's largest water garden centre awaits discovery across the car park and a visit to Yesteryear Museum means there's something for everyone at Stapeley Water Gardens.



Ian D. Parker working on 'Penguins'.

PHOTO: PHYLLIS BAKER

Ullesthorpe Easter winning events

The highlight of a series of events held at Ullesthorpe Garden and Aquatic Centre promoting water gardening was the draw for an 18in Kol carp.

The free draw was open to anyone visiting throughout the Easter weekend and the draw was made on May Day. The delighted new owner of this beautiful fish was Mr Brian Thomas of



Glen Parva, Leicester.

The series of events included a slide show by Mr Keith Watson, Aquatic Centre Manager, of his recent trip to Israel to purchase Kol and other coldwater fish. The May Bank Holiday saw a number of suppliers offering advice and assistance to visitors to the centre, supported by special offers.

"The events held were to promote the different ways of using water features and ponds in the garden," said Mr Ian Tallis, Director. "As not everyone wants a pond there is now a huge choice of alternatives available."

Be proud, not afraid, of this Giant

With multi-national organisations spread all over the world, periodic 'reporting back to base' is the rule for the subsidiary companies.

However, on their last visit back to Little Giant's headquarters in Oklahoma City, the Pump Division of W. J. Furse & Co. of Nottingham, were delighted to receive the parent company's award for 'Best International Subsidiary for 1995' for their outstanding contribution to sales (number one in the UK market in the supply of several pump models from the Little Giant range).

With this confirmation behind them, the W. J. Furse team led by Chris Dolman (Marketing Co-ordinator) and Craig Peebles (Product Manager) look forward to enhancing the company's solid reputation by implementing a range of new marketing initiatives to build upon this success during 1996 and beyond.



Craig Peebles, second right, receives the award from Little Giant's President, Gabe Zablounek, watched by Jim Hollingsworth, Little Giant's International Marketing Manager, far left, and Chris Dolman, Marketing Co-ordinator, W. J. Furse, far right.

SHORE WATCH

An ABC of



BY ANDY HORTON

Rockpooling

July promises to bring warmer temperatures after a disappointing spring. With the weather colder than normal during the early months of the year, 1996 may prove to be a poor breeding season for intertidal fish and crabs. By July most of the breeding visitors will have returned to deeper water and the first of the young fish and crabs will appear in rock pools.

The small variations in tides means that the shore fauna may lack variety this month with many of the most interesting animals to be found just below low water mark.



m

MACKEREL are a family of streamlined and fast swimming fish called the Scombridae. The species that migrates towards the British coast in the summer months is *Scomber scombrus*.

MACROPHAGOUS means feeding on large items of food.

MACROPLANKTON are members of the planktonic community large enough (over 1mm) to be visible by the naked eye, but excluding the very large members like Jellyfish which are called **Megaloplankton**.

MAGNIFYING GLASS is a lens for magnifying an image. Placed in front of the mini-

aquarium, or micro-aquarium, a whole new world of tiny seashore animals like Keelworms, miniature Sea Slugs, Hydroids, small shrimp-like animals, etc., are revealed. Magnification is about x3.5.

The **MAINTENANCE OF AN AQUARIUM** involves the monitoring and the correction of the changes that occur. This involves continual biological filtration to render the waste products of the captive fish and invertebrates to safe levels, monitoring of the life support system with checks on oxygen levels, pH, nitrite, etc., and the replacement of seawater that undergoes biochemical alterations.

MALACOLOGY is the study of molluscs.

MALACOSTRACA is the class of larger and more evolved crustaceans that are divided into three regions including the head, thorax and abdomen.

MANDIBLES are the first pair of mouth parts that Crabs and Prawns use for shredding their food.

MATURATION PERIOD IN AN AQUARIUM refers to the period between being first set up to after a period of between one and two weeks the ammonia, nitrite and oxygen levels should have stabilised,

Grey Mullet.

PHOTO: ANDY HORTON

and then it is safe to introduce fish.

MEDICATIONS are the additional of chemicals to the treatment tank, or painted on an injury to treat positively identified ailments. Before laying out your money purchase 'The Manual to Fish Health' published by Salamander.

MEDUSA is a Jellyfish or a Jellyfish-like organism. It refers to the mobile stage of the Scyphozoa (true Jellyfish) and Hydrozoa (Hydroids). The plural is **Medusae**.

MEGALOPA are the final planktonic larval stages of a Crab before it turns into an adult and lives on the bottom.

MERMAID'S PURSE is the egg case of the Dogfish and other members of the Shark family that lay egg cases. Mermaid's Purses with the young shark inside can be kept

in aquaria and hatched out.

METABOLISM refers to the biological processes of a living organism. The term **Metabolic Rate** is often used, e.g. the metabolic rate of the fish increases with the rise in water temperature.

METAMORPHOSIS means change of form and is often used for the abrupt change of a larval stage into its adult form.

MICROALGAE are the tiny forms of algae that grow readily in aquaria.

MICROPHAGOUS means feeding, always frequently, on small organisms.

A Compound **MICROSCOPE** is an optical instrument that magnifies an image in a usual range between x25 and x1,000.

▶ Continued on page 108



◀ Continued from page 106

MIGRATION means to move from one place to another. It is used for lots of different movements of marine life, e.g. migrations of Prawns onto the shore zone in the late summer.

MINERALISATION is the conversion of organic matter like the waste products of aquarium fish by scavengers and bacteria to inert mineral detritus.

MOLLUSCA are the phylum of invertebrates known to the layman as Snails or Shellfish. The phylum contains seven classes of which the most important are the Gastropoda which contains molluscs with snail-like shells and the Sea Slugs, and the Bivalvia which comprises the Snails with two shells like Cockles and Mussels. The highly evolved Cephalopoda are the highly mobile Squids, Octopuses and Cuttlefish, that are classified in this major group because they have the same body plan.

Mollusca refers to the soft insides, which is usually protected by a hard external shell, which is formed by a sheet of tissue called the 'mantle'. The calcareous crystals that form the mantle are laid down on a frame made of a protein called 'conchiolin'.

The **MONKFISH** is a species of Angel Shark of the family Squatinidae of which one species, *Squatina squatina*, is found in British seas. These Sharks are flattened to live in the sea bottom and are encountered in bathing waters.

MORPHOLOGY is the study of form and structure of animals, plants and rocks.

MUCUS is a slimy protective substance secreted by organisms. It gives a fish its slippery nature and also aids its swimming by resisting friction as it propels itself through the water.

MULLET is the name of two dissimilar families of fish with different word origins. The Grey Mulletts belong to the family of shoaling fish called the Mugilidae and three species are seen in southern seas in the summer, with the thick-lipped species *Chelon labrosus* venturing into estuaries. The Red Mulletts belong to the family Mullidae with one species *Mullus surmuletus* found in small schools offshore in the English Channel during the summer.

MUSSEL is a bivalve mollusc found in large numbers in most seas that are not braided by ice. They attach to rocks by the

Hermit Crab with Cloak Anemone.

PHOTO: ANDY HORTON

means of byssus threads excreted by the foot and are common on rocky shores with plenty of water flow. They filter diatoms (plant plankton) from the seawater as food.

MUTUALISM is two or more organisms living together each conferring a benefit to each other, e.g. the Hermit Crab, *Pagurus prideaux*, and the protective Cloak Anemone, *Adamsia carolinopados*, that feeds on the fragments of food discarded by the crab.

MYSIDS are also known as Opossum Shrimps and other names and are the name given to small (up to 25mm) free-swimming **Malacostracan** crustaceans of the order **Mysidacea**. Twenty nine species live in British coastal waters. The eggs are held by the female in a ventral (belly) pouch called a **Marsupium**. Mysids can be bred in captivity to feed to aquarium fish.

MYSIS is the name given to last stage of larval shrimps and shrimp-like animals before they turn into their adult form.



N

NATURAL SELECTION is the creative force of nature. It is accurately described as



'survival of the fittest' if the reader can imagine a process of evolution of species taking place over a period of 500 million years or more with the successful organisms adapting in form and behaviour to the changing environment.

NAUPLIUS is the first stage of crustacean larvae. The **nauplii** hatch from eggs carried by the female.

NAUTILUS is an ancient cephalopod (Cuttlefish-like animal) that has a chambered shell for buoyancy. There are a few living species in deep Pacific waters, but it is best known for its fossil record.

NEAP TIDE refers to when the range of the tide is at its smallest.

NECKLACE SHELL is a species of burying gastropod mollusc that has attained its British name by the shape of its egg ribbons. There are two common species found in the seas around Britain that belong to the family Naticidae. In

America they are called Moon Shells.

NEKTON refers to actively swimming organisms in the mid and surface waters.

NEMATOCYSTS are the commonest type of stinging cells found in Sea-anemones, Corals, Jellyfish etc.

The **NEMATODA** are a phylum of

When submerged Mussels will open up the two halves of their shell and draw in sea water from which they extract their food of microscopic plankton.

PHOTO: ANDY HORTON

small unsegmented worms known as Roundworms or Nematodes. Many are parasitic.

NEMERTEA are a phylum of large unsegmented worms that inhabit muddy bottoms in estuaries and the sea. Typically they are found coiled up, but when stretched out they can reach a length of several metres.

The **NITROGEN CYCLE** is the biological cycle of nitrogen. This is vitally important in aquaria where the toxic ammonia excreted by the fish is converted by aerobic bacteria called **Nitrosomonas** in the filter bed to the less toxic **Nitrite NO₂**, which are converted by aerobic **Nitrobacter** bacteria to **Nitrate NO₃**. Nitrate is practically harmless on its own in marine aquaria, but because it provides chemicals for algal growth it is desirable to keep the levels low.

The **NORWAY LOBSTER** is a name used in fishery circles for the Scampi, *Nephrops norvegicus*.

NOTOCHORD is the axial skeletal rod found in primitive members of the phylum Chordata. In advanced chordates like the fishes and other vertebrates the notochord is replaced by cartilage or backbone.

NUDIBRANCHS are opisthobranch gastropod molluscs that have lost their shell during evolution, and are known as Sea-slugs.

NUTRIENTS are the chemical components that can be used by the organisms in the sea as food, including nitrogen and phosphorus.

NUTRITION is the ingestion and digestion of food by animals or the autotrophic assimilation of nutrients by plants. Fish and invertebrates that are generalists and feed on a variety of foodstuffs are easiest to satisfy nutritionally.

A to Z of plants

Ceratopteris

The Ceratopteridaceae is a horrendous name to pronounce but it includes one of the most popular and easy to grow species available to aquarium owners. The group is known to terrestrial fern lovers as the Gold and Silver Ferns many of which have a coloured powdery wax undercoating to their fronds and are therefore very popular with curators of fern houses in botanical gardens. The aquatic members number just four species but this could be reduced as their exact taxonomy is open to dispute. The reason for this is that they exhibit polymorphism to an extraordinary degree, the leaf form and shape varying under different growing conditions.



PHOTO: BARRY JAMES

size. Colour is light green. As the plant ages, adventitious shoots are formed on the veins of decaying leaves. These float to the surface and become detached from the parent plant. The floating form will quickly colonise the surface with a dense mass of foliage. This floating form has fronds which at first lie flat on the surface and have broader pinnae. Later finer aerial foliage is produced. The roots on these floating plants are fine and extremely dense providing excellent fry cover and nesting sites for Anabantids and other bubble nesting fish. In the wild these floating forms will be 'grounded' when water levels fall, rooting in the mud to transform themselves once more into terrestrial forms.

Cultivation: Indian ferns are undemanding and will tolerate a wide range of water conditions. Temperature between 22-28°C.

Ceratopteris pteroides (Hook) Hieron 1825

Common Name: Floating Fern.

Description: This species is still called *C. cornuta* in the trade, the original name ascribed to by Hooker. A new world species, its home ranges from South America northwards to the Southern USA. This species is quite distinct with thick almost succulent leaves. The plant grows in the form of a rosette with short petioles and fronds up to 30cm in length and 25cm in width. The shape of the fronds varies from oval to triangular either simply indented or divided into three to five lobes.

Cultivation: Not an easy species under artificial light it seldom succeeds in aquaria. Temperature required is the same as for *C. thalictroides* and like that species responds well to regular fertilisation.

Propagation: By adventitious shoots produced along the margins of the leaf.

Note: The other two aquatic species are not available in cultivation and are never imported.

Ceratopteris thalictroides (L)

Common Name: Indian or Sumatran Fern.

Description: Virtually the whole of the tropical world now contains this species either as an endemic or by introduction. This plant has many growing forms. When grown emersed the pinnate fronds are stiff and narrow. An intermediate form has a more luxuriant appearance with denser foliage. Submerged the leaves are petiolate and may grow as high as 1m under ideal conditions but more normally will only achieve half this

JET SETTERS



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SOCIETY WORLD

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Missing trophies

The York & DAS are appealing for help in tracing some missing trophies. The Society was reformed in December 1995, and, although having found a number of former Society belongings, about 20 silverware trophies appear to have been misplaced.

If anyone has any information please contact Alan Holmes on 01904 414272 or Neil Ferguson on 01904 794966.

Lamprologus British Open Champion

Held in conjunction with Corby & District A.S. Open Show, and organised by the Federation of British Aquatic Societies, the British Open Championship is the annual opportunity for all 'Best in Shows' to battle it out for the top title.

This year the top results of this prestigious event were as follows:

1996 British Open Champion: *Lamprologus calvus*, 86 pts, owned by John Powell.

Runner-up: *Fariowella acus*, 85 pts, owned by Mr and Mrs Moore.

3rd Place: *Barbus nicholsi*, 83 pts, owned by Terry Hewitt.

Bracknell A.S.

4th Place: *Hyphessobrycon metae*, 82 pts, owned by John Egan, Port Talbot A.S.

5th Place: *Garra orientalis*, 81 pts, owned by Paul Whiddett, Mid-Sussex A.S.

6th Place: *Corydoras narcissus*, 80 pts, owned by Tom Mayle.

The event was judged by Brian McHugh, of Isle of Wight A.S.

New Anabantoid slides

The Anabantoid Association of Great Britain are releasing a pair of slides depicting the Black-spot Bushfish, *Ctenopoma intermedium*, and its Okavango habitat. The funds raised are to be donated to the continuing project to protect the East Cape Rocky, *Sandelia bairnsii*.

The two slides are available for £1.50 + 24p p&p (cheques made out to D. Armitage) from: D. Armitage, 2 Close End, Robert Road, Hedgerley, Bucks, SL2 3XY.

Readers are also reminded that the set of four slides including *S. bairnsii*, *S. capensis* and habitats of each, including tri-fold information leaflet, are still available from the same source, for £3.00.

Grocklemania '96

Dr David Ford, of Aquarian, crosses the water for the Annual Island Aquatic Get-Together

The Isle of Wight Aquarists Society held their traditional Annual Show over the weekend of May 17, 18 and 19. One hundred aquarists booked for the three-day event at Haven's Harcourt Sands Holiday Park which was already host to some 400 guests attending a 60's Music Weekend. Whilst these guests were dancing to the sounds of the 60's, the aquarists were competing for the famous Thomas Crapper Award in a separate room (won this year by Erith AS).

Sunday 19 was also the Isle of Wight Open Show and a further 120 day guests arrived with fish, displayed and judged in the Ballroom of the Holiday Centre. Of the 212 entries, Best in Show was won by Paul Whiddett of Mid-Sussex AS with a splendid *Garra orientalis*. Best Coldwater was won by the Show Manager himself, Les Pearce (IoWAS) with a Silver Goldfish.

During the three days campers were able to attend stands by Hagen (who sponsored the show) and the Aquarian Advisory Service, with one day exhibits by the FBAS and Wight Reptiles who brought 10 tanks of snakes and Geckos.

Lectures were given by Bill Rundle (FBAS President), Brian Walsh (Northern Catfish) and Dr David Ford (Aquarian). The third heat of the Aquarian AquaChamp competition was also run in the main ballroom while the FBAS judges were pointing the fish. The winner was Alan Stevens of Eastleigh AS.



A splendid venue for a fish show — the ballroom of the Haven Holiday Centre! The Judges can be seen hard at work.

Cream teas, pasties and fish

All three are to be found in Cornwall and well-appreciated by summer visitors but for local residents there are even more fish to be found and enjoyed all year round at West Cornwall Fishkeepers Society which meets on the second and fourth Friday of each month at 8pm at Camborne Community Centre. Details of all the Society's activities (especially their Open Show in October) can be obtained from Gary Shaw on 01736 763712/69211.

Challenges for Weston '96

With plans for this year's SUPREME FESTIVAL OF FISHKEEPING well under way, the Federation of British Aquatic Societies announces details of two exciting challenges for the Weekend event.

New for 1996 is the INTERPET FISHKEEPING CHALLENGE and finalists for this event can qualify in two ways:

1. Society Qualification. Question Packs will be sent to all Societies by the FBAS

containing three questions from each of the following categories: Coldwater fish, Marines, Livebearers, Catfish, Cichlids, Community fish, Fishbreeding, Fish Disease, Aquarium management, Aquarium Plants.

A Tie-Break question will also be asked; this will only become applicable in the event of a tie to determine Finalists.

The completed answer sheets to be returned to Interpet Fishkeeping Challenge, The Orchard, Gatcombe, Isle of Wight PO30 3EF, for marking.

Only one entry per Society will be accepted. The four highest-pointed answers returned will be eligible to contest the Interpet Fishkeeping Challenge Final at the Supreme Festival of Fishkeeping in November.

A FREE Weekend Ticket for Two (one Society member to compete in the Final on behalf of their Society and partner) will be supplied to each of the four Finalists with the compliments of Interpet.

2. Individual Qualification. In the preceding period before the event Interpet will, with the association of the aquatic press, run a competition based on the above basis but with different questions and only one from from each category.

Completed entries to be returned to the same address for marking.

The two highest-pointed entries will each receive a FREE Weekend Ticket for two, and the winners will be eligible to compete in the Final.

The Prize

The Winner of the Interpet Fishkeeping Challenge will receive a Trophy plus £400 mrrp worth of Interpet products of their choice. All competing Finalists at the event will receive a Trophy.

Supreme Society Challenge

The popular Society participation event which made its appearance at the 1995 Supreme Festival is to be continued this year.

The 'Table-top' competition (open to any aquatic Society) is based on displays by entrants and must include the following five categories: Handicrafts, Junior, Furnished Aquarium, Breeders Teams and a Theme Area.

The Competition is open to any bona fide fishkeeping Society.

Entries will be by application only and limited to a maximum of ten Societies (unless space permits) on a 'first-to-apply' basis.

Entries to be divided into two sections — with backgrounds and without.

Applications for entry must be received by September 1. All exhibits must be completed by 11pm on Friday, November 1; Judging begins 9.30am Saturday, November 2. Awards presented Saturday evening.

Societies to provide two members to act as Judges — judging all exhibits other than their own.

Dismantling will not be permitted until 5pm Sunday, November 3.

Awards

First Place receives Perpetual Trophy (returnable after one year) Society Trophy, Certificate, Hagen Aquarium as supplied.

2nd-4th places receive Society trophy, Certificate, Hagen aquarium as supplied.

All participating Societies will receive a Certificate of Appreciation and a Hagen 'Goodie-Bag.'

Full details and Rules of this Competition can be obtained by sending a SAE to: SUPREME SOCIETY CHALLENGE, The Orchard, Gatcombe, Isle of Wight PO30 3EF.

Society World is provided to help all Societies to promote themselves and their activities. One of the most difficult tasks within any Society is that of Programme Secretary, who is expected to fill every meeting with something of interest. These columns are a source for all manner of ideas for Societies' entertainment, and could lead to many a Speaker finding fame (if not fortune!)

So do your bit to let readers know of your good fortune, whether you have found an excellent Speaker or have come up with good ideas which have helped to entertain your Club's membership.

We can help you only if you provide the information. Depending upon availability of space, we are also pleased to incorporate highlights of Show results (major prizewinners only, please, and DO please include first names) together with photographs if they are suitable.

And, of course, ensure that as many people as possible have advanced warning of your Meetings, Shows, and other events, by sending us details for our comprehensive 'Diary Dates' column in good time.

Send your information to: 'Society World' Aquarist & Pondkeeper, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET; or you can e-mail direct to: societyw@sjpr.demon.co.uk (please let us have your information at least six weeks prior to publication).

DIARY DATES

JULY

2 Gloucestershire A.S. Talk on Fancy Goldfish by Martin Jones. Table Show Coldwater, AOV, Bell & Gavel, Cattle Market, St Oswalds Road, Gloucester. Contact Andy 01452 372948 or Christina 01242 520428

7 Scarborough & DAS. 27th Open Show. Friarage County Primary School, Longwestgate, Scarborough. Benching 11.30am-1.30pm. AUCTION 1pm prompt. Contact G. B. Hawksby 01723 862205

12 Yorkshire Cichlid Group. St Anne's Church Hall, Wrenthorpe, Wakefield. 8pm. Helen Burns with 'Breeding Successes'. Contact Dave Wright 01924 362313

21 Oasis. AUCTION at Monkwearmouth Community Centre, Sunderland. Enquiries to Avril 0191 384 1433

28 Association of Midland Goldfish Keepers. Pretty Fish Show. Members Only. Contact Anne Bloor 01327 261198

28 Kent Association of Aquarist Societies. Open Show & Auction. Village Hall, Meopham, Kent. Benching until 12 noon. Judging 12.30pm. Auction 3pm. Contact Adrian Dempsey 01227 740747 (evenings)

AUGUST

6 Gloucestershire A.S. Review of

1st Open Show. QUIZ, Bell & Gavel, Cattle Market, St Oswalds Road, Gloucester. Contact Andy 01452 372948 or Christina 01242 520428

18 Chwyd Aquatic Show Team '88. Aquatic Auction. Boys Brigade Hall, Castle Street, Caerwrlle, nr Wrexham. Booking in of Lots (limited to 25) from 10.30-11.45am on the day or in advance by contacting Peter Jones 01978 761829

18 Perth A.S. Open Show and Fish Auction (no reserve prices!). City Hall, Perth. Contact Tom Young 01738 621704

18 Portsmouth A.S. Annual Convention. Portsmouth Community Centre, Mallies Road, Portsmouth. Speakers Dr Peter Burgess and Brian Walsh. Tickets £5 including buffet. Contact J. Stillwell 01705 691030

25 Tyne/Tees Area Association. Aquatic Festival '96. 10am-5pm. Park Hotel, Tynemouth. Open Show, Lectures, Competitions, Trade Stands, Society and Specialist Stands. Sale of Fish by Hobbyists. Space available for non-affiliated aquatics to sell fish at £5 per space. Heat of AquaChamp. Further information from Colin on 0191 251 3452 or Jane 01325 466630

1996 OPEN SHOW DATES

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

6 July Port Talbot A.S. (FB)

7 July NW Cichlid Group

7 July Scarborough A.S. (Y)

21 July Ashby A.S. (Y)

21 July Phoenix A.S. (FN)

28 July K.A.A.S. (FB)

3 August Gloucestershire A.S. (FB)

4 August Peterhead A.S. (FS)

10/11 August Koi '96 BKKS National Show

11 August Dunfermline A.S. (FS)

11 August Grimsby & Cleethorpes A.S. (prov.) (Y)

11 August Salisbury A.S. (FB)

18 August Perth A.S. (FS)

25 August Glenrothes A.S. (FS)

1 September Cramlington A.S. (FB)

1 September US of A Show (USA)

7 September Bristol A.S. (I)

8 September Lincoln & DAS (prov.) (Y)

8 September Northern Catfish Group

14 September Hounslow A.S. (FB)

15 September South Scotland A.S. (FS)

15 September Mid-Sussex A.S. (FB)

15 September Plymouth A.S. (FB)

15 September Silktown A.S. (FN)

22 September Grampian A.S. (FS)

28 September Bristol Tropical F.C. (FB)

28 September Northern Goldfish P.S. (I)

29 September Darwen A.S. (FN)

6 October Grangemouth A.S. (FS)

6 October Halifax A.S. (FN)

6 October Washington A.S. & P. (FB)

13 October Solway A.S. (FS)

20 October Leeds A.S. (Y)

20 October West Cornwall F.K. (FB)

25/27 October BAF (Bowler's) (FN)

1/3 November Supreme Festival of Fishkeeping (FB). Coldwater Show, Saturday, 2; Open Show, Supreme Championship Final, Sunday, 3

10 November Bradford A.S. (Y)