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Features

COVER PICTURE

Like all marine Angelfishes, the juvenile French Angelfish (*Pomacanthus paru*) is quite different in colouration to the eventual adult. The yellow-striped, black body (the similar juvenile *P. arctuatus* has an incomplete yellow ring on the caudal fin) gives way to a dull grey body speckled with yellow-edged scales, yellow-rimmed eyes and a small yellow patch on each pectoral fin.

This Caribbean species is quite aggressive when young, especially to others of the same species.

Regulars

Comment

Business As Usual

Welcome to 1996, and especially to this particular issue of The Aquarist & Pondkeeper.

Towards the end of 1995, the ownership of *A&P* changed hands, a not uncommon procedure in the world of publishing and something always undertaken with confidence on the part of any new owner.

Although there is never a convenient time in any regular publication's production schedule at which to make such a change, the new owners, MJ Publications Ltd., are old hands at producing *A&P* — at least the printing and production side of things — which they have been associated with for many years. Thus, the majority of the incoming team's effort will be devoted to ensuring that *A&P* continues its reputation as a stimulating, interesting and entertaining aquatic journal.

As a longstanding contributor to *A&P* (and a practising aquarist, given the time!), I feel I know what the magazine should be offering to readers no matter where their individual fishkeeping skills or interests lay. Having spoken to our regular contributors and friends in the aquatic trade, I am sure that you will hardly notice any difference in the changeover; readership loyalty is of the prime importance to us but I am equally sure that you won't be slow to come forward and tell us about all our rights and wrongs (hopefully the former will always outnumber the latter). I look forward to receiving your views and comments in the coming weeks and months; we are here to reflect modern fishkeeping in all its forms and rely on your support to keep us up to date.

Brian Rees

EDITOR
E-MAIL ADDRESS: CompuServe no. 101372, 3451

Solid steel blue male (true strain)

• PHOTOGRAPHS BY THE AUTHOR •

BRIAN MIDDLETON, APPARENTLY AS CONFUSED AS EVERYONE ELSE, LOOKS AT FISHBREEDING TECHNIQUES WHICH ARE ...

TAKING THE STRAIN OUT OF DISCUS KEEPING

Dragons, Pandas, Sunset Tigers, Pigeons and any other name you can think of, this confusing array of names sounds like a stock list of a private zoo. What the list actually demonstrates is that no one has defined what a single one of the above Discus really is.

Ten years ago, the Discus available were very defined in their categories such as Turquoise, Turquoise Reds, Cobalt, Solid Cobalt, Solid Turquoise, etc. These were all derived from wild fish originally, which were Brown Discus (*Symphysodon aequifasciata axelrodi*), Blue Discus (*Symphysodon aequifasciata haraldi*) and Green Discus (*Symphysodon aequifasciata aequifasciata*). Particularly good specimens of Blue Discus were given the prefix Royal, and therefore became Royal Blue Discus and particularly good specimens of Green Discus were similarly elevated to Royal Green Discus.

On the positive side, what has happened over the last 20 years is a few, very dedicated breeders in Europe and America have virtually devoted their lives to improving and increasing the quality and strains of their chosen fish. The way this is done is very easy to explain but incredibly difficult to put into practice. The method is to breed from fish especially selected for their perfection: the fish has to be perfectly round, as large as possible, have the required colour characteristics and, finally, there obviously have to be two of them — a male and female. These criteria alone can take years to accomplish. From the selected breeding stock the very best specimens are mated. After approximately seven generations the broods from the selected parents are virtually identical; with a lot of luck and complete dedication this process takes between seven and ten years. Without going into complex genetics this is a very simplistic overview of what a breeder is striving to achieve.

As a consequence, the traditional strains of Discus have been improved beyond what was thought possible only a few years ago.

Solid metallic green.

INCREASED KNOWLEDGE

On the negative side, what is happening now is actually putting serious Discus breeding back 20 years, and I will explain why.

Now, many more Discus keepers are successfully breeding their fish. This is due to the increase in the knowledge of water chemistry, and equipment such as reverse osmosis units, etc. The consequence of this advancement is that, in most cases, the fish being bred are from nondescript, cross-bred fish. These are initially imported from the Far East (along with some very exotic diseases) from where they are being mass-produced in the true tradition of that part of the world. They are fed, in many cases, on a diet of *Tubifex* worms which is potentially disease-ridden. By far the worst thing to happen, however, has got to be the introduction of the so-called Pigeon Blood strain, and this also goes for Pandas, Sunset Tigers, Red Dragons, Golden Dragons — and any other name you can think of. THESE FISH ARE NOT YET ANYWHERE NEAR BECOMING A TRUE STRAIN and even if they were, I cannot see the point in propagating a strain of fish that is not of pure colour. They are covered in black, dust-like smudges and in most cases do not attain the size a pure strain fish should. As a rule, they do not rear their own young because the ability to secrete the very essential mucus has been bred out of them. Perhaps most importantly, they don't have stress bars (vertical stripes) which give the Discus owner vital advance warnings of illness or stress, which is such an important factor when keeping Discus.

A little earlier I mentioned Discus breeding being put back 20 years. The reason is this: any new Discus keeper will be looking for the most economical way to set up. A lot of hard-earned cash will be spent on filters, heaters, tanks, cures, books and then the cheapest Discus that can be found will be bought! These 'cheap' fish are, nine times out of ten, from breeding stock that originated from the Far East. The novice then wonders why they don't grow, why they are lemon-shaped or why, after a couple of months (or less), they die! The reason is very simple, the stock from which these fish are being produced is, in most cases, inferior — they are being bred for quantity, not quality.

PIGEON BLOOD CHARACTERISTICS

For years we used to be inundated with bright blue and bright red Discus from the Far East, until a few wise people realised these fish were being fed with male hormones to give them these false colours. It was only about a month after being put in the owner's tank that the colour reverted to brown. What the unsuspecting owner also did not realise was that in consequence of being fed hormones the much-prized Discus was also sterile. Since Discus keepers in the West have got wise to this, the mass producers in the Far East have had to find another way to take the Discus-buying public's money — hence the Pigeon Blood!

Most Pigeon Blood fish are bred with a normal fish, therefore any broods are completely cross-bred. The only criteria for those breeders is that the pair will breed; they don't have to be round, big, or even of the desired colour as, when the brood grows, a proportion will have Pigeon Blood characteristics (and called Pigeon Blood ... or Red Dragons ... or Sunset Tigers ... or Pandas ... or any other 'pretty' name!). The rest, looking like the other parent will take on its

TROPICAL

Taking the Strain out of Discus Keeping

name, in other words if it was a Cobalt the young will be called Cobalt; the parent may well have been a Cobalt x Cobalt but these young are actually Cobalt x Pigeon Blood, crosses having a high possibility of not being able to raise their young or to grow into magnificent Discus. If two crosses are allowed to breed there will always be a proportion of Pigeon Bloods which means that the breeding programme is basically back where it started! BUT now all the 'impure' young fish must be christened and sold!

So now the 'Cobalt-looking' fish are entitled Pigeon Bloods, Red Dragons, Golden Dragons, Sunset Tigers or 'Peking Ducks' (bamboo shoots optional)!!

Now the true strain has vanished completely. One thing I very rarely see are any fish that are advertised as Pigeon Blood crosses. Where are they all? I think I know ... they are strewn all over the British Isles with a price tag of £5.00-£6.00. It should be the aim of every serious breeder to find new colours and characteristics in Discus, but these characteristics should be handled with the utmost responsibility until maybe, just maybe, a new improved strain is accomplished. Please don't think you have a new strain after breeding for just two or three years, it doesn't happen that way! One importer of these fish actually said to me: "When you breed these, you won't get two fish that look the same, they are a genetic minefield!"

Well, that is at least accurate but, as with any minefield, we must be careful not to blow ourselves to bits!

GENUINE BREEDERS SCARCE

Ten years ago, my Sundays would very often be spent taking a trip out to look for decent Discus. Although it may have involved a few hundred miles it could be virtually guaranteed that I would find what I was looking for — and end up spending more than I had planned! With the advent of Pigeon Bloods, the genuine breeders of high-quality Discus in Great Britain can now be counted on one hand. In Germany there are many breeders of superb quality Discus: these are expensive, for the simple reason they have to be as the complex, time-consuming selection process does not allow the breeders to have many Discus to sell. One Discus you will have great problems locating in Germany would be a Pigeon Blood, many of the most respected breeders have nightmares about one getting within a mile of their breeding tanks! Maybe we should follow their lead.

I must explain at this stage (if you have not already realised) that I love breeding and looking after Discus. I find it heart-breaking, after keeping and breeding these superb fish for over 20 years, to see so many people genuinely wanting to keep Discus having such difficulty. They get rid of their community tank, set up a Discus tank, buy what they think are good quality fish and within a few months are disillusioned: the fish are not growing, they are lost through disease. Is it any wonder these people are put off keeping Discus, and all due to not having quality fish to begin with. Even if they manage to keep these fish alive it will be at least a year before the females mature and possibly 18 months before the males do — what a waste of everybody's time!

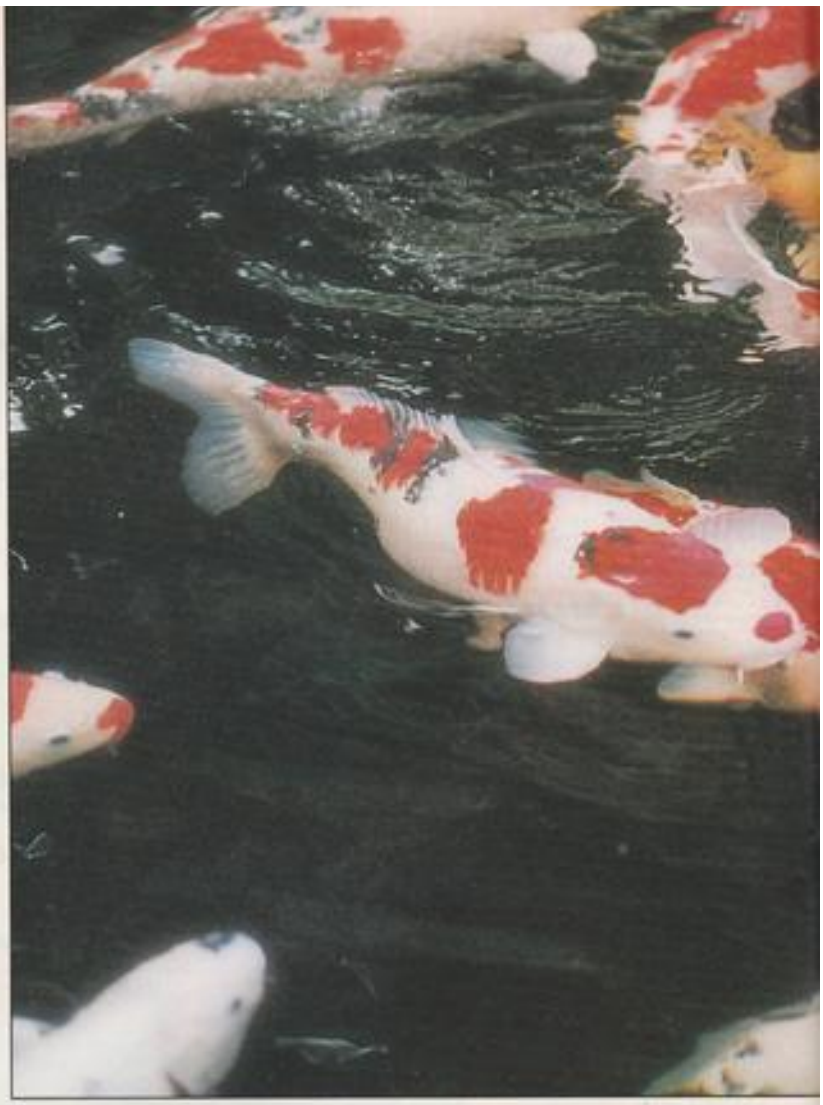
The breeders and dealers selling these fish are doing the trade no favours whatsoever. I don't know of any other species of animal that is bred as indiscriminately as Discus; surely any breeder of species must be looking for the best possible bloodstock. If you cross a Greyhound with an Alsatian the result is a mongrel , it will never be a Greyhound or an Alsatian — and will never win Crufts!

I am sure there will be readers who will disagree with what I am saying; I also suspect that some may agree. Whatever your view, write and tell me: let's have some feedback from Discus breeders out there.

I have merely given you my opinion — now let me have yours!

"Red Dragon" pigeon blood.

KOI TALK



THIS MONTH'S KOI TALK ATTAINS FEATURE STATUS AS **ALAN ROGERS** EXPLAINS THE PROBLEMS WINTER CAN BRING FOR YOUR KOI.

• PHOTOGRAPHS BY THE AUTHOR •

WINTER PROBLEMS

With temperatures decreasing at this time of year, it may be prudent to focus on some of the severe conditions that will confront our Koi. The over-wintering of Koi is essentially a matter of dealing with adverse low temperatures over a prolonged period. The condition at which Koi *arrive in Spring*, is dependent on how meticulous you are in the preparations during the winter period.

For most of Winter, and sometimes early Spring, Koi go into a state of semi-hibernation, the degree of which is solely related to the surrounding water temperature. This condition is better known as *ectothermic* existence. It is therefore important that healthy, strong Koi, displaying no visible symptoms of distress, well-nourished with adequate energy reserves are prepared for such an ordeal. These torpid conditions associated with many forms of hibernation will continue until

A scene from the middle of winter in a heated pond!

the arrival of stable and improved pond temperatures.

SURVIVAL BASICS

From brief research of recorded meteorological data, summarised over a fifteen year period, we can establish that the average British winter can vary from 12-22 weeks, depending upon the severity of any particular winter. This figure is based upon air temperatures eventually stabilising at 50°F (10°C) and should coincide at a time when renewed activity could be anticipated from fish in outdoor ponds.

Temperatures below 48°F (8.8°C) create a level of stress even in healthy Koi and, as they decline dramatically, the degree of stress and subsequent threat to life progressively increases. Weak and sick fish will experience great difficulty surviving such harsh conditions, particularly when average readings hover around 40°F (4.4°C) for a three or four month period. In this ectothermic existence, water temperatures lower than this and even closer to freezing will cause traumatic stress, often resulting in death.

In reality, for Koi to flourish, grow and live healthy natural lives they need to enjoy eight months of the year revelling between 65°F (18°C) and 75°F (24°C). Koi will survive in ranges between 50°F (10°C)and 60°F (15.5°C) but at such low temperatures can never be expected to develop their full potential. Optimum growth and development would be expected between 75°F (24°C) and 82°F (27°C) — temperatures unlikely to be achieved and sustained in the U.K. without the assistance of reliable pond heating.

Contrary to many beliefs, Koi can never be classified as a coldwater variety. They do not accept, or take kindly to, these low temperatures. I do not accept that Koi, which are produced for their aesthetic looks rather than their durability, can contend with such adverse conditions. I stand to be corrected, but I know of no other fish which are naturally expected to go into a state of hibernation each and every year.

Koi are raised in far more cordial climates of the world which never endure temperatures relating to those of British weather. In such climates their continuous activity encourages feeding and growth for twelve months of the year. Furthermore, it creates no serious setbacks to a healthy vitality to these Koi, so why should many British Koi keepers even consider that hibernation is an expected part of this life cycle? It has been suggested in the past, that the lifespan of a Koi may shorten if a period of fasting does not take place on a regular basis, but so far to date no evidence supports such a questionable theory.

ENVIRONMENT & METABOLISM

Perhaps new enthusiasts consider that Koi keeping is really a seasonal hobby, one to be involved with during the Spring and Summer months only. Perhaps it is because most ponds are an integral part of the garden and, as most growth in the garden is relative to season and temperature, Koi are expected to respond with the same seasonal dormancy. This may have been the misconception ten years ago, but the real art of Koi keeping has changed a great deal since then. If Koi had the choice, cold winter periods would be abolished forever! Koi are not built like Arctic Polar Bears, and even the Japanese breeders (who experience several metres of snow each winter) have recognised the necessity to move stocks into safer and warmer surroundings BEFORE winter closes in. Such action brings appreciable benefits during the following Spring, merely by keeping winter losses of valuable stock to a minimum. Early words of wisdom from the Japanese breeders often referred to preparing strong winter shelters for their Koi, ensuring that snow and ice is never permitted to fall into the pond.

In recent years, many Koi keepers in this country have built ponds which are an integral part of the house, some even going to the expense of enclosing the whole pond within a purpose-built

KOI
Winter Problems

conservatory. Under such conditions, both fish and Koi keeper appreciate an all year round enjoyment from the hobby. In many respects, by sheltering the pond from the influence of snow, frost or freezing wind chill factors, immediate protection will be experienced against rapid temperature changes.

A fundamental fact which must always be recognised is that *Koi cannot tolerate rapid changes to their surroundings*. Nonetheless, they are able to adjust moderately well to a much slower degree of change.

The process which controls digestion and absorption of any food source virtually ceases to function around 44°F (6.6°C) and indeed at such temperatures feeding must cease altogether.

If food is given inappropriately, manifestation of internal disorders is likely to occur, with appearances of gelatinous faeces floating on the water surface. Misguided feeding in such alien temperatures must be clearly avoided as food consumed in this manner may have insufficient time to be completely absorbed by digestive enzymes in the intestinal tract; undigested food remaining inside the gut may promote a state of rancidity, which will develop an unhealthy pathogenic activity within the digestive system.

TEMPERATURE CHANGES

As winter approaches it brings with it lowering temperatures and reduced daylight hours; subsequently Koi respond with a number of physiological and biological changes. This reaction is termed *metabolism*, and it is the chemical process which affects stages of growth, energy production, storage of energy reserves and the removal of waste materials from the fish's body.

These metabolic changes also greatly affect the complex nervous system, oxygen demands, muscular reactions, blood circulation and functional response to internal organs. Furthermore, the affect of low temperatures is a serious detriment to the Koi's ability to control its own immunity resistance and such Koi are exposed to a considerably higher risk of infection and disease.

A constant fluctuation of temperature can be considered as stressful, and equally as hazardous, as those which remain close to freezing. It is quite easy to understand why very young Koi are at great risk when they are expected to survive weeks of cold weather; their inability to store vast protein and fat reserves becomes critical to such young fish when they are deprived of a regular food source.

Without any method of retaining heat in the pond, it would be highly improbable that a number of one (tosai) and two year old (nisai) Koi could survive such an ordeal. Three year (sansai) and four year old (yonsai) Koi are faced with somewhat less distress, relying on beneficial protein reserves and glycogen stored in white muscle tissue. These white muscle areas are usually prevalent along the dorsal and caudal peduncle regions and, in more mature fish, are principal areas for accumulating energy reserves.

During October and November, newly-imported Koi suffer considerable shock and stress created by upheaval and shipment from the other side of the world. Most will have been starved for a month (or even longer) before being exported. So, if you are considering buying new Koi around this time of year, always pay special attention to these individuals as they will need careful monitoring and sufficient time to recover before you withhold further feeding.

Japanese breeders moving fish before winter closes in.

KOI
Winter Problems

HEATING & INSULATING

For many serious hobbyists, heating the pond seems to offer considerable advantages, giving added sanctuary to their Koi during such harsh periods. However, this element of luxury has never come cheaply, especially when confronted with a long persistent winter! Having paid out hard-earned cash to heat the water, further consideration should be given to retaining it! One only has to venture out on a frosty night to observe the heat dispersing into the cold night air, in the disguise of a rising foggy mist. Not only is this lost heat, but it's also a waste of money. So it would make sense to construct some form of framework over the pond and cover it with a sheet of plastic bubble-wrap insulation or similar non-toxic material. Even unheated ponds will gain up to 5°F temperature gain by this method. Provided the plastic material does not touch the water, the volume of air immediately above the surface will act as a thermal insulation to the whole pond.

The aesthetic looks to a pond during these cold periods is of minimal importance, and the Koi below will appreciate those valuable degrees of improved comfort. Shallow ponds offer neither benefit nor protection in spells of freezing conditions. The smaller the volume of water, the more rapidly thermal variation will take place.

If the framework is substantial enough to support heavy snowfalls, and secure enough to protect against strong winds, the thought of providing a hole in any formed ice should never be a matter for consideration. If a cover is made, it is important that a regular daily inspection of the fish is carried out, rather than 'tucking them away' for another winter. Frequently observe for any raised scales, ulcerations or damage and always treat accordingly. Infection is less likely to escalate at these low temperatures, but equally, very little self-healing progress is likely to take effect either under such conditions.

Wounds such as this should be treated before winter sets in.

DISEASE WATCH!

Be observant for any apparent changes to the colours of your Koi and for the formation of fungal development on areas of body and finnage. *Costia* is often a coldwater-related problem and usually causes an increase in mucus and a whitish appearance over the whole body, something easily overlooked on certain coloured Koi; a continual subjection to *Costia* will seriously affect the delicate gills and respiratory system. Fungal development at this time is also very prevalent, especially if decaying leaves or materials are permitted to remain in the water. The viral symptoms of Fish Pox may also be encountered at these low temperatures but need cause no real concern; the wax-like growths on both body and finnage look far worse than they really are and it is advisable not to treat or disturb such lesions as they will gradually disappear with increasing Spring temperatures.

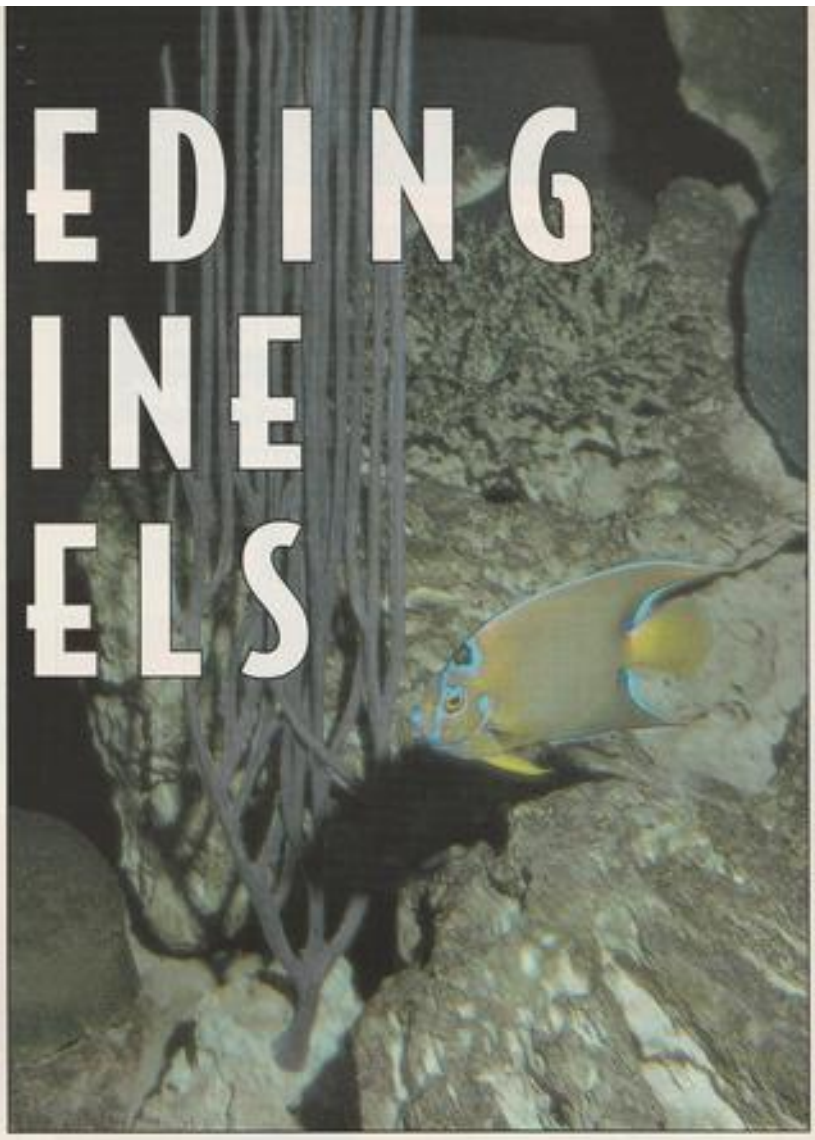
Fish laying at the bottom with their fins clamped tightly to their bodies is normal behaviour for many Koi in the coldest extremes, but do be concerned over individuals that tend to roll over on their sides for very long periods. These fish will be suffering unnatural and severely high levels of distress. Consideration must be given to transferring these fish into a warmer tank for a period of rehabilitation, so it may be advisable to have some emergency equipment as a standby, in a nearby shed or garage.

A great deal of winter-related stress to Koi can be relieved with a gradual increase to a higher temperature around 55°F (12.7°C), and can easily be achieved with an aquarium heater/ thermostat in a tank. The real problem a Koi keeper will then be faced with is being able to return the patient back to the pond after the convalescent period, especially when the pond temperature remains considerably lower. Any form of antibiotic treatment will have little therapeutic benefit unless temperatures are maintained at least around 65°F (18°C) for the duration of the therapy.

I resist the practice of treating the pond with chemicals at any time and prefer to treat individuals accordingly. This saves healthy occupants from the trauma of being subjected to chemical changes to the water when it is totally unnecessary for such individuals. There are, however, occasions such as parasitic outbreaks, where this practice is not always possible.

Always observe the activities of all your fish, watching for any loners that refuse to shoal with the rest. Being able to recognise the difference between normal and abnormal behaviour is very important. There can be no substitute for experience for, as we learn from the rigours of every winter, we also learn that other seasons are just as different, yet equally important, for our Koi to contend with.

BREEDING MARINE ANGELS



COLIN GRIST OF THE WORLD OF WATER AT BRISTOL ZOO GARDENS, CONTINUES HIS OCCASIONAL SERIES ON BREEDING MARINES WITH A REAL CHALLENGE.

• PHOTOGRAPHS BY THE AUTHOR •
• DRAWINGS OF SPAWNING SEQUENCES BY SUSANNA GRIST •

Who'd have thought you could breed marine Angelfishes? From the Dwarf Angels in the genus *Centropyge*, to the great *Pomacanthus* and *Holacanthus* species, we have a family with some of the most spectacular fishes in the world. Many of them are, however, aggressive and will not tolerate others of their own kind together in an aquarium and their natural spawning behaviour results in their eggs floating to the surface to drift with the plankton, or be eaten by the enormous throng of hungry fishes that always hang around spawning sites.

Nevertheless, there have been successes, although no-one has ever suggested it is easy. Certainly, the odds seem dead against the successful breeding of the larger angels, mainly because their territorial range far exceeds the space available in the average home aquarium. Having said that, there is bound to be more than one marine aquarist reading this with a tank large enough to house a pair, or several, adult angels.

HAREM SPAWNERS

Although many species have been observed mating in pairs, it is very likely that the majority, if not all, of the family operate a harem system where the male will spawn with a number of females in succession. It is, obviously, not impossible to witness spawning where only a pair of fishes are available.

I say "obviously" because, quite recently at Bristol Zoo's World of Water (WoW!), we had our two specimens of Queen Angelfish (*Holacanthus ciliaris*) pair off and start the mating process. Unfortunately, they were unable to complete their courtship due to a Nurse Shark sneaking up and devouring them while they were so preoccupied! This Nurse Shark had never predated on any other fishes in this exhibit before, or since (at least, to date).

Queen Angelfish (*Holacanthus ciliaris*). Large species, such as this one, are extremely challenging.

It appears likely that all species of marine Angelfishes start life as females, with some changing to males when the time is appropriate. This is, indeed, fortunate, as it is not always possible to differentiate between sexes easily, other than when they have become sexually active and a size comparison can be made; males are larger than females.

So, all you need to do when initiating your breeding programme is purchase several individuals and wait for one to change sex and service the harem. This, of course, is not going to be easy on the

TROPICAL MARINE
Breeding Marine Angels

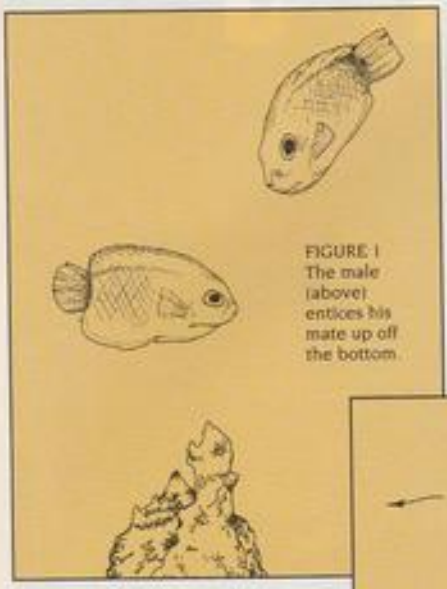


FIGURE 1
The male (above) entices his mate up off the bottom.

bank balance, but, unless you are lucky enough to obtain proven pairs, it is probably the only option.

The social system of Angelfishes is based on male dominance. The males will protect their harem, which generally comprises between 2 and 4 females, although, as mentioned earlier, only a single female may be involved in some cases.

If the dominant male dies, then he will be replaced by either another male from a neighbouring territory, or by the largest female within the group changing sex. It takes a female somewhere in the region of one week to adopt male behaviour and approximately 20 days to become fully active sexually.

Males are larger than females in most cases and there can be some colour differences between the sexes, particularly in *Centropyge*. There are also marked differences between the sexes of species in the genus *Genicanthus*, where males and females are easy to distinguish. However, in *Pomacanthus* and *Holacanthus*, there are no easily recognisable external differences to help tell males and females apart.

SEASONAL SPAWNING

Spawning generally takes place during spring and early summer while temperatures are still rising, with the exception of more temperate species, such as *Centropyge interruptus* from southern Japan, which will only spawn in mid-summer when the temperature exceeds 27°C (81°F).

One or two species of *Genicanthus* and some angels from the eastern Pacific have a tendency to spawn in the autumn, while others in the Caribbean may spawn in the spring and then again in winter, depending very much on locality. For example, angels in the Puerto Rican area have dual spawning periods.

It is possible that the spawning season of captive angels will differ from nature.

Dusk is the time for spawning where Angelfishes are concerned, but, they are not, in the main, affected by lunar cycles. In fact, the majority of species will spawn daily throughout the month. In captivity, spawning seasons may well be extended. The Hawaiian Potter's Dwarf Angelfish, *Centropyge potteri*, seems to be the exception to the rule, as it appears to spawn only during the week leading up to a full moon.

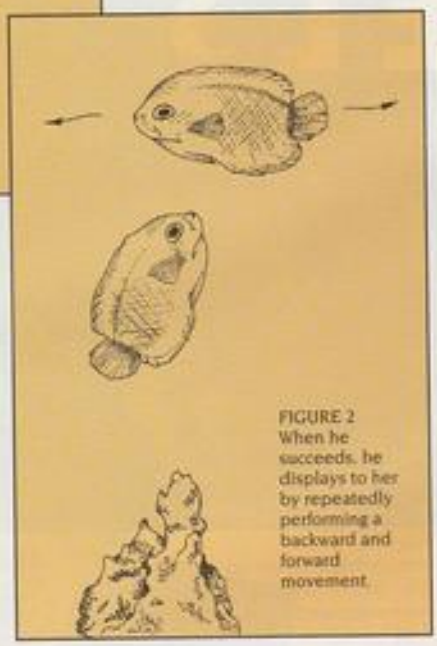


FIGURE 2
When he succeeds, he displays to her by repeatedly performing a backward and forward movement.

BREEDING BEHAVIOUR

Under normal weather conditions, courtship will commence around half an hour before sunset, with spawning taking place between 10 minutes prior and 5 minutes after setting. However, if the skies are dull, the fishes will begin their courtship activities earlier than usual.

The male always begins with a show of aggression, just to remind his harem who's boss. He then hovers over his chosen mate at an angle facing down to her in an attempt to persuade her away from the bottom. If she is ready, she will rise up to him and he will perform a back and forth dance for her.

Eventually, the male will move round behind his mate and move in close to push at her abdomen with his mouth. Spawning should then take place, with eggs and sperm being scattered in broadcast fashion to float to the surface. The pair then separate and return to the bottom.

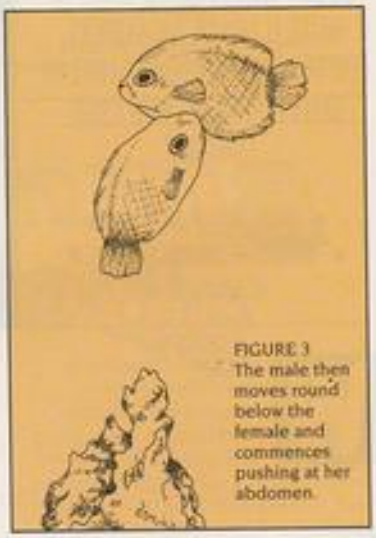


FIGURE 3
The male then moves round below the female and commences pushing at her abdomen.

Group spawning is not practised, where Angelfishes are concerned, so, males will move from one female to another.

The late Roger Lubbock observed aquarium spawning in *Centropyge flavissimus* and reported that, although there was the usual physical contact, spawning took place near the bottom and was undertaken with slow, swimming movements. As I have

witnessed similar behaviour in other species of *Centropyge*, it may be that the fishes have had to adapt their spawning procedure to suit the constraints of a captive environment.

HATCHING AND GROWTH

In most Angelfish species, eggs hatch after around 15 to 20 hours at a temperature of 28°C (82°F) and remain pelagic. The larvae develop fins and eye pigment after 48 hours and then begin to feed (72 hours for *Genicanthus*). They are quite slow-moving until they change from the larval stage. After 3 weeks approximately, sometimes a little longer, they move out of the pelagic stage and head for the safety of the reef.

In the aquarium, the floating eggs need to be transferred to a hatching and rearing tank by using a type of surface skimmer (see diagram), otherwise the eggs and/or larvae will be eaten by the adults. The skimmer needs to operate at a rate which allows the eggs to be drawn in and trapped by fine mesh, but not so fast that they get damaged.

Alternatively, if you are lucky enough to live close to a coral reef, you could collect floating Angelfish eggs with a plankton net in the evening along the shoreline. They would then need to be separated from all the other planktonic organisms caught along with them.

Rearing Angelfish larvae is difficult.

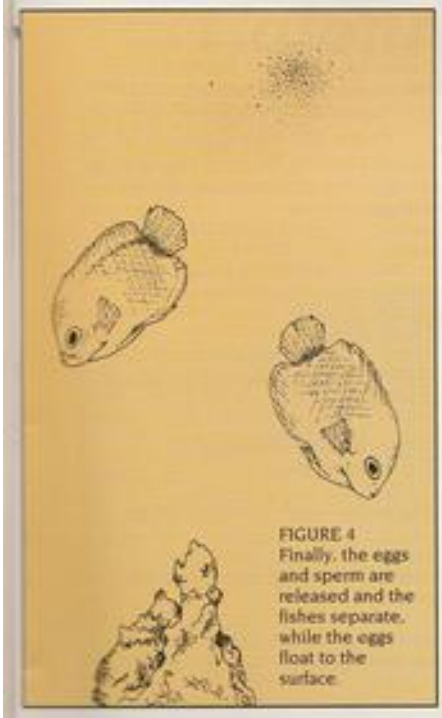


FIGURE 4
Finally, the eggs and sperm are released and the fishes separate, while the eggs float to the surface.

TROPICAL MARINE
Breeding Marine Angels

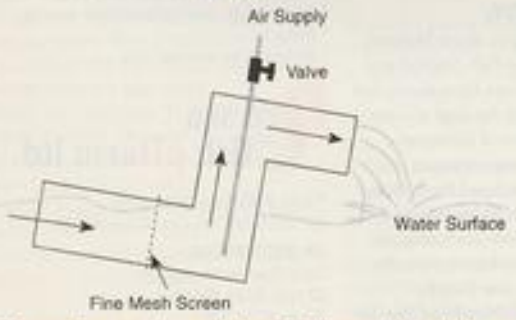
Dwarf Angels are generally easier to handle. Here are two such species: the appropriately named Bicolor Dwarf Angel (*Centropyge bicolor*) and a Rock Beauty (*C. fisheri*).

For a start, they are tiny — much smaller than those of Anemonefishes, *Amphiprion* spp. — and are unable to take even rotifers. However, rearing is not impossible if you can take the time to culture copepods and use their nauplii as a first food. Alternatively, you can culture zooplankton organisms such as *Euplotes*.

It may be possible to obtain cultures of these from biological material suppliers, otherwise you will have to start cultures by employing similar techniques as those used by freshwater aquarists to produce infusoria. Green water or potato water can be used and, as Martin Moe also suggests, place some rotting meat in a container of seawater. Cultures can be maintained by feeding them yeast. After a few days, the larval fishes should be large enough to start eating rotifers.

Obviously, the Dwarf Angelfishes are the most suitable for attempts at captive breeding, the likes of Queen Angels, *Holacanthus ciliaris*, and Emperor Angels, *Pomacanthus imperator*, being too large for most aquarists. Although the job is not an easy one, particularly trying to get the offspring beyond the larval stage, I know you all love a challenge, and this is one of the great ones!

SURFACE SKIMMER FOR COLLECTING FLOATING EGGS



This egg collector can be made from ABS elbows and bits of pipe, with a hole drilled in to accept a length of 1/8th inch air-line. A very fine mesh screen is fixed inside the pipework to trap the eggs as the water is drawn through.

ANGELS FACT FILE

1. Marine angels are easier to maintain, and therefore breed, in an algae-rich environment.

2. Angels all start life as females, with only some changing to males if the need arises.

3. Generally, angels operate a male-dominant harem system.

4. Angels do not group spawn, but males will service a number of females independently.

5. Larval angels are very small and unable to feed on rotifers. Something like *Euplotes* is more suitable as a first food.

Tomorrow's Aquarist

BY GINA SANDFORD

Power Cuts

For those of you new to the hobby, one of the most frightening things can be a power cut. Should this occur, ring the electricity board and see if they can give you an idea of how long the cut is likely to last. If the electricity is off for just a short time, say a couple of hours, your fishes and plants will come to little harm as the temperature will fall slowly and then rise slowly when the power is restored. It is a sudden change in temperature that harms the fishes, not a gentle rise and fall; that's why we float new fishes in their bags before releasing them into the aquarium, thus not shocking them with a sudden change in temperature. If using an air pump make sure that the water doesn't siphon back into the pump (and onto the floor!) when the pump stops. You should have a non-return valve in the system but check it anyway. When the power is back make sure that everything is working — external power filters have a habit of cavitating when the power returns.

If the power is off for longer, then action needs to be taken to minimise heat loss. If you have an alternative power source such as gas, you can fill empty lemonade bottles with warm water and float them in the aquarium, refilling as necessary to maintain warmth. If this is not available, a blanket over the whole aquarium will help conserve the heat.

One of the major problems with a power cut is the loss of the air supply. An undergravel filter will be okay for a short while, but over a prolonged period anaerobic bacteria will build up and can foul a tank. If this happens a water change is needed. Likewise, in an external filter the anaerobic bacteria will begin to build up in the filter medium so rinse this through before turning the power on again, otherwise you will just flush all the bad bacteria into the aquarium. In an overpopulated aquarium the fishes will also suffer because of the reduction of oxygen levels, here a battery-operated pump is useful in the short term.

The best way to overcome a power cut is to be prepared for it. Ensure that your tank is regularly maintained and the fish are not overcrowded. Have a plastic bottle/s available to fill with warm water and get yourself a battery-operated air pump and some spare batteries. When the power supply returns to normal monitor your aquarium carefully for a few days, checking the nitrite and ammonia levels and reduce, or even stop, feeding for a couple of days while the bacteria levels build in the filtration system.

Tetra TA COMPETITION

Colourful, Curious Catfish

When it comes to giving your pet a treat, the chances are that a dog or cat will be given their favourite titbit, but did you know that you can also treat your favourite Plecostomus and other catfish?

These fish vary tremendously in appearance and are not always immediately identifiable as a catfish. Some have skin that is naked or covered in bony plates, while others have small pointed scales. The most common characteristics of a catfish are the barbels, or feelers, found on the underside of the mouth; some resemble cat's whiskers whereas in other fish, such as the popular Plecostomus, they are small and often difficult to see. Quite a number of catfish spend most, if not all, of their time in close contact with the tank bottom.

Their diet varies too, from algae and plant matter to other fish, depending upon the species. However, **Tetra** has developed **PlecoMin** primarily for Plecostomus and other catfish. This is a specially-designed, vitamin-enriched tablet food which contains Spirulina Algae. The ingredients of this product will enhance the natural colours of your fish whilst providing them with the necessary vitamins and minerals for health and vitality.

Introduced to the market a year ago, Tetra have recently celebrated PlecoMin's success on its first anniversary. "Catfish are becoming more and more popular with aquarists, whether they are coldwater or tropical fishkeepers, as sales of PlecoMin over the past year indicate," says **Roger Foggitt**, Head of Tetra's Information Centre.

Tetra are inviting readers of Aquarist & Pondkeeper to join them in their celebration of PlecoMin's success! We have 12 tubs of PlecoMin (worth **£4.65** each) to give away to winners of this simple competition. All you have to do is answer the following questions about catfish and send your answers on a postcard (or back of a sealed envelope) with your own name and address to: **Dept PM, Tetra Competition, PO Box 2162, Bournemouth BH2 5ZA** to arrive no later than 31st January 1996. The **first 12 correct entries** to be drawn will each receive a tub of PlecoMin containing 200 tablets.

For detailed advice on any problems associated with your catfish, or indeed any species, and pond care, contact the **Tetra Information Centre, Lambert Court, Chestnut Avenue, Eastleigh, Hampshire SO5 3ZQ. (Tel: 01703 643339)**

Please answer, TRUE or FALSE, to the following statements.

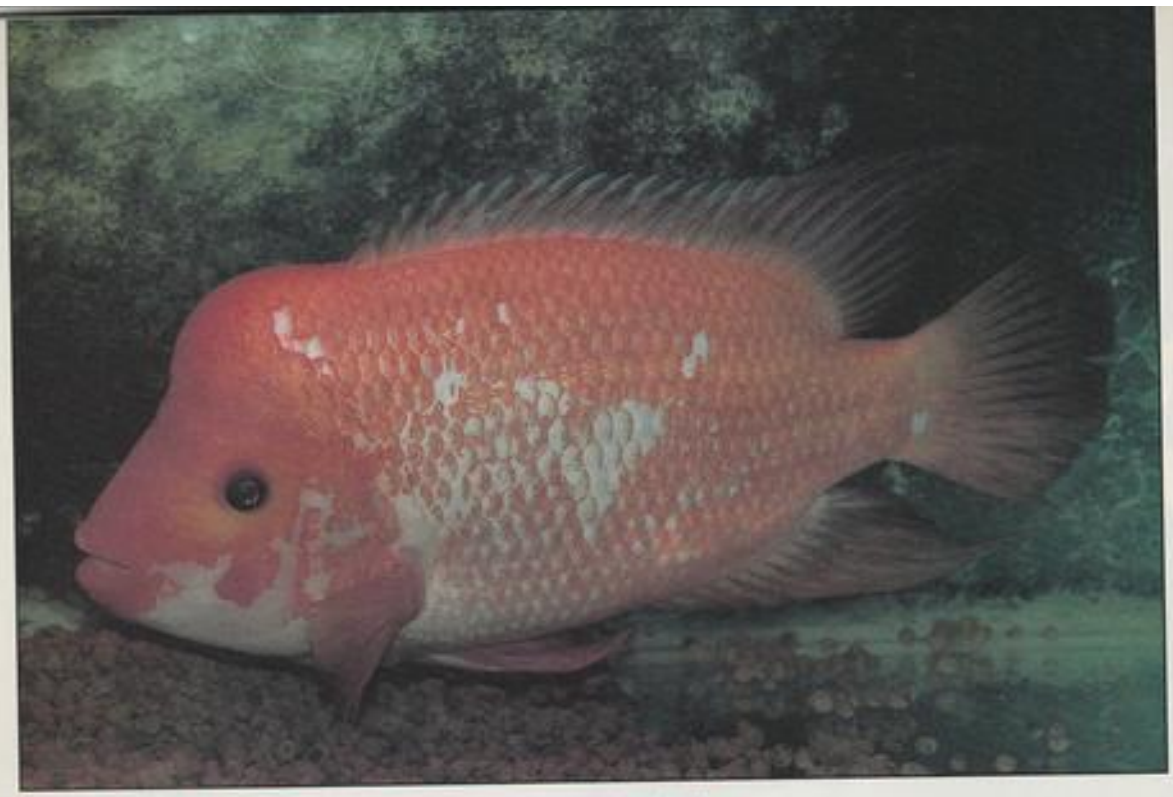
1 **Catfish generally spend most of their time at the bottom of the tank.**

2 **Catfishes have scales on their bodies.**

3 **All species of catfish have barbels or whiskers, which act as sensors.**

4 **Plecostomus and other catfish are becoming a more popular kept fish.**

5 **Catfish are never colourful.**



A large Red Devil male (*C. labiatum*). Note the smaller lump when compared to the Midas.

DEVILS WITH A TOUCH OF GOLD

PART ONE

Telling them apart

MARTIN CHANDLER BEGINS A THREE-PART IN-DEPTH LOOK AT TWO IMPRESSIVE AND CHALLENGING SPECIES OF CENTRAL AMERICAN CICHLIDS.

• ILLUSTRATIONS BY PHILIP ROBINSON •

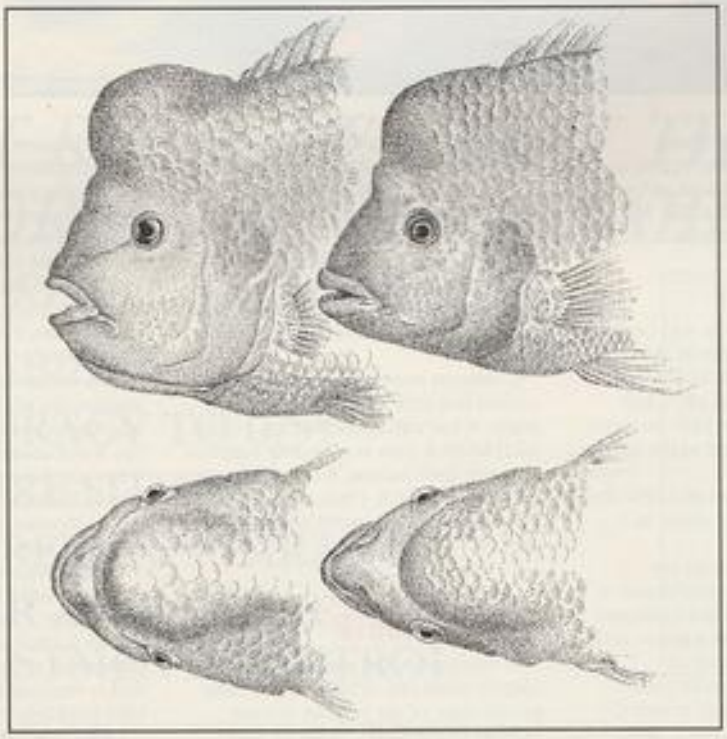
Probably the two species of Central American cichlids totally to fulfil their reputations are the Red Devil (*Cichlasoma (Amphilophus) labiatum*) and the Midas Cichlid (*Cichlasoma (Amphilophus) citrinellum*). Both are very large, aggressive and powerful fish with a bite

Young Midas Cichlid. Note that the lips are fleshy as in Red Devils at this stage. As this fish grew, its lips receded.

that can kill in an instant or demand respect from aquarists.

However, they are also very colourful and intelligent fish, being quite responsive to their keeper and, when kept correctly, they make the ideal fishy pets. This is why they remain very popular among cichlid enthusiasts, despite their disposition, and despite my having kept several more exotic species, the Red Devil still remains my favourite.

To the untrained eye, both species can look very similar and this has caused a lot of confusion among hobbyists as to which species they possess. So, before going onto general maintenance and breeding requirements, I have devoted this article to differentiating between the Red Devil and the Midas Cichlid.



MIDAS CICHLID
(*Cichlasoma citrinellum*)

RED DEVIL
(*Cichlasoma labiatum*)

Diagrams of fully adult male Red Devil (*C. labiatum*) and Midas Cichlid (*C. citrinellum*). The differences are plain to see. However, in younger fish, correct identification is not so easy.

COMMON NAMES

Both species having been in the hobby now for some time, have common names. *C. labiatum* is known as the Red Devil, not without good reason. *C. citrinellum* is known as the Midas Cichlid or as the Lemon Devil. It is the common names which cause the first confusions encountered between the two species, because, quite often, *C. citrinellum* is also named as the Red Devil. This is, more often than not, the case in retail outlets, where common names are often favoured to scientific ones.

Here, Red Devil is often applied to either species, so care must be taken to inspect the fish closely to determine which species you are actually buying. In

TROPICAL
Devils with a Touch of Gold

This is an 8in wild male Red Devil

such cases, of course, the blame shouldn't be placed on the retailer as not all are cichlid enthusiasts and will therefore tend to sell fish under the name that they are purchased.

SCIENTIFIC NAMES

Cichlasoma labiatum — the Red Devil — was described by Guenther in 1864 and has since been described as *C. dorsatum* and then *C. nigritum* Meek 1907, and *Heros erythraeus* Guenther 1866. However, *C. labiatum* is still accepted as the species name.

Cichlasoma citrinellum was also described by Guenther in 1864, and, since, as *C. granadense* Meek 1907.

The names of both species are currently referred to with *Amphilophus* in brackets. This is because the *Cichlasoma* are still being reviewed as a genus, and *Amphilophus* refers to species of Cichlasoma that share similar traits. Other species in this group include *C. macracanthum*, *C. altifrons*, and *C. lyonsi*.

DISTRIBUTION

The Midas Cichlid is widespread throughout the southern part of Central America, being found in the great lakes of Nicaragua, Costa Rica, and Panama. The Red Devil is found in the great lakes of Nicaragua, as well. However, owing to different feeding habits, the two species are not usually in direct competition.

C. citrinellum is mainly found over boulders or in open waters, often at great depths. It is not a shy species as it has very few, if any, enemies when fully grown.

C. labiatum however is found in areas of sunken lava rock which has very rough edges. It has well developed lips (in the wild) which it uses as a feeding adaption suited to their habitat. It is the difference in these lips which, I feel, provides the first major debating point on the two species.

LIPS AND MOUTH

In my opinion, the easiest way to identify these two cichlids is by a close examination of the mouths. A large number of available *C. labiatum* have fairly well developed lips and are quite easy to identify as, in the wild, only a very few isolated groups of *C. citrinellum* have been found with fleshy lips. These populations are only found where there are no *C. labiatum* and are very rare.

In *C. labiatum*, it would appear that the only purpose for the fleshy lips is to feed. In the wild, this species is forced by competive populations of *C. citrinellum* to remain in the areas of the lakes where the substrate is made up of jagged lava rock. Here, it uses the fleshy lips to suck its prey of invertebrates and small crustaeceans from crevices in the rocks. Continued 'bashing' of the lips against such a surface seems to cause the swollen lips which provide a protective cushion for the fish. This swelling of the lips is not unique to *C. labiatum*, though it has also been observed in species of African Lake Cichlids.

This increased swelling of the lips has also been noted in aquaria. If, for instance, lava rock is added to an aquarium and a live diet, such as bloodworm, is provided, the fishes' lips will soon swell as the invertebrates are sucked out of the rock. Once the lava rock is removed and the diet is changed back to pellets, the lips shrink.

I was once fortunate enough to get hold of a pair of wild-caught *C. labiatum* of some six inches in length. Their lips were very well developed, more so than I have ever seen in any tank-bred specimen. As they grew and became settled on a usual aquarium diet,

though, I observed a receding of the lips. They always remained fairly fleshy, but not as they had been on purchase. It would, thus seem that long-term captivity can have a marked effect on the lips of *C. labiatum*.

It has therefore become quite apparent to me that there is a large number of *C. labiatum* circulating within the hobby with little or no swelling of the lips at all. It is this aquarium-bred strain of which is being confused with *C. citrinellum* on a regular basis.

It would appear that hobbyists expect all *C. labiatum* to have fleshy lips and *C. citrinellum* to have thin lips. Even though this is not the case, more reliable differences can be found between the two species by looking closely at the shape of the mouth.

In *C. labiatum*, the upper lip arches slightly from the jaw, straightens, then curves down slightly, giving a gently pointed appearance. The lower lip runs very slightly downwards and the chin is very shallow. Also, when viewed from the front, the mouth is quite narrow, but when viewed from the side, it is quite deep.

In comparison, the upper lip of *C. citrinellum* is straight and runs slightly upwards from the jaw. The lower lip is also straight and runs upwards, while the chin is about twice as deep as in *C. labiatum*. When viewed from the front, the mouth of *C. citrinellum* is broad and, from the front, not very deep.

These quite-easy-to-observe differences are not so obvious in fish under three inches in length. However, in these younger fish, there is still a subtle difference. In *C. citrinellum*, for example, the lower lip projects in front of the upper and in *C. labiatum* the opposite is the case.

EYES, NOSE AND HEAD

Further differences between the two species can be seen by a close examination of the fishes' eyes, nose and head.

The eyes of both species are very similar in colour. The iris may be yellow, orange or red, with either black speckles or a vertical black bar being present, but it is the position of the eye which is very relevant as a point of identification.

In *C. labiatum*, the eye is positioned quite well back from the front of the mouth and not very high in the head profile. In *C. citrinellum* it is quite different. Here, the eye is further forward and much higher on the head profile.

The snout of *C. labiatum* is usually elongated in appearance, as opposed to *C. citrinellum*, which, when fully developed, has an almost vertical profile (as if it has hit a brick wall at high speed).

Both species will develop a nuchal hump on the top of the head. The nuchal hump developed by *C. citrinellum* is quite famous for its size, especially in adult males. The humps in *C. labiatum* are smaller than those but are still very large. In both species, the males will produce the largest humps.

SUMMARY

In this first article, I have identified the difference between the two species which can be summarised as follows:

1. Size of lips
2. Shape of mouth
3. Position of eye
4. Profile of snout and head

Hopefully, this will help you identify which species you may have in you aquarium. My comments are based on close observation of over a dozen fish of each species over a long period of time. I hope they will serve as a handy guide.

Reviews

Books

The Tropical Marine Fish Survival Manual
Author: **Gordon Kay**
Publisher: **Ringpress Books Ltd.**
ISBN: **1-86054-075-9**
Price: **£15.99**

They say never judge a book by its cover and I beg you to follow this advice. With one or two misprints and one upside down picture to 'encourage' you on the dustjacket, experienced marinists might well be tempted to give this book a miss which would be a pity, for they would be denying themselves not only a good read but also lots of practical information, too.

Although produced in the typical 'how to' format, the author (**A&P**'s own regular saltwater contributor) has managed to come up with something not seen in other books — a 'question and answer' panel accompanying most of the species pages; this is a very good idea for within each panel are the answers to many of the problems associated, perhaps, only with that particular species and what better place to look for it?

Extremely attractive to look at, with stunning photographs by some of the best lensmen around, the book simply 'tells it as it is' in language that is easy to understand and with illustrations that are clarity personified. The balance of 25%:75% between setting up the marine aquarium, its care and management and the description of some 109 different species (from 33 families) of fish is just about right. You're not kept waiting too long before the fish appear and any troubles you may encounter are sensibly left until after you've enjoyed the selection of species. Although invertebrates may be mentioned in passing (typically whether they are compatible or not with any fish species under consideration), there is no special chapter set aside for them (I hope the publishers recognise a hint when they see it, Gordon!). Similarly, whilst exotic species of fish are mentioned, they are done so as a warning NOT to keep them, either because of specialised feeding problems or from a conservation viewpoint. As Gordon points out, the world is getting smaller so fast that it's not much more expensive to book a holiday and see the fish in their own environment.

If you are thinking of keeping marine fishes, this book will lead you along a very safe path to success; you won't be puzzled by techno-speak and the very openness of the layout makes it easy reading. Add to this, the fact that after some 40 years of keeping marines, you have an author who has 'been there, done it (often wrongly and admits it!)' and is happy to share his secrets with you, means you (and your marine aquarium) couldn't be in better hands.

DICK MILLS

Lake Malawi Cichlids from Tanzania
Author: **Andreas Spreinat**
Publisher: **Verduijn Cichlids, Zevenhuizen, Netherlands**
ISBN: **3-931328-00-7**
Price: **£35.99** plus £2.50 p&p (cheques payable to British Cichlid Association) direct from: BCA (AP), 46 St. Margarets Road, Ardrossan, Ayrshire KA22 7EW.

As the introduction to this book explains, most of the biotope information on Lake Malawi cichlids available is for those found on the Malawian coastline of the Lake with species from Mozambique and Tanzania comparatively neglected; this, the author sets out to remedy, following a visit in 1993 to the Tanzanian shoreline.

Opening with background material on Malawi cichlid taxonomy, geography (general and more detailed maps), and a description of the coastline, the bulk of the work is devoted to the cichlids themselves, split into two sections — Mbuna and non-Mbuna. Each species is given a double page spread (one of text, one of photographs) and each genus has an introductory paragraph.

Information for each species includes details of its physical characteristics (size and colouration), distribution, habitat and feeding behaviour as well as notes on similar species and comments on a whole range of topics. In the case of species with an 'unofficial' (non-scientific) name there is also an explanatory paragraph on the name and possible taxonomic relationships. There are plenty of high quality photographic illustrations (chiefly by the author) and where there are different geographical forms of a species, these are illustrated separately.

Because Dr Spreinat's book covers new ground (and a region whose cichlids have begun to appear in the trade), it is an important complement to existing literature on Lake Malawi and its cichlids. My only reservations are that the Tanzanian coastline is only about 25% of the total and many of the species described are also found elsewhere and may well have been described in an earlier publication. This work is thus neither a comprehensive guide nor devoted exclusively to 'new' species. Nevertheless, it is a must for any Malawian aquarist whose enthusiasm extends to behavioural and biotypic information as well as to the fishes themselves.

MARY BAILEY

Self-Assessment Colour Review of Reptiles and Amphibians
Author: **Fredric L. Frye and David L. Williams**
Publisher: **Manson Publishing Ltd.**
ISBN: **1-874545-32-4**
Price: **£18.95**

Having read other works by both authors we looked forward to receiving this book. It contains many technical terms and advice on veterinary treatment and at first glance would seem to be written by vets for vets and not for the hobbyist.

However, it makes interesting reading for anyone involved with reptiles and amphibians and much useful information can be gleaned.

Some 230 cases presented in the form of photographs and questions as to diagnosis, cause, treatment, etc., are posed. The answers are then provided overleaf. The photographs are of high quality and many of them represent a salutory warning on the possible results of incorrect care. The format is extremely concise and easy to follow. Many of the common problems faced by keepers, parasites, *dystocia* (egg-binding), *stomatitis* (mouth rot), dietary deficiencies, etc., are dealt with.

Although it is not a simple D.I.Y. guide to disease meant to produce 'overnight experts' it should be useful both to amateur and professional, especially vets and students. There is a fast increasing demand for treatment of reptiles and amphibians as their popularity grows.

The main benefit to the layman is the information on symptoms, causes and prevention — ultimately treatment lies with the vet. Both authors are internationally-renowned. Frye is one of the leading authorities in reptile and amphibian medicine. A fascinating book which is a most useful addition to one's bookshelf and, at today's prices, represents good value.

BOB & VAL DAVIES

Video

An Introduction to Buying and Keeping Snakes
Written and presented by **Mark O'Shea**
Produced by **Scimitar Film Productions, Blagdon, Avon BS18 6RB**
Mainly available at specialist reptile outlets
Price: **£13.95**
Length: **40 mins.**

The writer is a professional herpetologist and gives the subject quite a thorough treatment covering most of the topics which a newcomer to snake-keeping should know. It starts with the right and wrong reasons for keeping snakes and covers various subjects such as choosing, housing and feeding.

Common diseases are briefly discussed and the importance of consulting a vet is stressed. A number of commonly-kept species are used to illustrate various points and their suitability for beginners assessed. However, small plastic animal carriers were recommended as one form of

housing; these are difficult to fit with a light/heat source and the lids are not always secure. They may be alright for small specimens kept in a warm room. A purely personal view — we do not like 'follow-on feeding' (i.e. as the snake is taking one mouse another is pushed into its mouth). Finally, some authorities have also questioned the use of Vapona R for treating external parasites.

BOB & VAL DAVIES

Software

Odell Under The Sea
Published by: **Iona Software, 16 St. Albans Road, Kingston-upon-Thames, Surrey KT2 5HQ. Tel: 0181-296 9454 Fax: 0181-296 9455.**
Format: **CD-ROM for PC (Windows) and Macintosh**
Price: **£19.95 inc VAT.**

Yes, it had to happen — the computer world has caught up with the aquatic world so now you can watch fish, as it were, through yet another glass-fronted box. Most CD-ROM titles that feature underwater pictures have been presented as 'screen-savers' which, attractive as they are, do not demand much interaction from the viewer. Then there are the encyclopedic databases of underwater animals that have stills and some video action. However, this programme is quite different, for you play an active part in the life on the coral reef.

Basically, you have to survive! Being on the reef means that you are always part of the universal food chain, so it's a case of 'eat before you're eaten'. However, this isn't an aquatic equivalent of a beat 'em up, shoot 'em down arcade game, for in order to survive you have to learn what to eat, where to go (or not), recognise a friendly fish (Cleaner Fish) or foe (Shark!) and so on. You can take on the identity of over 50 species of fish and 'live' at four levels: PRACTICE level lets you acclimatise yourself to life on the reef and flex your fins, so to speak; CHALLENGE puts you in a team of four fish (guess who's the smallest) and you work your way up to larger fish as points mount. At the top you become a REEF RULER, then start a new challenge with an entirely new group of fishes. In TOURNAMENT mode you work your way right through the whole range of fishes until you become the Great White Shark. The fourth level is designated CREATE-A-FISH and here you design yourself and try to outdo nature's own creations. Speed, endurability, agility, size, colours and special abilities can all be selected, although the special abilities (electric sting, ink projection, inflation, etc.) have to be bought and so eat up valuable points before you even start! Once started, each game gives you the reef to swim about on; a double check-scale indicates your health and energy levels (low health — find a Cleaner Fish fast! Energy low — eat something).

Hiding behind corals or in caves is permitted to escape predators. An information box reveals facts about plants and animals and the day/night indicator provides suitably appropriate fish for the hour. An optional dialogue box informs you of the result of any action you take (poisonous, inedible and suitable foods) — and also your fate should you fail to outrun a hungry Shark!)

So much for the entertainment content of the game, but there is a serious side to Odell as well. Of course you'll learn as you go along but the programme also offers comprehensive database information on three subjects: Fish, Corals and Sponges and other Sea Life. Common and scientific names are all here, together with notes on each species' importance, and relationship to underwater life. Be warned — should you start 'sidetracking' into these information zones, you'll never get into the game of living 'Down Under'.

Whilst the instruction manual gives full details about installation, playing and troubleshooting, it is based on the programme being floppy disk based, requiring installation; with the CD-ROM version this action is not necessary, the game runs straight from the CD — so doesn't take up any valuable hard disk memory space.

DICK MILLS

HERPETOLOGY Q&A

Q How can you tell Common Frog and Common Toad tadpoles apart?

A Until tadpoles are fairly well grown it is difficult to distinguish between those of the Common Frog and those of the Common Toad.

Once part grown, toad tadpoles tend to be black and frog tadpoles brown, often with a faint speckling. There are also differences in the arrangement of the rows of rasping teeth, but a powerful magnifying glass would be needed and the tadpoles taken out of water. Finally, toad tadpoles tend to 'shoal', whereas frog tadpoles usually graze separately.

Q We would like to keep Pink-tongued Skinks but understand they are specialist mollusc feeders. Is there an alternative food which is more readily available?

A Pink-tongued Skinks (*Tiliqua gerrardi*) tend to be specialist molluscivores in the wild, but some keepers maintain and breed them satisfactorily on an alternative diet without using snails. Snails and 'soft-bodied' (brown, grey) slugs are the ideal food, but may be contaminated with pesticides etc.

Many keepers therefore provide a diet of non-fishy tinned cat food or thawed pink mice, while others report using such items as mussels and waxmoth larvae.

Packs of frozen mussels can be bought from major supermarkets. The necessary amount is cut off and allowed to soak in tepid water, the water being changed two or three times to get rid of any salt. Some specimens of Pink-tongued Skinks may, however, refuse mussels.

In order to provide variety, you can try mixing other items e.g. crickets or thawed mice in the cat food, so that the Skinks may take them.

Part of a clutch of baby Pink-tongued Skinks eagerly consuming tinned cat food.
BOB & VAL DAVIES

QUESTIONS FOR THE HERPETOLOGY Q&A SHOULD BE ADDRESSED TO: BOB & VAL DAVIES, c/o MJ PUBLICATIONS LIMITED, CAXTON HOUSE, WELLESLEY ROAD, ASHFORD, KENT TN24 8ET.

WRITE BACK

Dear Sir,

Some readers may have seen, or purchased, our recent book *The Ultimate Aquarium* (published in November by Lorenz Books).

We were not a little surprised, on receiving our complimentary copies, to find that it includes a Glossary which neither of us had ever seen before; and not a little dismayed to find this Glossary contains some serious errors.

The text on page 87 has also been substantially altered, to the extent that neither of us can now make much sense of it, and we doubt that readers will meet with any greater success! As the page in question deals with electrical matters we can only reiterate our suggestion that professional advice is sought by the electrically-unititiated.

We are anxious to disassociate ourselves, and our advisors (as listed in the Author's Acknowledgements) from any responsibility for these alterations to our work, made by the Publishers without our knowledge or permission.

We would also like to reassure readers that they should find the rest of the book rather more accurate and meaningful, and to ask them not to judge it — or us! — on the basis of our Publisher's meddlings.

Mary Bailey and Gina Sandford.

BIOPLAST LETTER OF THE MONTH

Dear Sir,

Alas, your articles confuse me! In your October or November issues you suggest that about 50% of the pond water should be replaced. As all your articles deride tap water where else am I to find, or store, 600 gallons of water to replenish half my pond's contents? Also you suggest that each week 10% of the water be changed. By doing this, does it not keep replenishing the nitrates and so keep the water green with algae?

I, too, have experienced Trevor Gray's catastrophe when the pump drained the pond when a hose connection came undone. He suggests putting the pump into a bucket and covering it with small stones; does this not stop a lot of the muck in the pond being sucked out into the filter chamber?

Your guidance on these matters would help this confused pondkeeper.

A.M. Street, Colchester.

Trevor Gray replies:

Placing my pump in a bucket seems to have had no significant effect on the amount of waste reaching my filter, the fish stir up the bottom of the pond anyway. The gravel that I use consists of granite chippings (obtained from a local company that resurfaces roads, etc.) of approximately one inch, large enough not to clog easily — aquarium gravel would not be recommended.

Since writing the piece I have replaced the pan scourers (which do clog) and their holder by plastic piping with a plugged end and holes drilled in the underside. Because of the confined space the piping has to curve round the bottom of the bucket. This I did with angled joints. With a length of plastic twine replacing the bucket handle, the whole affair is easily removed from time to time for washing out.

Concerning the nitrates in tap water encouraging algae, this is probably correct although a 10% change should cause no major problems. As with most things, it is a question of compromises. Do the advantages of a water change outweigh the problems? Green water is a particular problem of the early season before the pond plants have got into their stride. Personally I have not suffered from this since installing a UV. Not cheap, but a good investment. There seems little point in keeping fish if you can't see them.

Thank you, Mr Street, firstly, for reminding us that there are readers who, upon devouring every word in *A&P*, can end up being more than a little confused by the varying opinions offered by our contributors and, secondly, having the courage to ask such simple but important questions!"

A £30 collection of Bio-Plast products will soon be on the way to you, by kind courtesy of our sponsor, Bio-Plast (UK). Tel: 01535 630230.

Now, working on the principle that one good question deserves another, (see Letter of the Month) could I seek an answer from readers for myself, please?

One of my local stockists is offering for sale Albino *Corydoras* with bright red rear halves, tail and caudal peduncle. The line between the two colours is clearly defined, an unusual feature for freshwater tropicals, although common in Marines. Even in Albino Ruby Sharks it is only the fins that are red.

I enquired whether these were a result of breeding or were produced in the same way as the dreadful coloured Glassfish, and was told that he did not know. He did say however, that if he discovered the latter to be the case he would refuse to stock them. Does anybody know the answer?

Trevor Gray, Norwich.

Cheers!

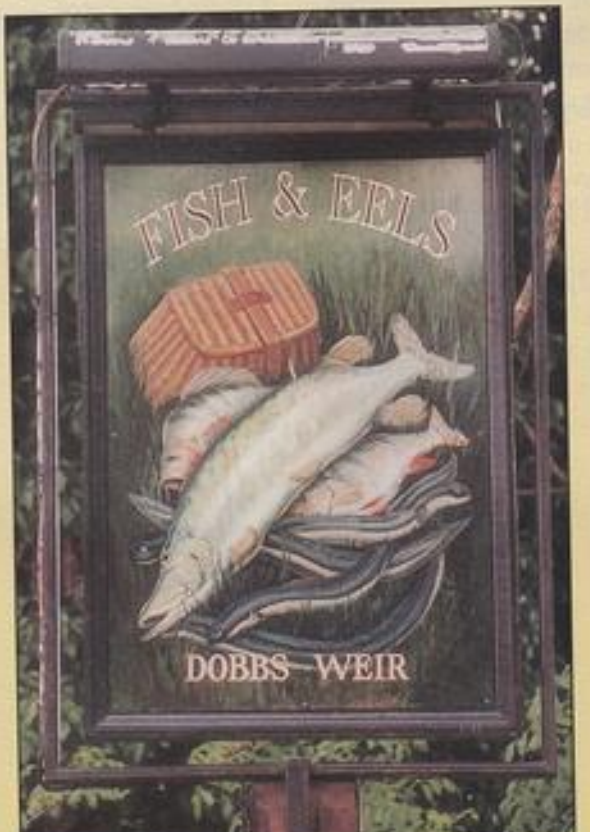
The less said the better about **Susan Brewer's** research procedures, as she wends her way along the aquatic pub signs trail.

Recently I read that the regulars of The George pub were up in arms because it had been renamed The Pickled Newt. Why? What have people got against newts? Now, if the name had been changed to The Foul-Mouthed Ape, The Green-Nosed Yeti or even The Smelly-Footed Yak, well, yes, then I could understand. But newts? Newts are normally gentle, quiet, inoffensive creatures (mine aren't, of course, they'll have your arm off at feeding time given half a chance, but that's another story). So, anyway, I decided to conduct a little survey of pub names — not out of pleasure, you realise, but purely in the cause of research. With a name like mine, I decided I was definitely the best person for the job. I came to the conclusion that our forebears were definitely aquarists, herpetologists or, at least, very fishy people!

Lots of public houses were named after fish: some after just any old fish and others after a specific favourite; hence we get, with rather a lack of imagination, **The Fish** or, in a case of two-upmanship, **The Three Fishes**, both quite common names which could well be the publican's way of hinting that his customers imbibe their drinks like — well — like fish. **The Fishermans Arms** is also a famous sign but I don't know why just his arms should be commemorated and not the rest of him. Why not The Fisherman's Big Toe? Unless, of course, it refers to the fisherman's habit of holding his arms as far apart as possible as he tells the saga of 'the one that got away'.

The **Fish and Eels**, at Dobb's Weir, Hertfordshire is presumably so-called because it's situated near a favourite spot for anglers, who no doubt enjoy the pub's hospitality when the fish aren't biting. Another eel pub is **The Balancing Eel** which must originate from the story of Alice in Wonderland where Alice recounts the poem of Old Father William that includes the lines 'You balanced an eel on the end of your nose, what made you so awfully clever?' Why it should be considered a good name for a pub is rather a mystery, unless it's a sneaky way of saying after a few pints some people will do anything for a laugh...

People began to get canny, and added objects or other creatures to the fishy names to make them more memorable, so we find **The Fish and Kettle**, **The Fish and Duck** and **The Fish and Anchor**. I suppose the first one is tied up with the expression 'Here's a pretty kettle of fish.' A fish-kettle is an oval, metal-lidded dish used on the stove to poach or steam fish. Another explanation for the phrase is that the word kettle was derived from 'kiddle,' an old term for a fishing net.



One of the many quirky pub signs featuring aquatic creatures!

SUSAN BREWER

The Fish and Ring, in London, commemorates an incident in the life of a saint. The Queen of Strathclyde was given a ring by her husband, the king which, instead of keeping she gave to her lover. Unfortunately, the king found the lover asleep by the river and, recognising the ring, snatched it off and angrily threw it into the water. He then called the queen and asked her to produce the ring which he'd given her. Terrified, she appealed to St Kentigern (affectionately known as Mungo) who prayed, causing a salmon to rise to the surface of the river with the ring in its mouth. Mungo quickly gave the ring to the queen who showed it to the king — who had no choice but to believe he was mistaken and his queen was innocent!

So what about amphibians? We've already had the Pickled Newt. There's a **Newt and Cucumber** in Cardiff, which is almost as pleasing as my own particular favourite, the **Frog and Rhubarb**, in Bedfordshire. Unfortunately, the owner of the latter can't remember the origins of the name, saying it was lost in the mists of time.' I was quite impressed, 'till I asked him how old the pub was — "umm, it opened in the 1980's," he replied sheepishly!

Frogs seem to be the most popular amphibians — I've found **Three Frogs** in Berkshire and a **Frog and Firkin** in London; in Islington there once was a **Froghall**, but I understand that it's now closed; apparently, its sign portrayed a plough drawn by frogs — presumably a frog-haul pun. The **Winking Frog** sounds fun but I'm not sure about **The City Frog**; he sounds a pompous fellow in a suit and bowler carrying his umbrella in case it should rain. (I'm certainly not sure about the **Frog and Nightgown** in the Old Kent Road, and what about the **Lotus and Frog** and the **Great Frog** which might not be pubs anyway — Ed). A mythical pub called the **Frog and Fiddle** was mentioned in a recent episode of Eastenders.

Rather surprisingly, I can't find any Toads, though maybe you know otherwise? I would have thought that toads, being quite common creatures, would have spawned (sorry!) lots of pubs. there is, however, **The Natterjack**, which was apparently called **The Railway Inn**, but when Dr Beeching wielded his axe in the sixties and closed the local line, the name had to be changed. I think Natterjack is much nicer! I've discovered **The Salamander** as well, only it seems it was named after a Grand National winner and not our beloved fiery-marked friend.

Sadly, I can't find an Axolotl Alehouse, a Tadpole Tavern or a Python Pub. Don't you think that White's Tree-frogs would look absolutely fabulous on a pub sign? With their enormous, happy, slightly-tipsy grins they'd be a great advertisement for beer-guzzling.

So, the next time you fancy a swift half at your local, check out the sign. You never know, you might discover it's a fishy one.

Pond Diary

JANUARY 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	

Pond-watching is a favourite pastime but, to make sure nothing is left to chance, we've put **Susan Stephenson** on monthly reconnaisance duties. Here, she braves the winter elements to check things out

January can be one of the coldest months, and for the pond keeper it is a month of watching and ensuring the structure of the pond, fish and plants are protected from severe weather.

Ice may prevent gases escaping and air reaching the water, so protect pools from it. Small pools which are most vulnerable to freezing can be protected by placing straw-filled sacks on boards over them. These should be removed after each freeze when a thaw sets in to prevent aquatics shooting prematurely.

Keep an area of the pond ice free by floating a small ball or piece of wood on the surface. When ice is over an inch (2.5cm) thick, pour boiling water over the float, removing it as it becomes loose. In an emergency a tin can filled with boiling water may be placed on the ice to melt a small hole. Bail out an inch or two of water and cover the hole with a straw-filled sack. When a thaw sets in, remove the sack and replace the water. Aim to keep as much of the pond water volume freely circulating as possible, with a hole allowing gas to escape while the rest of the ice acts like glass over the surface of the water. Alternatively, a small heater can be installed to keep an area of water ice-free.

A modest pond heater, like this one, will keep an area of your pond ice-free during the worst of the winter's chill.

PHOTO: KING BRITISH

Regularly check water levels and top up if necessary. Falling water levels may mean there is loss caused by cracks in the lining or sides of the pool so check these. Any damage to concrete should be repaired when the weather is warmer because concrete which freezes before it is set is useless.

If there are water lilies such as *Nymphaea alba* over-wintering at the bottom of the pond remember that at least 18 inches of water is needed to ensure survival.

Check the covering on any protected plants such as *Gunnera manicata* and restrict the temptation to remove them even if the weather appears to be warming up as the severest frosts of the year can still be to come, and if plants are shooting early because of exposure to lengthening days the damage done by a severe sudden frost can be irreparable.

Remove any debris which falls into the pond to prevent the build up of decaying material and gases. If there is a net covering the pond check it for signs of damage.

If fish become active during a mild spell give them a light feed to build up their body fats a little to get them through any further cold spells. Cease feeding if the fish become inactive.

Plan the spring planting programme for the bog garden and complete digging the beds for annuals.

Lily seeds can be sown under glass in January and boxes of slow germinating lilies sown in autumn should be brought indoors.

January is a month of watching the pond and keeping damage to a minimum whilst ensuring the environment remains ideal for the vigorous activity of the coming spring.

The harsh reality of a British winter!

ALAN ROGERS

Useful January Tips

a) A light blanket of snow can actually protect plants by creating a microclimate which is warmer than the outside air so do not be tempted to knock off snow but leave it to melt away naturally. Exposed leaves may get seveee frost damage.
b) Try to disturb as little as possible, both the plants at the pond margins and the mud at the bottom, as these can both be important over-wintering havens for pond creatures and plant buds, eg turions of Frogbit.
c) When replenishing water use only a sprinkler or trickle from a hose to keep disturbance of overwintering creatures to a minimum and so as not to disturb the bottom.

SO YOU WANT TO KEEP FISH?

AQUARIST & POND KEEPER

FREE Mini-Supplement

PHOTO: DEREK LAMBERT

This first Mini-Supplement of 1996 has been devised to bring together useful information that most of us would have liked to have been available before we took our own first tentative steps into fishkeeping.

ABOVE — A beautiful Lionhead.

LEFT — Pearlscales in a fully furnished aquarium.

PHOTOS: A&P LIBRARY

It is quite likely that many will have already preconceived ideas about fishkeeping, although the whole aquatic picture may not be fully clear. As far as the hobby itself is concerned, the worst thing that can happen is for people to get off to the wrong start and become disenchanted with the whole idea; as far as the fish themselves are concerned, the worst cannot even be contemplated. Do study all the possibilities before making sizeable financial outlays; in the long run taking time at the start will pay dividends by achieving success in the end.

WHY KEEP FISH?

Undoubtedly, the main attraction into fishkeeping in the first instance is the visual impact. To describe the typical aquarium scene as anything but a living picture would be to undervalue it. However, weighing up all the other advantages when compared to other forms of animal-keeping, the keeping of fish does have a lot to offer.

Whilst fish live, literally, in a world of their own the fact that we cannot naturally share their environment (nor they ours) does mean that the interest is self-contained. Apart from a growing number of tanks (inevitable once the bug bites) that may threaten living space in the home, fish do not demand much space nor late-night walks (no matter what the weather!) or other forms of accompanied exercise. They are not likely to take over your favourite armchair, nor to leave feathers or fur all over the place, chew up the Sunday newspapers or bring home unwanted litters. Neither are they noisy. In addition to being very considerate pets, they may be the only pets allowable in rented accommodation.

Describing aquarium-watching as an alternative to TV watching — the programmes are often better — is but to scratch the surface of its comprehensive interests. The amount of knowledge, involving a large number of associated subjects, can be quite staggering should you care to take time to tot up the relevant details: no less than physics, chemistry, mathematics, biology, genetics, geography, taxonomy and zoology may be encountered as the merest of glances. Add to these, the intangibles such as the values of learning (or teaching) the responsibilities of animal care and conservation, and you will see that fishkeeping is almost an Open University course in itself.

On the practical side, very little special equipment is needed by the practitioner — no special clothing (it's a clean-hands hobby, if ever there was one) and it can be undertaken by anyone at any level (intellectually or financially). Once involved, there are many diverse avenues of interest ahead — the fish themselves can be sub-divided into smaller more specialised areas, breeding programmes can be set up, geographically-correct biotope and species collections maintained and so on. All from the convenience of your own home.

On the social side, there is much to gain from meeting other fishkeepers.

MINI-SUPPLEMENT
So You Want to Keep Fish?

As well as being a safe haven for your fish and other wildlife, outdoor ponds can provide a spectacular focus for any garden.

PHOTO: A&P LIBRARY

Rather than follow your hobby in isolation, joining a fishkeeping Society will open up many more avenues of exploration: exchanging ideas (even fish and plants) with others will do much to expand your interests. Although magazines such as **A&P** do much to acquaint you with the broader picture, actual contact with other fishkeepers is highly recommended.

Fishkeeping is very much a 'what you make it' pastime but don't blame us if it takes over your whole life!

INDOORS OR OUT?

Although most people are attracted to fishkeeping by either seeing a particularly well set up furnished aquarium with beautiful plants and colourful fishes or after visiting a public aquarium, it should not be forgotten that there are many, many people who keep fish in the garden and who would hardly regard themselves as aquarists.

The main difference, of course, is that the outdoor fishkeeper has a relatively shorter period of activity — spring to autumn – whereas the indoor aquarist operates all year round. A further difference comes about due to

BELOW — Rummy-nose Tetras in an indoor freshwater tropical aquarium.

PHOTO: A&P LIBRARY

temperature — the range of fish species suitable for year-round outdoor culture is limited to those able to survive winter temperatures unless the more delicate species are to be brought indoors. In practice, this tends to embrace Goldfish and Koi with a few North American, or native fishes, although it is true to say in areas where summer temperatures permit, some of the more hardy 'tropicals' can be kept under outdoor conditions if so desired.

In the indoor aquarium, where conditions can be constantly controlled no matter what the outside weather is like, the choice of fish is only limited to what is available commercially (very few are fortunate enough to have locally-collectable tropicals on their doorstep). Here there is the choice between warm water fishes and coldwater species (kept in unheated aquariums) but now the choice is further divided into freshwater and saltwater fishes too.

On a direct comparison basis, outdoor fishkeeping demands more space; fishes tend to be bigger, and grow larger in their much bigger ponds and, naturally, the size of the pond is generally far, far larger than any indoor aquarium in order to suit the garden design requirements too. Against this, the choice of fish species is far greater for indoor culture and there is certainly not so much physical work involved in setting up the fishes' living quarters! Running costs are hardly comparable although an efficient pond filtration system could arguably consume as much energy as the heating, lighting and filtration system of an indoor aquarium. Maintenance routines break down about even handed: each system will generally require filtration unit cleaning, water plant pruning and a regular removal of accumulated debris once or twice a year. It may be argued that the outdoor fishkeeper benefits more from exposure to the sunshine and fresh air but this can be countered by the extra areas of interests afforded to the indoor armchair-bound aquatic traveller.

Lemon Tetras in a furnished tropical aquarium. PHOTO: A-Z-P LIBRARY

TROPICAL – FRESHWATER OR MARINE?

The tropical world of freshwater fishes offers the widest selection of fishes from all manner of habitats — rapidly-flowing mountain streams to sluggish jungle backwaters, the black and white waters of Amazonia to the almost sea-like proportions of the African Rift Lakes. We expect the inhabitants of all these locations to happily co-inhabit our aquariums as though it was the most natural thing to do and, thanks to their amazing adaptability and resistance to change, the majority of freshwater tropicals manage to do just that. Remember, the average fishkeeping buyer will be attracted to the fish by its outward appearance not by its ancestral address! A further complication is that many of the commercially available species are captive bred and would not necessarily recognise their own homeland waters if they fell into them.

Apart from their visual attractiveness, the almost impossibly-coloured species of fish from the coral reefs share only one thing with their freshwater counterparts — a water temperature around 25°C. Their habitat is nowhere as variable as that of freshwater species despite being many, many times the area (of the 77% of water covering the earth's surface, 98% is saltwater). This means that the water conditions vary very little indeed and whilst the freshwater fish can adapt to changes in water conditions relatively easily, the marine, or saltwater, fish cannot. As a result, the conditions in the saltwater aquarium must be kept as stable as possible, within very narrow tolerances.

If you can ignore the visual impact of a marine aquarium long enough to analyse its contents you will see that there is generally a distinct lack of plants. Macro-algae systems may be present for the benefit of grazing fishes but there is nothing like the diversity of aquatic plants as found in the freshwater

MINI-SUPPLEMENT
So You Want to Keep Fish?

Water features and plants, such as this attractive Gunnera, make welcome additions to a pond.
PHOTO: A&P LIBRARY

aquarium. On the other hand, this lack of 'greenery interest' in the marine aquarium can be made up for by the inclusion of separate invertebrate life or the cultivation of living rock with its populations of microscopic life-forms (when kept with invertebrate-friendly fish of course).

Both systems will employ exactly the same type of aquarium equipment: heating, lighting and filtration systems will be needed and commercially available equipment is generally suitable for both types of aquarium use. Now that modern aquariums are built as 'all-glass' constructions, there is little to fear from saltwater's notorious corrosive action as would have been the case with previously metal-framed tanks. Similarly, maintenance tasks are common to both systems although the saltwater aquarium has one major difference: during regular partial water changes, the removed water must be replaced with synthetic ready-mixed saltwater rather than just tap water.

Whilst tropical freshwater aquariums have been around for many years, the marine tropical fishkeeping scene is relatively new; this fact provides an opportunity for genuine research into all manner of fishkeeping activities as there is much more 'pioneering' work to be done, especially in the breeding aspect. A word of warning should be given at this stage: the majority of marine fishes commercially available for the aquarium are wild-caught. This means that they are

BELOW — A well maintained tropical marine aquarium.
PHOTO: A&P LIBRARY

ABOVE — A Clownfish feeding among a Sea anemone.

LEFT — *Rasbora pauciperforata*.
PHOTOS: A&P LIBRARY

fairly expensive at the best of times but this warning concerns the most exotic (and therefore most expensive!) species. Many of the most truly beautiful species are specialist feeders, feeding only on certain natural foods in their area: it is unlikely that such foods have been replicated by the fish food manufacturers to any great extent and you will, therefore, have paid a high price for the dubious pleasure of watching the fish fade away before your very eyes. Always make sure marine fish are feeding regularly (and do ask on what) before buying.

There is also a 'halfway-house' situation, where the aquarium water is neither pure freshwater nor full-strength saltwater. Known to aquarists as 'brackish' this water represents that of estuaries where the freshwater emerging from a river system meets, and is periodically added to, by the sea. Fishes that inhabit this environment (Scats, Monos and Mollies) have the ability to adapt to the changing conditions, although the extra 'salt' component in the water may mean that aquatic freshwater plants may not be suitable for inclusion — a fortunate thing, as many of the species able to be kept under these conditions would eat them!

COLDWATER – FRESHWATER OR MARINE?

The coldwater aspect of freshwater fishkeeping often stands accused of being of narrow interest. On sheer numbers of species kept, this may be true to a limited extent but on the diversity of varieties, or colour strains, within those species the scope is limitless.

Again, because the species are limited, specialisation within them tends to be the rule rather than the exception; it cannot be an accident that the Goldfish has survived for thousands

MINI-SUPPLEMENT
So You Want to Keep Fish?

of years simply as a plain red-gold pet that people couldn't bring themselves to kill for the table. Just as the Goldfish itself came into being through being first isolated as a specimen and then, through selective breeding, became a fixed colour strain which bred true, so too have countless variations on a theme been examined and will continue to do so in

Just some of the many heating and lighting options available to the aquarium keeper.

PHOTOS: A&P LIBRARY

THE EQUIPMENT

The main component is the **tank** itself (the dimensions of the outdoor pond need not be discussed at this stage) and there is one important guideline to be considered: the number of fishes that can be kept in a tank of any given size will depend on what type of fish they are. We have already seen that water temperature affects oxygen content but, despite the fact that as water temperature rises so oxygen content falls, the rule is that the order of the maximum number of fish for any given tank capacity is tropical freshwater, coldwater freshwater, tropical marine and coldwater marine.

As a rough guide, the minimum sizes of aquariums or long term successful fishkeeping are 60x30x38cms for freshwater tropicals, 90x30x38cms for coldwater freshwater and 120x30x38cms for tropical and coldwater marines. The first two dimensions refer to the length and width measurements of the aquarium, the 38cms depth may be varied to suit design requirements and has no bearing on the number of fishes kept, except that they will have more swimming room in larger tanks. Allow 30 sq cms of water surface area per 1cm body length for tropical freshwater fishes, 75 sq cms per 1cm body length for coldwater freshwater fishes, and 120 sq cms per 1 cm body length for topical marine and coldwater marine fishes.

The **heating system** required for tropical species is not complicated, nor is it required to provide steaming temperatures; not many of us would choose 24°C as an ideal temperature in which to spend long periods of time immersed in water. Modern equipment is reliable, economical to run and compact, requiring only the ability to fit a plug to bring it into action.

Lighting will be needed for all systems (yes, even ponds have poolside lighting for summer evenings!) and not just for the convenience of the fish watcher. Lighting stimulates activity and plant growth and it may be necessary to add extra lights to achieve the required results. Marine aquariums may well need extra lighting for the development of beneficial algae growths for food for fish and also for algae cells which within the bodies of invertebrates. It is normal practice to fit a cover-glass on the tank which will protect the lamps from water spray or condensation damage.

Filtration comes in many forms — internal and external systems, both in aquariums and ponds — but provides three main processes: mechanical (straining), chemical (absorption) and biological (nitrification and de-nitrification). Together with regular partial water changes (in aquariums), filtration will do much to keep the water conditions within safe parameters. The actual equipment ranges from small sponge foam units (for fry raising tanks), to large 'hide it in the cupboard beneath the tank' systems.

Decoration will always depend upon two things — what is required by the fish, and on the furnishing skills (and taste) of the fishkeeper. Not all aquariums, for instance, need plants: fish from the African Rift Valley Lakes are more used to rocky habitats; many fish have a hearty appetite which include plants so plastic replicas are the answer here. Marine fish will find shelter amongst the branches of coral whilst freshwater fishes will appreciate the realistically-modelled synthetic underwater logs and branches simulating their native habitat to a very accurate degree. Petrified, and reclaimed, bogwood is a favourite decorative feature too. A covering of the tank base is preferable: 3mm size gravel is about right for freshwater tanks with crushed coral and coral sand being the norm for marine aquariums. In both cases, the depth of the bottom covering material must be adequate in order to accommodate plant roots, provide burrowing fishes a night-time 'bed' and provide a bacterial home for nitrifying bacteria if a biological filtration system is fitted.

A small selection of filtration devices to help maintain optimum water quality for indoor aquaria.

PHOTO: A&P LIBRARY

future; such is the potential for experimentation. The emergence of the Koi, and the speed of its increasing popularity is yet another example of what can be done within so-called limited scope.

However, there is no need for the newcomer to think that coldwater fishkeeping is limited to just variations on the previously mentioned two examples, the Goldfish and Koi. The Shiners, Sunfishes and Basses are North American fishes from temperate zones, together with some European species such as the Bitterling, provide excellent aquarium or pond subjects. All are quite colourful and have interesting breeding behaviour; many are nest builders whilst the Bitterling will only breed in the presence of Freshwater Mussels within whose protective mantle the fertilised eggs develop in complete safety.

Keeping coldwater saltwater fish may not have occurred to many people contemplating keeping fish for the first time, yet the proportion amongst them who haven't, at one time or another, delved into the depths of a seaside rockpool must be minute. Native shoreline fishes are both easy to collect and, within reason, fairly easy to keep; if they outgrow their aquarium it is a simple matter to return them to the wild and replace them with younger specimens. As with the tropical marine scene, the interest can be expanded by keeping invertebrate life too.

PHOTO: ALP LIBRARY

Reducing stress to new stocks is important. These fish are being kept in floating bags until they have acclimatised to the temperature of the water in which they will eventually live.

The coldwater aspect of fishkeeping brings maybe two problems — space and heat. Although cold water contains more oxygen than that at 'tropical' temperatures, coldwater animals require more of it and so their aquarium must be proportionately larger in oder that this vital gas can continuously be available in adequate amounts. It is also a fact that many coldwater fishes, especially those from native fresh waters, may require extra aeration provided either by an airpump or by a supply of running (moving) water. The heat problem will only be encountered during the summer months, when water temperatures in the aquarium and small ponds can rise to quite high levels. It is important that steps are taken to keep things as cool as possible, especially with native marine collections; in this instance the adding of cold water straight from the tap will not be the answer (the salinity would be drastically affected), and a sealed bag of ice cubs would be preferable, to the financial outlay required for a chiller unit as insurance against hot summer days, which may or may not manifest themselves all that often.

Obviously, no heating equipment will be needed, but lighting and filtration systems will be for the indoor aquarium with filtration units (backed up with an ultra-violet lamp unit to combat algae problems) being standard equipment for outdoor ponds.

AQUARIUM MANAGEMENT

Feeding is a regular chore that should not be neglected nor, on the other hand, overdone. Whilst most of modern, well-researched,' commercially-available fish foods fulfil all the fishes' nutritional requirements, you should be aware of what food your fishes look for in nature and how they take it. Floating foods are not likely to satisfy bottom-dwelling fish, and many fish are nocturnal by nature and so require feeding after 'lights out'. Vegetarian-minded fish should have a suitably 'green' diet and receive supplements of green matter if necessary.

The dangers of over-feeding cannot be overstressed. Any uneaten food simply decomposes, polluting the tank and using up oxygen in the process. Only feed as much food as will be eaten within a few minutes and remove any uneaten surplus at once.

Maintenance is important, as the aquarium is not self-cleaning as a pond might be. It is only by regularly maintaining the aquarium that you begin to understand what is going on; watching the aquarium is not just pure enjoyment, you can usually soon pick up visual clues when things aren't quite right. However, the amount of time spent on maintenance is relatively small — just a few minutes a week.

Plants need to be pruned and decaying vegetation removed; **cover-glasses** should be kept clean so that the light is not obstructed and prevented from reaching well down into the water. Despite their normal appearance, **fluorescent tubes** lose their full strength after six months or a year and should be replaced. Regularly siphon off **accumulations of dirt** from the gravel; this is best done at 'partial water change' time — the dirt is then discarded with the water removed. Using a gravel washer will remove fine sediment without removing any of the gravel. **Growths of algae** should be removed from the front glass, although it can be left to grow on the other three sides of the tank for the benefit of grazing fishes. **Filter media**, depending on type, may be rinsed and reused but only rinse the material in some aquarium (or pond) water so that nitrifying bacteria are not killed off. Undergravel biological systems can benefit by siphoning out some of the accumulated sludge from beneath the plates by using a tube slid down the uplift tube. External **pond filter systems** may be fitted with a drain, or back flushing, tap to facilitate cleaning. External **aquarium filters** are easily serviced by fitting isolating taps in the inlet and outlet hoses; in this way, reconnecting, and restarting, the filter is no problem. A knowledge of water chemistry is not, in the general run of things, absolute necessary; should, however, you decide to try to breed some of the more demanding species, then it may be necessary for you to prepare more exact water conditions for them to be sure of success. These days, there are water test kits which enable you to test for almost every conceivable component.

Health problems present a worry to the new fishkeeper. Many diseases are easy to recognise by visible, external symptoms or by noting erratic or abnormal behaviour. Such diseases are readily cured by proprietary remedies. Internal disorders are much harder to cure as, by the time external symptoms are seen, the fish may be too ill to cure. To be on the safe side, it is good practice to isolate any new stocks and quarantine them for a few weeks; the quarantine aquarium need not be large but its water conditions should be the same as those in the main aquarium. It is often unappreciated that a problem, such as an infestation of snails, can be introduced via new plants; similarly, a parasitic disease may well be brought in with any live food caught from the wild.

FURTHER INFORMATION & ADVICE

Armed with the foregoing information, it is now possible to venture out along the fishkeeping road of your choice towards, we hope, every success in a lifetime-lasting interest. However, you may well think it prudent to reinforce your basic knowledge even more before taking that initial step.

There are a number of sources from which to seek relevant information. For theoretical matters, a visit to the Public Library will provide a number of books on aquatic subjects, and their contents can be studied from the comfort of your favourite armchair. Similarly, taking a few copies of the hobby-related periodicals will not only give you an insight into the many diverse interests within the hobby but the advertisement can direct you to specialised, and knowledgeable, retail outlets in your area.

Manufacturers of aquarium equipment and supplies provide a great fund of information; there are numerous brochures, catalogues and guides to read through with most of the latter being written in clear 'beginners' English'. Look for their addresses and write to the relevant advisory services for all the help you need.

Once things get really 'serious', then it's time to hit the road. In addition to evaluating the retail outlets (check frequency of stock changes, attitude of staff towards beginners, etc.), you could do worse than visit any fish Show that is being held locally (it's even worth making a longer trip too for such occasions!) Here, not only will you see hundreds of fishes in their prime (mostly adult fishes are exhibited) but you can also meet experienced fishkeepers who will be only too delighted to talk to you — you may even have trouble shutting them up! One real advantage of meeting members is that they have been down the same 'novice way' that you are about to experience, they have been keeping fish in exactly the same conditions as you, so where better to go for expert guidance? With some 400 fishkeeping societies in the UK you can be sure you're never too far away from one; your local town hall should have details of its location and meeting times.

Do develop a relationship with your dealer. By becoming a regular customer your likes and dislikes, home aquarium set-up details will all become known to the dealer who will be in a much better position to advise you on the suitability (or not!) of any future purchase and, if you buy stock regularly you've also got someone more likely to listen sympathetically to any unfortunate complaints you may need to raise. For the beginner it is advisable only to deal with local outlets; these will be keeping fish in the same water conditions as yours at home; buying fish in distant towns or at Shows may very well result in you obtaining different species unavailable in your own area, but there may well be acclimatisation problems once you get them home.

Finally, don't look upon your fishkeeping future as doom-laden. Providing you have prepared yourself properly, make haste slowly, and, follow the advice to be found in these columns, you won't go far wrong — but don't blame us if it alters your lifestyle forever!

ECOHOOD PRODUCTS – ADDING A NEW DIMENSION

The **ECOHOOD SYSTEM** offers the aquarist the opportunity to keep whatever aquatic animal takes the fancy whether it be coldwater goldfish, tropical cyprinids or even marine fishes and invertebrates in a truly 'complete' environment.

The system is designed around the standard 'tank sizes' 18", 24", 36" and 48" lengths so that accommodation in cabinets and on stands is entirely practicable. The attraction of this system over conventional aquariums is that there is the 'above water' dimension to consider too; by extending the vegetation above the waterline it is possible to create a proper mini-ecosystem reflecting every aspect of the biotope in which the animals live. No longer need you not keep those floating plants which would otherwise push the hood off the tank, why not have a miniature waterfall inside the aquarium? Apart from the visuals, there are practical advantages too: for instance, nitrates are eliminated completely by the natural feeding action of all the plants used. If you are one of those fishkeepers who like the look of dramatic houseplants, such as *Dracaena*, but have never had them flourish in the aquarium (well they wouldn't, as they are not true aquatics) now you can give them the right conditions for survival.

One commonly-asked question is 'Why doesn't the whole thing steam up?' The answer lies in two parts: there is a special ventilation system built into the hood (no, not a fan or any special piece of equipment) which has a strip called a plenum running along the back and a specially-engineered gap running along the front. The combination of these two ensures that the heat generated within the tank by the lights (and by any heated water, if so designed) create a natural circulation of ventilating air and so the glass keeps clean. The second part of the answer lies in the hobbyist's installation location: it must be in an area with a stable temperature. Note that this does not necessarily mean a heated environment; opposite a constantly opening door, for instance, is not a stable area, nor is above a radiator! Given the right location there will be no condensation, or otherwise foggy problems.

Because of the relatively shallow depth of water (the whole system is 18" tall plus hood depth), only one fluorescent light fitting is required as penetration of deep water is not needed. The built-in reflector is quite adequate to provide enough light for most purposes but the hood will accommodate extra lighting, say for special illumination effect, if required.

Ecohood Products' 2,500 sq ft of production space has a unique position in its location: to put it bluntly, they are in the middle of a 'dead fish' area! As their industrial estate is primarily taken up with fish-processing plants (Brixham Harbour and its associated fishing fleet is nearby). Ecohood can proudly say that they are the only purveyors of live fish in the area — and they're not filleted!

Production is not limited to Ecohood Systems as aquariums and associated cabinets and stands are also made on the site. Managing Director Colin Lang says that he believes that the new Ecohood System will give an added interest to aquarists and even many invertebrate keepers who can now give their charges the environment they deserve for a fully-functional, and natural, future.

BUY LINES

Barry James'

round-up of latest innovations for your pond and aquarium

More underwater structures

Well-known for their huge range of products for aquarium decoration, BATSFORD offer four more models in their SIMLASTONE range. Stratified rock formations HR8 (27cms high x 34cms wide) and HR4 (29cms high x 20cms wide) fit snugly into the back left corner and the middle reaches of the tank respectively. Caves provide both sanctuary and spawning sites for fishes as well as providing a popular different type of tank decoration. CV8 and CV12 are both 8cms in height with the latter model being 32cms long as opposed to 24cms.

For details of stockists contact: BATSFORD PRODUCTS, Holly Lane Industrial Estate, Atherstone, Warwickshire CV9 2HA.

New pond accessories

If you're having physical problems setting fountain heights and waterfall volumes, then the re-designed PUMP STAND AND FILTER HOUSING from BLAGDON GARDEN PRODUCTS will make things easier, as the pump is supported just below the water surface (on average pool depths).

Details of all new products for the new season from: *BLAGDON GARDEN PRODUCTS, Bristol Road, Bridgewater, Somerset TA6 4AW. (Tel: 01278 446464. Fax: 01278 446155).*

Sunny ideas, and joined up ponds

The new SOLAR-POWERED PUMP, from OASE, is based on the AQUARIUS 600 models with the Solar Panels themselves rated at 11 watts. The AQUARIUS series of pumps has four new models in the upper size range with the already mentioned 600, together with the 900, 1200 and 1800 models (litres per hour in each numerical case). The externally-fitted AQUAFIT AIR PUMP is an efficient pond aerator and, if you have plans to expand your pond (or wish to fit an in-ground filter system) then the WALL TRANSITION SYSTEM will solve the problems attached to joining pre-formed pools together; ponds are joined together by a series of pipes with strainers fitted to the inside of each pool preventing the pipes from getting blocked.

Details from: *OASE (UK) LTD, 3 Telford Gate, Whittle Road, West Portway Industrial Estate, Hampshire SP10 3SF. (Tel: 01264 333225. Fax: 01264 333226).*

New pond test kits

Electronic testing devices from RAPITEST for use in the garden have been well-known for many years but now the Company has decided to 'get its feet wet' with the launch of new test kits for pool owners. POND TEST KIT consists of easy-to-use chemical tests for pH, Nitrite and Nitrate. There are also two pH tests - POND TESTER utilizes litmus paper whilst POND CHECK uses a liquid reagent.

Details from: *RAPITEST, London Road, Corwen, Clwyd LL21 0DR. (Tel: 01490 412804. Fax: 01490 412716).*

New — concept filters

PHOTO: A&P LIBRARY

Simple ideas are the easiest to have, but then, perhaps everybody's occupied with thinking up more complicated ones that the easy ones slip through unnoticed. Take, for instance, the new SEASTORM FILTER from OCEAN NUTRITION, via UNDERWORLD PRODUCTS.

The notion of keeping bacteria in a biological bed oxygenated by passing water through it is not new at all; but what about moving the whole biological bed itself about in water to achieve not just the same, but immensely better, results? Due to this new concept (known as Fluidized Bed technology) efficiency is said to be improved by about 30 times over comparable-sized traditional-design trickle filters and can respond quickly to any sudden increases in biological loading, such as when new stock is added.

Advantages of the system are that there are no dead spots, nor can the water channel through the paths of least resistance, both conditions often found with traditional biological filtration systems. As all surface areas of the filter medium or media, is 'active' there are no anaerobic area problems either.

Three models (all suitable for both freshwater and saltwater applications) are available: the alternatively-named SQUIRT-60 is an in-tank unit for systems up to 60 gallons (probably US gallons); SQUIRT-30 and SQUIRT-100 models are already planned. The SEASTORM-125 is an external 'hang-on' version, while the SEASTORM-300 is a professional unit for up to 300 gallons.

All models are of low maintenance design and can be used with existing systems — canister filters, open-sump systems, or from any source of pre-filtered water pumped from the aquarium.

Details from: *UNDERWORLD PRODUCTS. Units 1 & 2, Belton Road West, Loughborough, Leicestershire LE11 0TR. Tel: 01509 610310. Fax: 01509 610304.*

Diamonds are a pondkeepers' best friend

LOTUS have announced that the range of DIAMOND PUMPS has been extended at the more powerful end of the series. The 1500 is based on the design of their existing pump whilst the 2000 and 3000 models are of 'sump pump' design but unlike many pumps of this type have been manufactured for continuous operation. Among the innovative features are Ceramic Shaft Sleeves, Triple Seals, Water-cooled Motors, Thermal-overload Protection and Heavy-duty Bearings.

These pumps are also available with a foam rubber pre-filter and plastic biological filter media.

Existing Diamond pumps will also be supplied with specially-developed new jets which offer four different patterns. New accessories include 1.25 extension pipes and new specially-developed jets for larger pumps.

Details from: *LOTUS WATER GARDEN PRODUCTS LTD., Junction Street, Burnley, Lancashire BB12 0NA. (Tel: 01282 420771. Fax: 01282 412719).*

OVER THE RAINBOW

DEREK LAMBERT TAKES A LOOK AT THE FASCINATING RAINBOWFISH.

• PHOTOGRAPHS BY DEREK LAMBERT •

Rainbow fish have been one of the staples of the aquarium hobby for many years now, and in recent times have been steadily gaining popularity. In the early days the group was only known from a few species, but the number coming in has been increasing year on year and you can now find a dozen or more species regularly appearing in aquarium shops.

Rainbowfish, strictly speaking, belong to the family *Melanotaeniidae*. Hobbyists, however, include two other families under the blanket heading of 'Rainbowfish'. These are *Pseudomugilidae* (Blue-eyes) and *Atherinidae* (Silversides). All evolved from marine fish which would today be included in the family *Atherinidae* (Silversides).

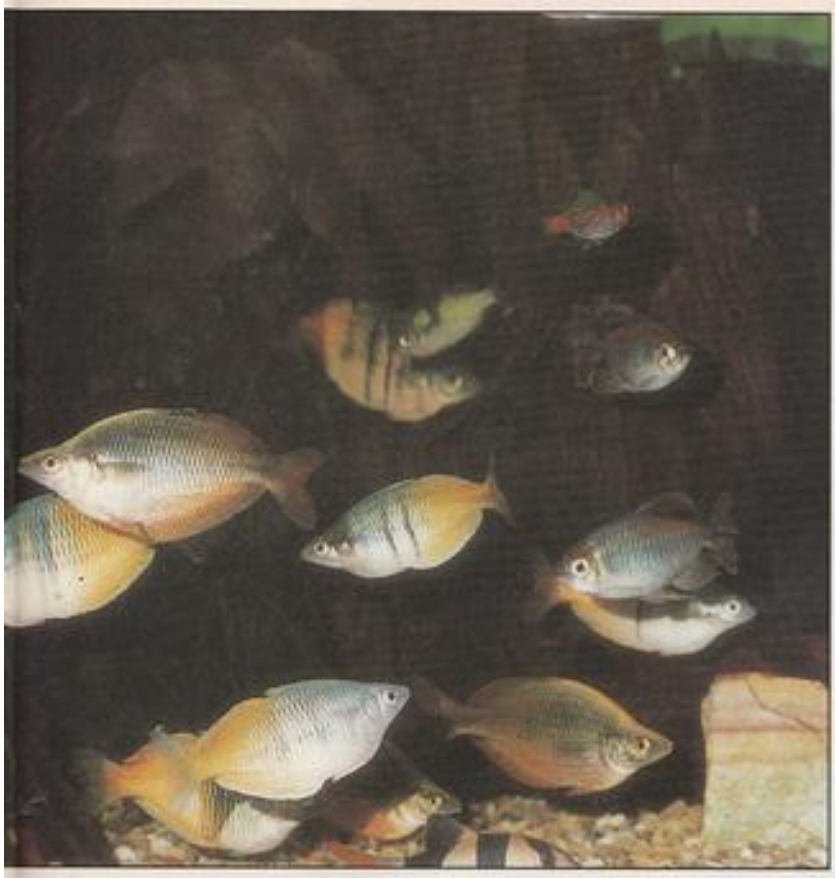
There are probably 160 species of Silverside, 40 species of Rainbowfish and about 10 species of Blue-eye. Rainbowfish and Blue-eyes are confined to the Australia and New Guinea areas but Silversides can be found in tropical and sub-tropical seas throughout the world, as well as in many freshwater habitats.

The Mexican genus, *Chirostoma*, contains 18 species, all of which are only found in freshwater. These Silversides are unusual in that they are reputed to internally fertilise their eggs. All other species in this group are thought to scatter adhesive eggs which are fertilised external to the body. So far very few Mexican Silversides have made it back from the wild alive and there are no reports of successful reproduction in captivity.

CAPTIVE BASICS

All species of Rainbowfish are mid-water swimmers which are constantly on the move and make excellent community fish, being lively, peaceful and very

Melanotaenia affinis (WEBER, 1908). A young male North New Guinea Rainbowfish.



Community aquarium containing various Rainbowfish. In this sort of set-up any eggs produced must not be saved because they could have been fertilised by a different species.

attractive. They are unusual in having two dorsal fins, the rear one of which is much larger and is positioned close to the caudal fin. On the whole they are omnivorous and eat all foods, but prefer a mix of dry, live and frozen foods.

They need clean well-filtered and oxygenated water to be kept in good health. Large, regular, partial water changes are also important as is low stocking levels. In a well filtered and oxygenated aquarium many more fish can be kept than in a still water tank, but when there is a power cut (a regular occurrence in my part of the world), the Rainbows will be in serious trouble within half an hour, and dead in one, if the tank is overstocked. A battery operated airpump will help, but why take the risk?

Whether being kept in a mixed community aquarium or a specialist Rainbow set-up, the aquarium layout should include plenty of open water swimming space and a secluded heavily planted section for fish wanting a rest from the hurly-burly of the shoal. Water conditions are not too important as most species will adapt to your tapwater. However, very acidic water should be avoided.

If your Rainbows are in good condition most species will spawn on a regular basis in a community tank. Obviously under these conditions the eggs will usually be eaten, which is a good thing. Rainbowfish living in a mixed shoal will spawn on mass and the eggs of one species will commonly be fertilised by sperm from another, thus creating a hybrid. These eggs should therefore be discarded and Rainbows specifically set up to spawn in a breeding tank.

Sexing Rainbowfish can be quite tricky when they are young. As they mature, however, it soon becomes apparent that the front dorsal fin of the male is longer and more pointed and that his other fins are larger as well. In some species long filaments develop and the males' colours are much brighter.

ABOVE — *Melanotaenia splendida australis* (CASTELNEAU, 1875). The Western Rainbowfish has recently been imported under the trade name of 'Ornate Redtailed Rainbow'. This is a young male which has yet to develop its full colouration and body depth.

BREEDING

From the point of view of reproduction, Rainbows can be split into two main groups. The *Melanotaeniidae* and some of the *Atherinidae* tend to produce large numbers of small eggs and are best treated as straightforward egg scatterers. Depending on the size of the species to be spawned set up a 2 to 4 foot long aquarium with plenty of artificial spawning mops hung from one end. Unless your tapwater is soft and acidic no special water conditions will be required. The

temperature should be set at 76°F (24°C) and a bubble-up sponge filter included, but not switched on yet. Ideally the breeding tank should be positioned where it will receive morning sunlight as an added stimulus, but this is not essential.

Prior to setting up your breeding tank, the adults should be conditioned with lots of live foods. *Daphnia*, Bloodworms and chopped Earthworms make good conditioning foods. If these are not available use frozen foods and high protein conditioning dry foods. For best results condition the adults for two weeks, the sexes being maintained in separate tanks. This prevents premature spawning. Once your adults have been conditioned, and the breeding tank has been set up, an adult pair can be introduced to the breeding tank. This should be done in the evening, shortly before you turn out the lights. Most pairs will spawn the next morning, but if they do not leave the pair in the breeding tank for a week before removing them. Alternatively, try with another pair or recondition the originals.

Assuming all goes well, the male will court the female by dancing in front of her with his fins spread. His colours heighten and some species take on completely different colours to those you normally see. The pair move up and down the full length of the tank until the female is sufficiently worked up and swims into or over the spawning mops. The pair come together side by side in the mops and scatter some eggs into them. The pair then resume courtship until they again spawn in the mops. This continues until the female is depleted of eggs. They can then be removed.

FRY CARE

The eggs of most species take about five days to hatch and the fry are another two days before they become free-swimming and start eating. They are quite small and require infusoria, Liquifry or a very tiny first food such as A.P.R. New born Brine Shrimp is usually too large for the babies for at least a week after they are born. Once the fry are two weeks old and feeding on Brine Shrimp the filter can be switched on. At about a month old begin 10% weekly water changes and gradually increase the volume as the fry grow. The fry tend to be slow growing and may take five or six months before they are sexable and start to colour up. Large, well coloured specimens may be a year or more old, which is why they are often expensive in the shops.

The other group of Rainbows includes most members of the family *Pseudomugilidae* and some of the *Atherinidae*. These produce a few large eggs every day and need to be setup in a similar way to Killifish. Hang some spawning mops at each end of the aquarium and scatter a few on the bottom as well. Normal filtration should be included in the set-up and most species do best as a group containing several females to each male.

Since these fish are spawning nearly every day they require large amounts of live food in their diet if they are to do well. If possible check through the mops regularly for eggs. These should be picked off and placed in a bare 12x8 in. hatching and rearing aquarium. The eggs normally take 10 to 14 days to hatch but the fry are much larger and will eat baby Brine Shrimp as soon as they are free swimming. As soon as the first egg hatches stop putting newly harvested eggs in this tank. As soon as the fry are large enough to handle they should be moved to a larger rearing tank with filtration. Prior to this make sure you change 10% of the water in the small tank every few days. Once in the larger aquarium most species grow quickly and will be sexable in three months.

For more information you can contact **Len Eldridge** at **The British Rainbow and Goby Society, 64 Molesham Way, East Molesey, Surrey KT8 1NX.**

The author would like to thank The Aquarium Shop, Lincoln, for making species available for photography.

Melanotaenia boesemani (ALLEN & CROSS, 1980). Boeseman's Rainbow takes over 12 months to develop its full colouration and can be expensive.

COLDWATER JOTTINGS

BY STEPHEN J. SMITH

More on North American fish

There is a healthy 'thread' (as they say on the Internet) within 'Coldwater Jottings' about North American species. Roger Hockney of Newbury, Berkshire, wrote by traditional means in response to November's item on North American fish. He explains that our winter climate is relatively mild compared to the climate in North America. "In the north-west (of the USA) they expect ponds shallower than four feet to freeze solid in the winter, and fishkeepers have to make alternative arrangements during the winter," says Roger.

He adds that he keeps a number of North American species; Red-bellied Dace bred by a breeder in London, NA Killifish raised from eggs from Yorkshire; Golden Top Minnow; and Black-stripe Top Minnow. "The Black-stripe is certainly winter-hardy as its range extends to the Great Lakes, the Mid-west, and Canada (about as cold as you can get in the winter). These don't get too big — approximately three or four inches maximum — and are surface fish and very visible. Also any *Fundulus* Killifish from North America is probably a good bet as a frost-hardy alternative."

I am also indebted to Roger for mention of a book which readers may find of interest: *Atlas of NA Freshwater Fishes*, by Lee Gilbert, Hocutt Jenkins, McAllister, Stanter, published by North Carolina State Museum of Natural History.

Can anyone tell me where I can find this book?

Flip 'n' flop

The 'phone lines have really been 'zinging' with e-mail responses over the past couple of months, since I provided an e-mail address (please note a minor amendment, specifically for 'Coldwater Jottings' to this e-mail address, below).

Frances Wymans followed-up our initial electronic correspondence with a letter and a photograph by traditional post (termed 'snail mail' by the techno-geeks). Frances, of Scrabster, near Thurso, Scotland, admits to have been "addicted to computers for years" but is evidently also a keen Goldfish-keeper. Indeed, Frances writes that she is being squeezed out by our Goldfish. "They started as little Goldfish, about two inches, in a two-foot tank. All the books said that they would not outgrow their tank: that was ten years and four tanks ago!

"They now live in a six-foot tank in my office, on the opposite side from my computer system. The dog and I can only just fit in between. The fish are now ten inches and twelve inches long: can anyone better that for a record?

Now there's a challenge which I'm sure 'Jottings' readers just won't be able to resist.

Flip and Flop have outgrown their owner, now ten years old and exceeding ten inches in length. F. WYMANS

Hard to Swallow

Here's an interesting plea trawled from one of the newsgroups available on the Internet: Clare Constantine, of Murdoch University, Australia, is planning a pond for her front garden, and is hoping to stock it with edible fish, such as Carp and *Tilapia*.

Edible...?! Now, I fully appreciate that the hobby of keeping ornamental fish, especially Koi, stems from keeping and breeding fish for food. So Clare's plea turns things full circle. I enjoy food fish as much as many, but the thought of munching a Matsuba or roasting an Oranda is too much for me to swallow!

Clare told me that she has several aquariums which she greatly enjoys keeping. "The major reason for the pond plan is that I love water features and have recently been doing some reading about permaculture, which is a design system for planning ecological human habitats and food production systems.

"In a suburban yard you can't really include an effective aquaculture system but I would like a miniature version for aesthetics as water is a major element in permaculture design for food production, microclimate effects, and fire hazard reductions."

Clare added that she is not particularly fond of eating fish, or even whether edible Carp and *Tilapia* are legal in Australia. Perhaps someone could let us know.

However, Clare is looking for information on how large these fish become, as well as stocking rates, and availability. So, if anyone can help her, contact her by e-mail at: *constant@numbat.murdoch.edu.au* or, if you send your information to me I will be pleased to pass it on to her.

Tilapia are becoming an increasingly-popular Koi food. These were photographed at a fish-farm in Singapore. Let's hope no-one ever finds out how tasty Koi can be ...! STEPHEN SMITH

And finally ...

Wishing all readers of **A&P** a happy, healthy, and successful fishkeeping year.

Whatever your coldwater preferences, don't forget to keep me informed: your comments, information, and opinions are always welcome, so write to me c/o Coldwater Jottings, A&P, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET or you can e-mail me direct at jottings@sjspr.demon.uk where I will be delighted to hear from you.

Out & About

WESTON-SUPER MARE IS FAMOUS FOR ITS ALMOST NON-INCOMING TIDES, BUT **LINDA LEWIS** FOUND ATTRACTIONS ELSEWHERE – EVEN IN CHILLY NOVEMBER!

1995 Supreme Champion, *Parotocinclus maculicauda*.
LINDA LEWIS

THE SUPREME FESTIVAL OF FISHKEEPING

The **Supreme Festival of Fishkeeping**, organised by the **Federation of British Aquatic Societies**, has been held at Pontins, Sand Bay, near Weston-super-Mare each November for several years.

1995's event, sponsored by **Rolf C. Hagen** for the first time, was to be much, much different! Hagen's, making as they do, a wide range of pet foods and equipment, decided to give the weekend broader appeal by featuring other animals as well as fish. Throughout the two and a half days it was possible to see budgerigars, finches, a huge HAMSTERdam city, as well as performing dogs. **Mobile Petz** were there, too, with an exotic range of animals, skinks, snakes, owls and so on.

Coldwater O.S. Best in Show Breeders 1995 — Shubunkin.
LINDA LEWIS

(I thought someone was kidding me when he said he saw an owl watching the evening cabaret but it was true!). As you will realise, there was an awful lot going on, so please forgive me if some events and displays are not mentioned. To cover everything would require the whole of this issue of **A&P**! Instead I will concentrate on the highlights as I saw them.

The Festival is not just a fishkeeping event — it's more like a HUGE party. There were over 520 people staying at the chalet centre for the weekend and most seemed to know each other. A loud, but most charming, group even travelled all the way from the **Peterhead Aquatic Society** in Scotland!

STANDARD VERY HIGH

This year, in a new competition, Aquatic Societies competed for the title of **Supreme Society**. They were given a strict brief to follow — furnish a 24 in aquarium, show two breeders' tanks (two

adults with offspring and accompanying spawning notes), display examples of craft work plus an essay and drawing by a Junior member. I thought the standard was very high indeed. In the end, the display by **Erith & District Aquatic Society** took first place.

There seemed to be more Trade Stands this year, and each was worth a visit.

Any technophile was assured of a great time as all kinds of complicated equipment was on show.

Coral Reef Technology featured a space-age flying saucer aquarium being filtered by 'liquid sand' (a fluidised bed to those in the know), an idea that is bound to catch on. The **Award for Most Informative Trade Stand** rightly went to **Interpet**. Not only did they feature a truly beautiful aquarium that could be viewed from both sides, but they had set up a walk-through tunnel section packed with information on fish health, backed up by some truly marvellous photographs. **Anglo Aquarium Plant Company** received a Special Award in appreciation of their continued support of the FBAS; each year they build, from nothing, a superb water feature. This year it was a lily pond, surrounded by all kinds of waterside plants, many in flower (in November?). All that was missing were the bees!

A main area of attraction was the **Hagen Pet Fun Factory** ostensibly designed for animals you understand which was dominated by the HAMSTERDAM city in which any small rodent could happily spend hours of fun racing from level to level. An opportunity to act as a judge (of budgerigars, not fish) offered itself as visitors were invited to pick the best bird, much to the amusement of onlookers; what to look for was personally given by Hagen's Mr Budgie himself, **Geoff Capes**. Many people picked up many a useful tip from Geoff during the course of the weekend about the care of these colourful, and companiable birds and there was ample opportunity to choose exactly the right type of cage for them too. From feathers to fins, and the **Hagen Helpline** was on hand to assist with all those problems that people are only too glad to help you choose the right equipment for your aquarium — from the comprehensive range of the company's products handily opposite the Helpline! The Voucher Selection Box was as busy as any Post Office on Pension Day as residents made up their minds on redeeming their £20.00 Vouchers from the range of selected items ranging from food to power filters.

Other fish-related displays by various specialist Societies — Cichlids, Anabantoids and Livebearers — each staffed by people with real knowledge of their subject. **Bristol Zoo** had an excellent display of oddities — from Seahorses to Giant snails, confiscated Turtle shells to a Giant Millipede (yuk!); I watched as several people held a real live snake for the very first time.

WIDE VARIETY OF LECTURES

Although very entertaining and extremely popular, the emphasis was on the Zoo's conservation work, and highlighted some of their breeding programmes (I really must get around to making a visit soon).

A wide variety of lectures were available free to visitors and covered all manner of subjects — Water Lilies (**Dr David Pool** to the International Water Lily Association's AGM on Friday) to Fish Keeping and Breeding for Juniors (**A&P's Dick Mills** and Hounslow's **Peter Anderson,** Saturday), International & Home Aquarium Environments (**Dr Chris Andrews,** Saturday/Sunday), Coral Reef's **Les Holliday** (Sunday). A special mention must go to **Heiko Bleher** who kept his audience enthralled for hours (despite an unscheduled break caused by a faulty projector) with his presentation on keeping and breeding Discus, Discus in the wild and Discus in their contemporary hybridised colour forms at breeders' farms worldwide.

Meanwhile, heats in the Junior and Adult **Furnished Aquarium Races** were being staged, with water, water everywhere (plus all kinds of friendly sabotage being evident in the Trade Heat!).

Heat winners **Mark Munro** and **Andrew McDonald,** both aged nine, from **Seascale Junior Fishkeeping Society** (of which more later) went on to win Sunday's Junior Final (with real gravel and plants this year) with **Driffield A.S.** taking the Adult award. As if this wasn't a wet enough activity, residents could even try their hand at scuba diving, courtesy of the **Bristol**

Interpet — winner of Best Trade Stand.
LINDA LEWIS

THE SUPREME FESTIVAL OF FISHKEEPING

Scuba Club, in the swimming pool.

The Festival featured fish shows on both days. Saturday saw **Bristol Aquarist Society** staging a Coldwater Open Show that attracted many entries. The Best in Show was a Shubunkin entered in the Breeders Section by **Mr C. A. Roberts**; fish in this Class, bred this year, looked like giants when compared to the youngsters in my pond!

Peter Sykes, Operations Manager, Rolf C. Hagen, receives presentation from Joe Nethersell, FBAS, watched by Peter Furze, Chairman, FBAS.

STEVE LA THANGUE

FRIENDLY SPIRIT EVIDENT

The final event on Saturday afternoon was a Tug o' War. Why bother to mention this? Because **Geoff Capes** was in charge! One does not argue with this man, even though he is quite kind to budgies, I believe. I haven't laughed so much for ages. By giving only the tiniest bit of help (alright — cheating!) Geoff was able to ensure that the right team won — in this case the 12 children from Seascale who had travelled down from Cumbria. (It was thanks to generosity from Hagen's that the school was able to travel to the show and how they rewarded their sponsors). Just to show the true friendly spirit of the weekend, as the kids were so tired after having to 'pull' three times in the semi-final, those terribly nice chaps from Peterhead (have I mentioned them before?) volunteered to pull on their behalf and duly beat **Bracknell A.S.** But back to the kids: they belong to a true Junior Society, not a section within an adult group. It began with a single tank placed in the School by a fishkeeping teacher, Helen Steele. All who met the children could not fail to be impressed. They were well-behaved, quiet, impeccably turned out in their Society 'uniform', knowledgeable about their hobby and keen to learn more. If this is what fishkeeping does for children then I recommend that the subject be added to the National Curriculum — fast. I think they made the show for everyone. (We will be featuring the youngsters in a future issue of **A&P** — Ed).

Saturday evening, residents were treated to a Presentation Dinner, after which various awards were made to Officers (and spouses) of the FBAS. I will only mention one of these, that made to **Joe Nethersell** — the **Golden Carp Award** — in recognition of his years of hard work and dedication to the Federation. Go to Weston, look for the busiest person and it will be Joe, yet he still has time for a friendly word! Unfortunately, **Andrew Bartyla**, Hagen's MD, was away in Italy on business and so missed the culmination of his team's efforts in presenting the Supreme Festival, but **Peter Sykes** duly accepted everyone's congratulations on behalf of the company.

Sunday came too early, after the previous evening's cabaret and socialising but fish had to be benched in the **1995 FBAS Supreme Championship** and the **Hagen Masters Open Show.** I thought it was a great idea to let the public watch the judging, albeit from behind the safety of a rope barrier (some of the judges can get quite nasty you know!). One by one the points for each Class was displayed, which one of the 450 plus entries would be **Best in Show**? An unusual species of Swordtail, *Xiphophorus nezahualcoyotl*, owned by **Dave McAllister** of **Welland Valley A.S.**

CATFISH SUPREME CHAMPION

Judge Alan Stevens had to dash from the Show bench to the tension of the Final of **Aquarian's Aqua Champ Competition** (fishkeeping's version of Mastermind). This year because of the problem with projector trouble, both specialised and general knowledge rounds ran consecutively (some of the finalists actually preferred this to two separate appearances in That Chair). After a very close first round, where all entrants were within a point or so of each other, the result was ... a tie between **Dr Joe Smartt** and **Alan Stevens.** After a hastily-arranged set of tie-breaking questions, Dr Smartt (who had answered specialist questions on goldfish) emerged triumphant.

No less than 44 fish competed for the Supreme Champion title — qualifying classes are held throughout the year countrywide, so it's a bit like Crufts with 'breed against breed'.

The announcement of the winner is traditionally kept secret until the very end of prizegiving and then is revealed in reverse order. The tension was tangible (I was worried too — what if I hadn't photographed the right fish, several show tanks had been placed too high for me to reach!). At last, to a cry of delight the winning fish was announced — a *Parotocinclus maculicauda* belonging to **Mr J. Hill** of **Salisbury A.S.** I had never seen this fish before, it's a dwarf suckermouth catfish that measures just 50mm when fully grown (yes, it did get maximum points for size out of its total of 89 points), a most beautiful little fish indeed.

Everyone I spoke to went away happy, both day visitors and residents alike: day visitors received a complimentary case packed with Hagen goodies whilst each resident received a £20 voucher to be exchanged for certain items displayed on the Hagen Stand. My only complaint — no calculators! It took me ages adding up prices in my head, trying to get close to £20! All in all, the weekend was a HUGE success — Hagen must have people already banging on their door either with congratulations or begging for more — I'm already counting the days to the 1996 event and hope to see YOU there.

TRAVELLER'S TALES

1995 was a special year not only for many aquarists, including **Dr David Ford** of the **Aquarian Advisory Service**, but also for a particular species of fish.

Photographs by the author.

A Piece of Southend Rock — with "Blue-mouth" down the middle?

1995 signified 50 years since the end of World War Two, with many celebrations being held throughout the world. The aquarist hobby could not develop until after that war, so many Societies formed during those 50 years with the result that most of the 400 UK aquatic Societies are now celebrating 20, 30 or even 40 years of service to members.

Port Talbot & D.A.S. held their 25th Anniversary Show and **Sandgrounders A.S.**, the Southport Society, were also 25 years old. **Hull A.S.** held their 30th Annual Open Show whilst **Walthamstow A.S.** celebrated 40 years. **Southend, Leigh & D.A.S.** actually formed before the war, and 1995 saw their Diamond Jubilee — 60 years of continuous service!

On a personal note, **AQUARIAN** was launched in 1975, together with its Advisory Service, so I was celebrating a 20th Anniversary because I have run the Service for all that time. To commemorate the occasion, Dr David Sands and I have been touring the country lecturing to Societies at Public Aquaria, with free entry for invited aquarists to the aquarium. So when Southend, Leigh & D.A.S. wrote to me about their Diamond Jubilee, I invited them to one of our Anniversary Lectures. This was held last May at the Southend SeaLife Centre where all Society members attended my lecture and then were given a conducted tour of the Centre, including behind-the-scenes. It was on this occasion that we met the **Blue-Mouth.**

Of great interest to everyone that evening was this new fish. A Southend fisherman, Paul Gilson, found the fish in his nets and took them to the SeaLife Centre where no-one could identify them! Alwynne Wheeler, of the Natural History Museum, identified the fish as a deep sea one once recorded in Southern Britain many years ago before pollution became a problem in the Thames Estuary.

It is an orange-coloured fish with black eyes, which flash a deep blue when the iris opens, but the unusual feature is the inside of the mouth which is deep blue. As it is a carnivore, the SeaLife Centre's provided diet of squid and shrimps suits it admirably and growth is rapid with a body colour change from orange to deep brown. It is believed that the fish has migrated from its usual rocky home at 200-800 metres to colonise the many wrecks in the Thames Estuary now the water is cleaner due to current effective pollution controls.

I keep a log of the lectures I have given over the last 20 years as a Consultant for Aquarian and was surprised to note that the Southend SeaLife Centre lecture was also another 'anniversary' — the 400th! That's a lot of talking about our fascinating hobby and since these lectures have been worldwide now you know where all the stories originate for this Traveller's Tales series.

As I noted in the talk that evening, Southend Leigh & D.A.S. are to be congratulated on their 60 years of service to the hobbyist, as is the Aquarian Advisory Service on 20 years of helping aquarists — only 100,000 letters answered. But all this paled into insignificance for me when the Blue-Mouth was seen at the centre ... here is a much more important anniversary, the return of a fish that had abandoned us because of our polluted waters.

Blue-Mouth in its wild (orange) and captive (brown) colours in aquaria at the Southend SeaLife Centre.

The Thames and its Estuary is clean again; sorry it has taken 50 years but, Blue-Mouth, welcome back!

Blue-Mouth Update: The fish has been identified as *Helicolenus dactylopterus* — one of the Scorpionfishes (Scorpaenidae). The name comes from the five-fingered extensions on the pectoral fin used to probe around the ocean floor. Little else is known about the fish because it is rare; species of this genus are often viviparous, but it's too soon to say if the Blue-mouth is. Scorpionfish are also known as Stingfishes because tropical species have a stinging mucus which can be injected via the dorsal spines. SeaLife have not encountered this problem, so maybe the coldwater species lack the poison. Scorpionfishes are also said to be good to eat — but I hope no-one does that!

SLADAS members gather for the Aquarian Lecture evening.

frogs & friends

By BOB and VAL DAVIES

HERP FACT FILE – The Marine Toad

Marine Toad (Bufo marinus) 'the solution that became a pest'. BOB & VAL DAVIES

The Marine Toad or Cane Toad (*Bufo marinus*) is commonly imported for sale. These large (up to 32cm/9ins) toads originally hail from Central and South America but after supposedly successful introductions into the Puerto Rican cane fields in the 1920's they were introduced into Australia in the 1930's to help control the Greyback Cane Beetle which was devastating the sugar cane crop. One hundred of these toads were imported: they produced more than one and a half million eggs and of these 62,000 young adults were released in Queensland.

Protected by its poisonous skin secretions, especially those from the large parotoid glands (just behind the eyes) the toad soon became a pest.

When provoked the poison from these glands can be sprayed to a reported distance of 1 metre (39 ins). Dogs affected by the toxins suffer extreme discomfort and there are reports of human deaths in the Phillipines after eating Marine Toads — evidently frogs are a natural part of their diet and the danger of eating *B. marinus* was unknown when they were introduced there. The eggs also contain toxic substances for protection.

The climate of Australia enabled year-round breeding — a pair can produce 20,000 plus eggs per clutch and numbers soon got out of control. The toads found better pickings away from the cane fields and have become a threat to native frogs and any other animals capable of fitting into their capacious mouth. Having voracious appetites they do not discriminate — many creatures which are beneficial to agriculture are consumed, thus defeating the original objective.

Today they are commonly found in gardens where they could pose a threat to young children. Large numbers fall victim to cars at night — squashed bodies being a common sight in the morning. Substantial numbers are evidently used for research purposes in laboratories and the skins are tanned for leather but neither use seems to have much effect on their numbers.

In spite of their toxic nature there are no reports of harm to keepers. The toxins are only released under extreme provocation but obviously it would be wise not to handle a specimen unnecessarily and to avoid touching one's eyes or mouth before washing the hands. Marine Toads are commonly kept in captivity but due to their size need a large, warm vivarium and substantial amounts of food.

Undesirable aliens

Having just written about abandoned Terrapins (Nov '95) we saw on Watchdog, BBC1, 23 October that some garden centres are selling tadpoles of the American Bullfrog (*Rana catesbeiana*) and recommending them as suitable for garden ponds. However, the adult frogs are already proving to be a pest. Fully grown they measure some 20cms (8 ins) snout to vent, and their voracious appetites will soon empty a pond and the surrounding area of anything small enough to eat, especially native amphibians. Viewers were warned that allowing this non-native species to roam at large is an offence and a possible fine of up to £5,000 was mentioned.

Stowaway

A recent addition to our collection was a male Kotschy's Gecko (*Crytodactylus kotschyi*) which had been found in a cargo of Cyprus potatoes at Heysham docks.

It is not uncommon for small geckos to be found in ships' cargoes. Hopefully, he will soon have a mate. He was easily identified by the peculiar hooked claws typical of this species.

Our Kotschy's Gecko after its long journey. BOB & VAL DAVIES

CLUBS

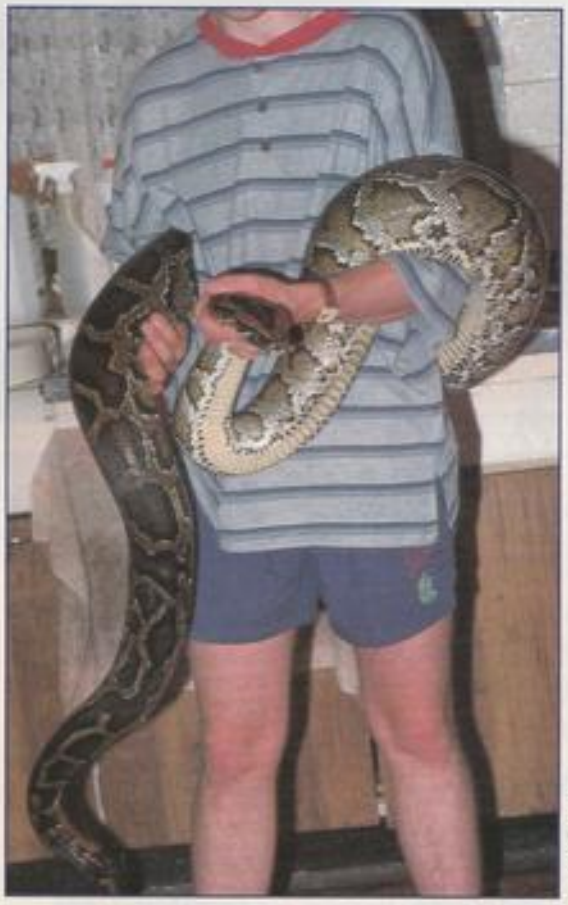
LIVE IN ESSEX and interested in reptiles/amphibians? E.R.A.S. meet in Witham on the second Thursday of each month. Contact 01621 819675 for further information.

Buyer Beware!

During our time in the hobby we have kept various reptiles which eventually grew quite large — Boa Constrictors, Iguanas, etc., but gradually realised that the space they occupied would house a larger variety of smaller creatures and, having wide interests, the large creatures, regrettably, had to go to new homes. Many, many years ago we were once misguided enough to buy a young Caiman but that is another story.

When purchasing, the eventual size of the animal must be taken into consideration; it is not fair to the creature to be housed in accommodation which is too small. Terrapins are a familiar example (Frogs & Friends Nov.) — a full-grown Red-ear needs a large aquarium if the water is not to be perpetually foul to the detriment of the occupant. There is usually a steady supply of unwanted adult Red-ears, so many in fact that certain individuals and establishments who 'rescue' them may now refuse to accept any more.

The other 'giants' which are often on offer are Iguanas, large Pythons and Nile Monitors. Having increased in size and outgrown their original housing they pose a dilemma. If the animal in question is of uncertain temperament then the problem increases. We once visited a person who kept large snakes. He admitted being terrified of one huge Reticulated Python which struck fiercely every time he went near the vivarium. Cleaning the vivarium was a 'traumatic' affair and before we left the owner made us an offer we could refuse — quite firmly. Another offer we once politely declined was a large Monitor Lizard. The owner's wife was trying to sell it (very cheaply) while he was away on business. The poor lady's sales pitch was not very effective but at least she was honest. The animal was 'wild, almost impossible to clean out,' scared the life out of both of them and she was terrified for the childrens' safety in case it got out.



BOB & VAL DAVIES

Burmese Python 33 kilos (70lbs), nearly three years old and still growing.

On the other hand we do know people who satisfactorily keep large reptiles of various kinds. They are able to provide adequate space and are experienced enough to handle their charges. Iguanas, if obtained when young, can make delightful pets even as adults, but babies, which are frequently on sale, need a reasonable amount of knowledge and experience to raise, thus dietary deficiencies are common.

The above is not meant to be a negative comment on reptile keeping and we are certainly not against keeping large reptiles, but there are many pitfalls into which the inexperienced might fall — think before you buy. Keeping reptiles can be a most rewarding experience but the people in the examples cited above, as a result of making a poor choice of subject, may not agree.

DAVID TWIGG'S

KOI CALENDAR

A Happy New Year to all my readers. With Christmas over, many people start thinking about the coming Show season Calendar; holidays may well be booked around it. I would therefore like to take this opportunity to remind the BKKS sections and other independent Koi Societies that if you haven't passed on details of your Show to me yet, please do so at your earliest convenience, as this column is written at least 10 weeks before the publication date. May I also ask that if you spot an error or omission you get in touch at the earliest opportunity. Thanks. I hope to continue to preview and review Shows this year and my thanks go to those who made Lyn and I so welcome at the Shows we attended last summer.

This is the time of year when dealers are receiving their new stocks from Japan and it is well worthwhile paying them a visit. Even if you will not be buying this time round the experience of seeing the better, more expensive Koi before they are sold is a very worthwhile exercise. It is only by seeing and discussing, with fellow Koi keepers, the relative merits of the better quality Koi that our appreciation of these wonderful fish improves.

If you buy Koi while on one of these viewing trips, have you got an adequate quarantine facility into which to place it upon your return home? If not then maybe this would be the time to consider all the options available. Remember that such a facility might well be able to double as hospital quarters for sick Koi in the future. If you do design such a system then please give proper consideration to the size and include a good filter system into the design from the word go. An inadequately filtered small pond is the worst home that you can give your newly purchased Koi. If too small it will stress the fish and poor filtration will mean poor water quality and possible damage to the gill lamellae, the life support system of the Koi.

The **South of England Koi Club** held its first Show, sponsored by *Nishikoi Aquaculture*, over the last weekend in October and Lyn and I visited on the Sunday. The Show was staged indoors under specially designed lighting and the 148 Koi (30 exhibitors) were judged and displayed in the Japanese style. As in any Show, the well being of the Koi should be of prime importance and that certainly was the case here at the SEKC Show where **Bernice Brewster** was taking regular tests and water changing took place as and when required. Water temperature was maintained around 14°C and the Koi were very happy.

This really was a wonderful display of Koi for the visiting public to admire and certainly met the SEKC ZNA (SEChapter) founding ideal of *Promoting and Preserving the Traditional Japanese Art of Keeping, Displaying and Appreciating Koi*. Judges at the show, **Nigel Caddock, Keith Phipps, Ian Stewardson, Stan Collinge, Alan Rogers** and **Paul James** discussed and deliberated on their decisions that were as follows:

Congratulations to **Grant Clifton** for taking four of the top five prizes: Grand Champion (6Bu Showa), Mature Champion (6Bu Sanke), Adult Champion (5Bu Kohaku) and Jumbo Champion (7Bu Hikarimuji).

Baby Champion went to **Martin and Gareth Bell** with their 3Bu Kohaku.

ABOVE Grand Champion, SEKC ZNA (SEC) 1995. Owner: Grant Clifton.

LEFT Mature Champion — Sanke, Adult Champion — Kohaku, Baby Champion — Kohaku, SEKC ZNA (SEC) 1995.

PHOTOGRAPHS BY THE AUTHOR

Best in Size awards

1Bu — 1, Kohaku, Katy Kemp; 2, Showa, M. L. Priday; 3, Hikarimuji, Andrew Davis.
2Bu — 1, Hikarimoyo, Di and Keith Harrison; 2, Kohaku, Dennis Brown; 3, Sanke, S. Rowley.
3Bu — 1, Kohaku, M. and G. Bell; 2, Hikarimoyo, Mark Price; 3, Showa, Jean Shakes.
4Bu — 1, Showa, Colin Benford; 2, Sanke, Mark Price; 3, Hikarimuji, Pippa Holtum.
5Bu — 1, Kohaku, Grant Clifton; 2, KinGinRin, Pippa Holtum; 3, Showa, Luke Hagstrom.
6Bu — 1, Sanke, Grant Clifton; 2, Kohaku, Grant Clifton; 3, Showa, Bob Thompson.
7Bu — 1, Kohaku, Grant Clifton; 2, Koromo, Grant Clifton; 3, Hikarimoyo, Carl Morley.

Other 1st Prize winners in Variety and Size were:

1Bu — Kohaku, Katy Kemp; Showa, Utsurimono, KinGinRin,

M. L. Priday; Hikarimoyo, Andrew Davis.
2Bu — Kohaku, Dennis Brown; Sanke, S. Rowley; Showa, Dennis Brown; Utsurimono, M. and G. Bell; KinGinRin, Katy Kemp; Tancho, Sid Bowles; Asagi/Shusui, Andrew Davis; Hikari-Utsuri, M. L. Priday.
3Bu — Sanke, Fred Price; Utsurimono, Dave Collis; KinGinRin, Tony Price; Tancho, Tony Whitternham; Bekko, Ken Taylor; Koromo, Luke Hagstrom; Kawarimono, Di and Keith Harrison; Hikari-Utsuri, S. Rowley; Hikari-muji, Sid Bowles; Hikarimoyo, Di and Keith Harrison.
4Bu — Kohaku, M. and G. Bell; Sanke, Mark Price; Showa, Jean Shakes; Utsurimono, Colin Benford; KinGinRin, Carl Morley; Bekko, Jean Shakes; Hikari-muji, Pippa Holtum.
5Bu — Kohaku, Sid Bowles; Sanke, Fred Price; Showa, Colin Benford; KinGinRin, Pippa Holtum; Tancho, Ken Taylor; Asagi/Shusui, Dave Wooldridge; Koromo, Pippa Holtum; Kawarimono, Keith Shakes; Hikarimoyo, Mark Price.
6Bu — Kohaku, Sanke, Grant Clifton; Showa, Luke Hagstrom; Utsurimono, Tancho, Colin Benford; Kawarimono, Hikari-muji, Fred Price; Hikarimoyo, Len Shakes.
7Bu — Kohaku, Grant Clifton; Koromo, Jean Shakes; Kawarimono, Colin Benford; Hikari-moyo, Fred Price.

1996 SHOW CALENDAR

May — **Merseyside Section BKKS.** Open Show. Phil Adamson, 0151 220 2970.

May 4/5 — **International Koi Show.** Bletchley Exhibition & Leisure Centre, Milton Keynes.

June/July — **Merseyside Section BKKS.** Closed Show. Phil Adamson, 0151 220 2970.

September 8 — **Leicestershire Koi Section BKKS.** Annual Show. Contact Mick Reffin, 0116 271 2517.

MEETINGS IN JANUARY 1996

8 — **Northampton Section BKKS.** Speaker is Gary Pritchard, Chairman BKKS. Contact Albert Day, 01604 407361.
10 — **Merseyside Section BKKS.** Photo competition. Contact Phil Adamson, 0151 220 2970.
— **Leicestershire Koi Section BKKS.** Quiz & Fun night at B.S.C. Social Club, Scudamor Road, Leicester. Contact Mick Reffin, 0116 271 2517.
14 — **Mid-Somerset Section BKKS.** Tony Staden speaks on 'Using microscopes'. Contact Alan Purnell, 01458 272132.
17 — **Crouch Valley Section BKKS.** AGM. Laindon, Essex. Contact Ron Parlour, 01277 840863.
27 — **Crouch Valley Section BKKS.** Annual Dinner Dance, Laindon, Essex. Contact Ron Parlour, 01277 840863.

My thanks go to all Koi club Secretaries, Pro's 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 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.

Alternatively please write to me at your earliest convenience via the Editor at **A&P, MJ Publications Ltd., Caxton House, Wellesley Road, Ashford, Kent TN24 8ET.**

COLDWATER Q&A

PHOTO: A&P LIBRARY

Pumpkinseed Sunfish will do well in outdoor ponds, but beware; they are likely to become aggressive and territorial if put with other pond inhabitants.

Q Is it possible to keep a Pumpkinseed Sunfish in an outside pond in our climate? I have two of these fishes, approximately three inches long, in one of the tanks in the house. There are times when I feel I could make better use of this tank and would like to put these two fish outside, at least for the summer months. What is your opinion?

A The short answer to your question is yes. The Pumpkinseed (*Lepomis gibbosus*) is originally from eastern North America, but has become established in parts of Europe and some locations in southern England.

If you intend to put these fishes into a pond containing other fish, be aware that they grow to eight to ten inches and can be somewhat aggressive. In an indoor tank their behaviour is similar to some cichlids. Outdoors, in a pond, they are likely to behave like perch and may become territorial. Diet consists mainly of worms, insects, crustaceans, and smaller fish. Once they have been 'let loose' into a pond, you may not see much of them.

Also bear in mind, if you ever want to catch them, this might entail emptying the pool.

Q I have been told that snails are a valuable addition to a garden pond. Is this true and, if so, which species are most suitable?

A There is a good case for adding native snail species to a wildlife pond. They are, after all, part of the flora and fauna which help to create the effect you want. In all other ponds, I think snails are quite worthless.

It has been said that snails will consume uneaten fish food. I'm sure this is true but, if you are feeding correctly, there will be no uneaten dry foods rotting away in the pool anyway. Snails do eat fish waste of course, they then proceed to produce waste themselves and so the net result is much the same. Algae of various kinds is eaten by snails but, these are usually the soft mossy growths and not the types which we call blanket weed or the free floating types which cause green water. What usually happens is when the most appealing algae have been eaten, attention is turned to the most succulent plants. Most fish will eat snails and their eggs so this might be seen as a small plus. In practice, however, snails breed readily and most seem to survive resulting in an epidemic.

If you like snails and wish to keep them for their own sake, that's fine, but don't expect them to 'keep the pond clean'.

There are many native species although most of these are too small to be of interest to the pond keeper. The two types usually seen are the Ramshorn (*Planorbis corneus*) and the Common Pond Snail (*Limnaea stagnalis*). Of these, the Ramshorn is the least trouble. An albino form (Red Ramshorn) exists which might, from a decorative point of view, justify its inclusion in the ornamental pool.

A word of warning: snails, like all other living things, can and do provide a vehicle for importing disease into your pond, so take care to obtain them from 'clean stock'.

Planorbis corneus.
ALEX STEPHENSON

Limnaea stagnalis.
ALEX STEPHENSON

Q Is there, in your opinion, a definitive book on Goldfish which I could/should buy for Christmas?

A I don't know any book which I would call definitive. All have something to offer and some are better than others. Here are two of my personal favourites:

Goldfish Guide by Yoshiichi Matsui.
Published by **T.F.H. Publications, Inc.** (This is now in its third edition).

Fancy Goldfish Culture (Second Edition).
Published by **Nimrod Press Ltd.** ISBN: 185259 007 6.

These are not the cheapest books available, but are well worth their price.

Q Years ago I attempted to keep Goldfish without much success, so I took up 'tropicals' instead. I now have several tanks housing various species.

With a little experience behind me, I feel I am ready to try Fancy Goldfish again. Can you advise me on the best type of filtration to use?

A It is perfectly possible to keep Goldfish without filtration. However, to do so usually means an almost daily ritual of siphoning off the sediment and fish waste, removing some of the water and topping up with matured or 'conditioned' water at approximately the same temperature.

Some form of filtration will save you a lot of this work but, I'm afraid, not all of it. Whatever filtration system is used, it is still a good idea to do a bit of tank maintenance, perhaps on a weekly basis. The siphon tube is still one of the best bits of machinery for a Goldfish keeper.

Filters for Goldfish need to be efficient and, as far as possible, non-turbulant. There are fish species that enjoy the strong currents which can be generated by power filters, but Fancy Goldfish prefer calmer waters. If you decide to use either an internal or external power filter, then fit a spray bar or something similar to reduce the velocity of the discharge.

One of the best systems, popular since the 1950's, is the air-operated undergravel filter. Effective, simple, and trouble-free, it is ideal for a permanent set-up. Remember, though, Goldfish do a lot of digging, so make sure there is more than enough gravel over the filter plate.

I would just like to add how pleased I am you are returning to Goldfish. The experience you have gained with other species is bound to pay dividends.

QUESTIONS FOR THE COLDWATER Q&A SHOULD BE ADDRESSED TO: ALEX STEPHENSON, c/o MJ PUBLICATIONS LIMITED, CAXTON HOUSE, WELLESLEY ROAD, ASHFORD, KENT TN24 8ET.

Out & About

ROGER FOGGITT ESCAPED LONG ENOUGH FROM HIS NORMAL CAPTIVE POSITION ON THE TETRA DISPLAY STAND TO ASSESS ...

BAF '95

Viewing this year's British Aquarists Festival, organised by the Federation of Northern Aquarium Societies in collaboration with the **Aquarist & Pondkeeper** magazine, both from behind, and in front of, the many stands and exhibits present, gave me a much better insight into just how much goes into a show of this kind. Traders and hobbyists alike came together to put on what seemed, from my 'wide angle' to be a smooth and successfully run event (but I don't suppose it looked that way from the temporary office of the planning and working Committee).

HUGE SELECTION

Over four thousand fishkeepers came through the doors over the weekend to view the huge selection of fishes entered into the competition, listen to leading aquarists talking on this year's show theme — conservation, watch one of the many demonstrations, getting that specialist piece of advice or pick up a bargain or two.

Many of the displays reflected the conservation theme, none more so than Chester Zoo, whose 'Ark' presentation made you realise just how vitally important it is to our hobby, to ensure that breeding projects such as those being carried out at the Zoo are successful. The delicately-balanced aquatic ecosystems around the world need careful monitoring and maintenance if 'specialised' species are ever to be made available for aquarium culture.

All the guest speakers included the message in their respective presentations. John Dawes explained the fascinating breeding programme through which the Dragon Fish had to go before it was removed from the CITES list: this involved a complex certification procedure of all breeding offspring and even 'electronic tagging' to verify the fish were indeed captive bred (see Buy Lines, this issue — Ed.). John Jarvis of Liverpool Museum and Justin Bell of Chester Zoo looked at conservation of tropical and marine environments, whilst Derek Lambert and Dr Pete Burgess entertained with stories about their trips to far off climes in search of rare (or even previously unknown) species. Incidentally, the approach to the lecture theatre was enhanced by a myriad of colourful entries for the Children's Aquatic Paintings Competition, won by Andrew Kearsley of St Thomas of Canterbury School, in the 5-7 age group and Marie Ratcliffe from Orrell School in the 8-11 group.

QUALITY OF DISCUS

Walking around the trade stands, a few things caught my eye, notably the quality of Discus from S. & D. Punchard and the innovative Fluidised Sand Aquarium Filters from Technology Aquatics (one of which will soon be fitted to my marine system, after having been persuaded to part with some hard-earned cash!). You couldn't fail to see the huge selection of Bogwood from Ornamental Wood Supplies, a finer collection of decorative wood would be difficult to find. A wider selection of fish for sale would also be hard to find compared to that on the IMC display — everything from Arowana to Zebras (well, nearly).

Competition categories numbered 85 and catered for everything from tableaux to individual fish. Isle of Wight A.S. emerged victorious from the close-fought Tableaux Competition (a number of imaginative entries including mini-fairy-tale castles) with what can be best described as a 'moving image' display. 'Visitor-participation' (not all children) gave the components a real bashing, but nothing a little maintenance back at base won't rectify and restore to its former glory.

One of my favourite classes has to be the Furnished Aquaria and these did not let me down — I just wish I had the same 'eye' and ability of the competitors which would result in my own tank looking the same! The eventual winners of the Tropical Class were Mr and Mrs B.Walsh, from Darwen A.S. in the Individual Class and Darwen A.S. in the

The A&P sponsored Champion of Champions Cape York Rainbowfish (*Melanotaenia splendida splendida*, owned by Ted Derrick of Halton A.S.

PHOTO: BRIAN WALSH

THE BRITISH AQUARISTS FESTIVAL 1995

Society Class. R Turner, from Halifax A.S. won the Individual Coldwater Class with Halifax A.S. as Society Class first.

NEW 'HABITAT CLASS'

A new entry on the Furnished Aquarium theme was the new 'Habitat Class' sponsored by Tetra in which all entries reproduced as accurately as possible the natural environment of their fish. Bill Drake, from the British Killifish Association, produced a stunning display which rightly earned him the new, superbly hand-carved, wooden Habitat Trophy.

The quality of fish on display was again very high with often not more than three or four points spanning the top three in any Class. Best fish in Show was a superb Killifish, *Nothobranchius eggersi* (blue), owned by Mick Agnew from the British Killifish Association, whilst the Champion of Champions, sponsored by **A&P**, was a stunning Cape York Rainbowfish, *Melanotaenia splendida splendida*, owned by Ted Derrick of Halton A.S.

As with all Shows, thanks must go to the organisers and sponsors of such a successful event, particularly to Arnold Chadwick, of the Federation of Northern Aquarium Societies, without whose untiring efforts this Show would not have been run. Finally, we should never forget the support from hobbyists and Aquatic Societies, whose fishkeeping knowledge and enthusiasm keeps this event as enjoyable as it is.

A tropical furnished aquarium from BAF '95. PHOTOS: BRIAN WALSH

PLANT Q&A

Q I spotted a plant in my local aquarium shops which I have not seen before. It had grass-like leaves with swollen bases and floated on the surface. The shop assistant had no idea what it was. Information please!

A The plant in question is called *Hygrorhiza aristata*. It occasionally turns up in imports from Sri Lanka and is also cultivated in a few continental nurseries. It is only useful in open-topped aquaria.

Grown as a floating plant, it can reach a length of 100cm (39in) or more, and can make as much as 10cm (4in) of growth per week. This species needs very bright light, preferably sunlight, a temperature of 10-28°C (50-82°F), and is easily propagated by cuttings.

Q I have a plant floating which completely covers the surface of my aquarium. I never knowingly bought this plant, so I suspect it must have been on another one.

One of my friends says it is Duckweed, but another identified it as *Salvinia*. Which is correct? I enclose a small piece for your examination.

A These two plants are very distinctive when *Salvinia* is growing in its most robust form. In aquaria, however, *Salvinia* assumes a depauperate form which, to the untutored eye, can make it appear somwhat similar to Duckweed.

Salvinia auriculata growing in an outdoor pond. BARRY JAMES

Salvinia grows in chains of leaves, whereas *Lemna* (Duckweed) consists of individual plants. The upper surface of the leaves of *Salvinia* are hairy, while those of Duckweed are smooth.

Your specimen is *Salvinia auriculata*.

QUESTIONS FOR THE PLANT Q&A SHOULD BE ADDRESSED TO: BARRY JAMES, c/o MJ PUBLICATIONS LIMITED, CAXTON HOUSE, WELLESLEY ROAD, ASHFORD, KENT TN24 8ET.

An ABC of SHORE WATCH

Rockpooling

BY ANDY HORTON

PHOTOGRAPHS BY THE AUTHOR

Jargon is not a lot of big words designed to confuse the reader and make the writer, or marine biologist, feel more important.

Hopefully, in the simple art of rockpooling, the strange names and terms are used only if they are absolutely necessary. New words are used only for a purpose, and then only if a simpler and clearer word cannot be used instead.

In this regular series I shall endeavour to introduce the reader to some of the animals to be found on the shores around the British Isles and explain some of the straightforward terms in common use.

ACFOR System

Ever wondered when you read in books that a certain animal is abundant, or common, or rare? What does this mean? Usually, this is just a vague term to describe the relevant frequency of certain animals. However, greater precision is possible if everybody uses these common words to mean the same thing. Therefore the following system has been introduced:

ABUNDANT = 1,000+
COMMON = 100-1,000
FREQUENT = 10-100
OCCASIONAL = 2-10
RARE = 1 only

Clever people will quickly realise that the size of the area covered is vitally important. A single record in one square metre could be 100 records in 100 square metres.

Rockpoolers have only a short time to explore the shore when the tide is out. This may be between one and two hours. The evidence of the frequency of a species found during this time can be translated to the above scale. Accuracy still leaves a lot to be desired as some rockpoolers may cover a small amount of ground in detail whilst others may wander over a large expanse of the intertidal rocks.

a

ACTINARIA: Sea anemones (see anemones).

ADSORPTION is the adhesion of molecules as a layer on another surface. This is how **ACTIVATED CHARCOAL** works as a filtration medium by absorbing organic particles before they enter the 'Nitrogen Cycle'. Adsorption should not be confused with absorption.

AEROBIC refers to an organism growing or occurring in the presence of oxygen. The opposite is **ANAEROBIC** growing in the absence of oxygen. **ANOXIC** is the description given to a habitat devoid of oxygen.

ALGA are non-flowering plants that includes the seaweeds (macroalgae) and the covering of the rocks and glass in aquaria (microalgae). The plural is algae.

The Beadlet Anemone is widespread and common on British rocky coasts. The column and tentacles are red, green or brown. The photograph is of the spotted 'strawberry' variety which is sometimes regarded as a different species Actinia fragacea. Out of the water the tentacles retract and the anemone looks and feels like a blob of jelly.

AMPHIPODA are an order of small crustacea that includes the Sandhoppers that are the black jumping arthropods familiar to shore visitors. Amphipods and all small crustaceans make excellent food for marine fish.

AMPLITUDE is a technical term that is a favourite of mine. It is a useful term in the aquarist's vocabulary. It means 'the range of tolerance of environmental conditions of an organism or species'. It is often referred to as 'ecological amplitude'. How is this useful to aquarists? If a fish can only survive in a temperature range between 9°C to 22°C, it can be said to have a temperature amplitude of these figures. Salinity, pH, nitrite are just other examples of amplitudes.

ANADROMY means migrating from salt to fresh water. The salmon is an example of an anadromous fish.

ANEMONES. Sea anemones are a jelly-like carnivorous animal that is usually fixed to a rock. It has stinging tentacles which it uses to capture small prey. True Sea anemones belong to the order called **ACTINARIA,** which is part of a larger class of a<None>nimals called the **ANTHOZOA** which includes the corals.

There are at least nine species of Sea anemones that

can be found on British shores. They are sometimes common (over 100 records on a shore visit).

ANGEL SHARKS are the family of flattened sharks called the Squatinidae that live on the sea bottom. The British species is called the Monkfish and can be found in shallow water.

ANTENNAE are the pairs of hair-like feelers on the head of prawns and crabs and other arthropods. Smaller supplementary antennae are called **ANTENNULES.**

AQUARIOLOGY is the science of aquaria.

ARCTIC-BOREAL refers to the fauna of the Arctic region. The marine Arctic-Boreal fauna reaches its southernmost point of distribution in the seas around Britain.

ARTHROPODA is the phylum (major evolutionary group) of jointed animals that includes the insects and crustaceans.

b

BACTERIA are microorganisms present in all habitats on this planet. Nitrifers are bacteria in the aquarium filter that convert toxic **AMMONIA** to safer nitrogen compounds.

BARNACLES are sessile crustaceans classified as Cirripedia. **ACORN BARNACLES** are super-abundant on rocks on the shore.

BATHYMETRY is the measurement of the depth of the sea or lake.

BENTHOS refers to the sea bottom. The life on the sea floor is referred to as benthic fauna.

BIODIVERSITY. This is a popular buzz word that is banded about a lot nowadays. The simple dictionary meaning is bio = life diversity. Biodiversity is a word coined by the zoologist E. O. Wilson to summarise the phrase 'biological diversity'. It encompasses the whole range of variation in living organisms: genetic variation, species variation and ecosystem variation. In other words — 'the variety of life ...'

The Common Starfish has detached one of its arms by a process called autotomy. A new arm will grow in its place, but it will be smaller than the detached limb.

AUTOTOMY is the self detachment of part of the body of an animal. Crabs can detach claws and legs if attacked or trapped, and Starfish will quite readily amputate one or more of its arms.

AUTOTROPHY is the ability of organisms to synthesise organic substances from inorganic substances including carbon dioxide. Bacteria (chemoautotrophic) and plants (photosynthesis) are examples.

BIODIVERSITY CHALLENGE is an agenda for conservation action in the UK.

BIOLOGICAL FILTRATION is conversion of harmful ammonia to nitrites and nitrates by nitrifying bacteria in the aquarium filtration system.

BIOLOGY is the study of living organisms.

BIOMASS is the mass of the living organisms. The biomass of an aquarium is all the living organisms in the aquaria including the bacteria and microscopic plants and animals.

Colonies of the bryozoan Membranipora membranacea on seaweed.

BIVALVES are a large class of molluscs with a shell divided into two valves. Common British species found on the shore are mussels and cockles, as well as the now rare oyster.

Brittlestar.

BLENNIES are a family of small rock pool fish called the Blenniidae. They have sharp comb-like teeth and a scaleless mucus covered skin that allows these small fish to squeeze into crevices. The Common Blenny, or Shanny, is frequently found on rocky shores the length of the British Isles. The family name originated from the Greek *blennos* meaning mucus.

The Smooth Blenny, or Shanny, breeds on rocky shores the length of the British coastline.

BRACKISH describes water that contains less salt than the sea but is not fresh water. This is usually under 3% salinity, which is a specific gravity of 1.022 at 15°C and 1.020 at 25°C.

BRANCHIURA are a class of parasitic sea lice.

The **BRITISH MARINE LIFE STUDY SOCIETY** is a society for the study of British marine life both in the wild and in aquaria.

BRITTLESTARS is the common name for the subclass of fragile starfish known as the Ophiuroidea. They can be occasionally discovered on British rocky shores where they are abundant in deeper water.

The **BRYOZOA** is a phylum of very small creatures that live in colonies in aquatic habitats. Under a microscope each individual (zocid) can be examined. These mat-like colonies are also known as Sea-firs and are occasionally found on brown seaweeds between the tides.

SEAVIEW

BY GORDON KAY

Calls for ban ignored

I reported last year on the Whale and Dolphin Conservation Society's battle plan for the 1995 Annual Meeting of the International Whaling Commission. I can now tell you that the meeting in Dublin, at the end of May, raised some pretty strong issues. For instance, the Commission again called upon the Norwegian government to immediately halt all whaling activity and to abide by — and drop their objection to — the IWC Moratorium. Sadly, and probably predictably, the Norwegians ignored the call. Furthermore, when they failed to find enough whales to kill in order to fulfil their quotas, they extended the hunting season!

On a similar vein, the Japanese have for some time been trying to circumvent the IWC ban by asking for a new category of whaling, called "small type coastal whaling". They have been trying to obtain a quota of 50 Minke whales per year, quoting economic need as the reason. At the 1994 meeting, these proposals were firmly rejected. Last year, they had another bash by trying to establish a new definition, this time called "community based whaling". For the first time, a resolution was passed that recognises constructive elements in Japan's proposals, which is very sad. However, I'm glad to report that both the UK and US rejected the resolution, saying that any new category of whaling would "circumvent the commercial whaling moratorium". Hoorah!

Also at the meeting, the issue was raised that Japan is continuing to work closely with developing nations, like Grenada, St. Lucia and the Solomon Islands, to develop a voting block which makes it more difficult to get policies passed at the IWC. In Dublin, the Caribbean nations promoted a resolution that denies IWC access to their waters, thereby stopping their scientists carrying out research related to small cetaceans. The resolution also limits research to that which can be totally controlled by their governments. Obviously, this resolution is a threat to scientific freedom and a worrying precedent for the IWC.

Aquarium lifeblood

Water is the lifeblood of our hobby, but it is also the cause of much consternation in a growing number of marine aquarists — especially as the stuff which comes out of our taps is suspect to say the least.

PHOTO: ARP LIBRARY

Measuring redox values can help with reef tank management, but this is no substitute for careful observation of the animals, which reveals the true quality of their aquatic environment.

There are several ways to combat poor quality tapwater. Of course, you could use distilled, de-ionised or spring water and these would give you absolutely pure water. But the cost would break you very rapidly and so, if you live in an area with poor water quality, it is a good idea to invest in a de-ioniser or a reverse osmosis unit. These latter units are very expensive, but a de-ioniser will repay the £100 (approx) it will cost a thousand times over. However, if you cannot afford this level of expenditure, do not dispair. There are measures we can take to either eliminate altogether or at least keep harmful substances to a minimum.

A lot of tapwater contains high levels of nitrate. Obviously, it is counter-productive to change water, in order to dilute nitrates, using water which is itself high in nitrates! We can use distilled water, added to the tapwater in a 50/50 mix to dilute nitrate. Be warned, though, that single distilled water can contain impurities such as **copper** and so only triple distilled should be used. Copper and other heavy metals will cause havoc in the aquarium. Many houses have copper piping to carry water into the building. If yours is such a house, run the tap for about five minutes, so that any copper dissolved in the water will be flushed away. Never use the hot tap, ever. Hot water dissolves heavy metals easier than cold. Filtration over activated charcoal also purifies water to some extent, by adsorbing organics and other elements. As I have already said, water is the lifeblood of our aquariums. We MUST make every effort to ensure that we use only water which is as pure as we can make it.

STOP PRESS

I have just had news that the government has not declared Cardigan Bay and the Moray Firth "Special Areas of Conservation", or SACs, for Bottlenose Dolphins. European law requires that a network of SACs is established across Europe for certain named species. Bottlenose Dolphins and Harbour Porpoises are among these species but, despite the Government's advisers recommending the Moray Firth and Cardigan Bay for these species, the lists do not include them. SACs are seen by many to be a golden opportunity to start improving the lot of the animals they are designed to protect. I wholeheartedly agree. If you do too, please write to John Gummer at the Department of the Environment, 2 Marsham Street, London, SW1P 3EB. Thanks.

SNIPPETS

The scientific name for the Reefip Blenny from the Eastern Atlantic is *Blennius ocellaris*, whilst the Brown Blenny is *Parablennius incognitus*.

A whale's stomach consists of four chambers, each of which plays a particular part in the digestive process and its kidney is actually a collection of rencuil, roughly translated as "little kidneys".

The Mushroom Coral — *Fungia fungites* — is one of the few solitary corals on the reef and one that lives completely unattached to it.

Halimeda are algae which incorporate large plates of calcium in their tissues. In places, much of the sand is made up from these plates.

Adaptions to life on a coral reef, as in any watery medium, offer many advantages over a land-based existence. Dehydration is not a problem and a tough outer skin to keep out moisture is redundant. Plants and animals on the reef can be very delicate, with soft membranes through which gases and salts pass easily. Furthermore, the water provides support. Anyone who has seen a jellyfish or an octopus out of water can testify to the debilitating influences of gravity.

In spite of their ferocious image, Great White Sharks tend to attack in an inhibited fashion. It could be that they merely "taste test" swimmers, who look from below like seals — the shark's favourite food.

Netting of Sydney beaches as a shark-preventive, began in 1936. In the period from October 1937 to February 1939, 1,500 sharks — including 900 potential maneaters — were caught.

Most fishes swim rapidly and erratically to avoid a predator, sometimes even leaping from the water. Flying fishes have perfected this and by spreading their pectoral fins and sculling with their tails, can reach speeds of 60 kilometres per hour.

Growing Tips

BY BARRY R JAMES

Barry James takes a look at plant culture and this month he's getting right to the bottom of things.

"What do you put on the bottom of an aquarium?" is a vexing question I must have been asked thousands of times. Having examined the situation first-hand in rivers and ponds throughout the tropical world, the answer is more complex than it might first appear.

Aquatic plants grow in a variety of substrates. Even in the same river you will find some plants growing on fine mud banks, others on accumulations of fine and coarse sands, others in beds of quite coarse gravel; in quieter waters plants can even be found growing in leaf litter.

In aquaria, we distinguish between substrate organic and non-organic materials placed below the gravel — and the gravel itself. In nature it is not so simple but aquaria need a clean environment so organic and very fine mineral materials must be used in such a way that they do not discolour the water. Writers on this topic have put forward many ideas and opinions on which are the best materials to use, often producing strong arguments and personal experiences to back up their case; however, there's more than one way to skin a cat!

To a certain extent, the answer depends on what you intend to use the aquarium for. In Britain we distinguish between the sizes of rock particles — sand is the finest, graduating upwards to gravel.

American literature uses 'sand' to cover all tiny granules of rock, leading to a lot of confusion. The Oxford English Dictionary defines sand as 'powder produced by wearing down of flint, etc., on the seashore' and gravel as 'coarse sand and stones.' As broad definitions these are fine but when used in commerce or industry much more information is needed to differentiate between these materials.

Sands and gravels are formed as a result of natural forces on rock formations whose chemical composition determine the properties of the sand or gravel formed. Those produced as a result of wave action on the seashore will consist mainly of hard rock particles with rounded surfaces; additionally, water currents may carry sands and gravel many miles from their original rock source. Gravels and sands from pits are deposits either laid down by seas and rivers in prehistoric times or by glacial action.

Gravels sold in aquatic stores are mostly obtained from Chesil Beach in Dorset, and are sold in several sizes — 1/8 in., 3/16 in., 1/4 in. and 1/2 in. — all fine for normal aquarium use but, because of they contain significant quantities of lime, are not suitable for aquariums in which a low pH is desired.

Middletown Quarry is the home of Border Stone & Company Ltd., specialists in producing an amazing range of rockwork and gravels for the garden or aquarium. From tests I carried out on some 15 varieties of gravel and crushed rocks only one is totally lime-free, namely 'Golden Flint' flattened chips some 3-6mm particle size.

Sand is composed mainly of Silica (Si) which does not occur in a free state but whose compounds make up about 28% of the earth's crust. Its oxides, known as quartz, and compounds called silicates, are the most important rock-forming minerals. Silver sand, a fine powder-like material, is mined in Bedfordshire and comes in various grades, the coarsest of which are preferable for aquarium use being generally neutral, or slightly acid, in reaction. Ordinary red/yellow builder's sand is quite dirty and contains appreciable amounts of lime, again making it unsuitable for aquarium use. Amongst the refractory sands — used in blast furnaces — the 1/8 in. particle size is excellent material.

Gravels made especially for aquarium use include those in three colours and 1-3mm in size from Dennerle — first class but very expensive; the synthetic clay-baked 'gravels' Aqualit (oatmeal colour) and Natalit (a more appealing dark brown) from Underworld Products are both neutral in reaction but are very hard on the fingers when planting!

A to Z of plants

Barclaya longifolia

Common Name: Orchid Lily
Distribution: South-east Asian mainland
Description: A beautiful plant related to the Water Lily, this species only produces submerged foliage. Arising from a compact rhizome the short petioles support long, strap-like leaves narrowing towards the tip. Arranged in the form of a rosette, these leaves vary in colour according to light and nutrient availability. The upper surface is olive-green often with darker diagonal streaks, whilst the undersurface varies from pale pink to deep red.

In nature, *Barclaya* can reach a height of 50cms but normally grows much smaller under aquarium conditions. Flowering often occurs, the quite large blooms floating on the surface with their appearance somewhat resembling an orchid. The sepals are pale green and the petals, which form a central tube, are purplish-red. Fruits are not often set but when produced are water berries.

Barclaya longifolia. DAVID ALLISON

Cultivation: *Barclaya* grows best in aquaria containing a sub-gravel heating system. They need a rich substrate containing laterite and a bright to shady situation. Temperature should be no lower than 25°C.
Notes: Two other species, *B. motleyi* and *B. rotundifolia* exist but are rarely imported. Growing *B. motleyi* (some 25 years ago) showed it to be less temperamental than *B. longifolia* — it flowered freely and, with its circular reddish flowers, was a very beautiful species — but I haven't been able to locate a specimen since.

TROPICAL Q&A

Q How long do tropical fish live for? Are they, for example, likely to outlive Goldfish? I have had my Goldfish for 20 years!

Siamese Fighters are surprisingly short-lived, particularly in the wild. GORDON WIGENS

A Goldfish often live 10 years in an aquarium and can (like yours) live to 20 years. The oldest on record is 30 years, but this was in a pond. Goldfish are carp and, of course, they are a long-lived species. Wild carp have been found at 50 years old and it is claimed they can live 100 years.

The lifespan of tropical fish is very variable. Angels usually live 5 years, but can reach 10 (rarely). The average lifespan of tropical fish is, generally, shorter than in coldwater species (about 3 years in captivity). In the wild, this can be much reduced because of predation. For example, the Guppy male's average lifespan is only 3 months (before they are eaten)... that is why they need to mature and inseminate females so quickly.

In general, the larger the fish, the longer it lives, so the big tropicals can last well past the average 3 years, e.g. Angels and Discus. Catfish also tend to be long-lived, because they just sit around most of the time! Koi live longer than their smaller cousins, Goldfish.

Marines are longer-lived too... evidence is still being collected, but marinists report coral fish that are 10 or 15 years old.

It is quite common for aquarists to set up a tropical community aquarium, then write to me about a mysterious disease some three years later, only to be told that it is just old age! Any fish (such as Neons) that last 5 or more years, are simply a recommendation of the good water quality the aquarist maintains.

Note, of course, that some fish are annuals, e.g. many Killifish and, surprisingly, Siamese Fighters in the wild.

QUESTIONS FOR THE TROPICAL Q&A SHOULD BE ADDRESSED TO: DR DAVID FORD, c/o MJ PUBLICATIONS LIMITED, CAXTON HOUSE, WELLESLEY ROAD, ASHFORD, KENT TN24 8ET.

SOCIETY WORLD

Solway winners

Brian and Steve Crich of Sutton AS won the 'Best Fish in Show' award at the recent Open Show of Solway AS for the second year running and with the same Characin *Leporellus vittatus*. The top-pointed exhibitor was Gavin Cowan, Solway AS.

Second year for MAPS

Midland Aquarists and Pondkeepers Society (MAPS) celebrated its second anniversary with a talk by **A&P** regular columnist Stephen Smith. Stephen gave an illustrated overview of fish farms in Singapore and Malaysia, with reference to the Aquarama series of exhibitions.

MAPS meets on the second Thursday of each month at Burbage Liberal Club, Lutterworth Road, Burbage, near Hinckley, Leicestershire. Annual membership subscriptions are just £7.50 for individuals or £10 for families, and membership enquiries should be addressed to MAPS chairman **Vic Aylett, 8 Barrie Road, Hinckley, Leicestershire LE10 0QX. Tel: 01455 616165.**

Drake's progress

Plymouth and District AS meet on the first and second Tuesday of each month at Plymouth Electricity Sports and Social Club, Armada Street, Plymouth.

For details, contact **Ian Blackie, 55 Carnock Road, Manadon, Plymouth, Devon. Tel: 01752 709599.**

Jack Stillwell reports: at the *A.S.A.S. Convention* held in Portsmouth on September 10, members of *Portsmouth, I.O.W., Redhill & Reigate, Eastleigh, Bracknell, Mid-Sussex* and *South Dorset Societies* heard two excellent talks: *Cichlids of Lakes Malawi and Tanganyika* by Mary Bailey and *Breeding Characins* by Bill Rundle, the FBAS President. An Auction of Fish, Plants and Equipment followed.

At the Catherington Country Show, held over the Bank Holiday Sunday, *Portsmouth Aquarist Society* exhibited 40 furnished aquaria of tropical and coldwater fishes and one vivarium containing pond life. A novelty aquarium made by Dave Oxford proved to be a real show-stopper as people young and old queued to get a fish-eyed view of the underwater world. The photographs, taken by Wally Ryder, capture a young enthusiast viewing a Bristol-type Shubunkin. Could this be the way we will be judging fish in the new millennium, I ask?

Tony Painel, President of Jersey Aquatic Society.

Holidaymakers to Jersey need not get withdrawal symptoms about leaving their fish at home.

There is a new thriving Society on the Island, *Jersey Aquatic Society*, which meets on the first Monday of each month at the Royal British Legion Club, Devonshire Place, St Helier. President Tony Paine (seen here addressing the inaugural meeting), says that another 30 members especially keen on Koi are about to form a special section within the Society.

Details of J.A.S. from General Secretary, Mrs Melanie Langlois, Champ Donne Cottage, Route de Trodez, St Ouen, Jersey, C.I. Tel: (01534) 481369/0979 718000.

In Memoriam

As **A&P** was about to go to press, the tragic news came through that **Wilf Chapman**, of **Southend, Leigh & District A.S.**, had passed away suddenly. Wilf, together with son Roy, were a double act to be reckoned with at Open Shows, travelling the length and breadth of the country in pursuit of awards. As the saying goes, it wasn't so much 'who was going to win, but who was coming second to the Chapman's', such was their prowess at producing winning fishes and furnished aquariums.

In recent times Wilf's health took a bit of a knock but he slowly regained his taste for competition — not only at aquatic shows but at Horticultural and County Shows where he took many awards for such diverse activities as cake-making and jams! Many fishkeepers will have learned a lot through meeting with Wilf, who was always generous with practical advice, and he will be very much conspicuous by his absence next year.

We extend condolences and sympathy, from all who knew him, to his wife Jean and to Roy and Justine.

Strathclyde Fishkeepers Festival '96
April 5th, 6th, 7th 1996
St Margaret Mary's Secondary School,
65 Dougrie Road, Castlemilk, Glasgow G45

Open Show
Cafeteria
Tombola
Displays
Prize Draw
Fish Auction

For further details contact:
Mr H. McGuiness, 10a Mill Road,
Halfway, Cambuslang G72 7QG

... LATE NEWS ...

The Yorkshire Cichlid Group will be hosting evenings with Alan Hill and Mary Bailey, respectively, on January 12 and February 9 1996.

Both meetings start at 8 pm at St. Annes Church Hall, Wrenthorpe, Wakefield.

For further details please contact **Dave Wright on Wakefield (01924) 362313.**

The Group also holds its Spring Auction on February 11 1996 at St. Annes Church Hall, Wrenthorpe, Wakefield.

For further details please contact **Rosemary or Andrew Ripley on (01430) 441759.**

Bracknell Aquarist Society meet regularly on the second and fourth Wednesdays of each month. On the second Wednesday there is to be a Junior Section starting at 7 pm at The Pinewood Leisure Centre, Old Wokingham Road, Crowthorne, Berkshire, with an Open Show held at the same venue on May 5 1996. Details from Show Secretary **Ray Hogg (01344) 302313.**

Talks planned include Lake Tanganyika by Pete Travett on February 28 and About Ponds by Dave Easer on March 27. Details from **K. Sollitt (01734) 732874.**

Scottish Supreme Champion 1995 — January wins in November!

(DR DAVID FORD)

AQUARIAN'S Dr David Ford gets his months mixed north of the border

An unusual Tetra won the 1995 Scottish Championship — the January Tetra, *Hemigrammus hyanuary*.

Since the Scottish Aquarist Festival ended, the **Federation of Scottish Aquarist Societies** have been moving the Scottish Supreme Final around the Scottish Open Shows. This year, the Final was held at the Scottish International Fish Show held in Dunfermline's Pittencrieff Park at the Glen Pavilion.

At the two-day Show, displays were built by **Peterhead & D.A.S., Grangemouth A.S., Glenrothes A.S., Greenock & D.A.S., Perth A.S.** and the home society, **Dunfermline A.S.**

The Fife group of the British Killifish Association put on a Killi display and **AQUARIAN** had a commercial stand showing their new range of fish foods.

The Scottish Champion is owned by Allen James, of **Greenock A.S.**, who obtained the January Tetra in Holland when he visited last year. Second was a Killifish owned by Michael Jannetta of **B.K.A.**, third a *Corydoras* Catfish belonging to R. and K. Kirkup of the **Rainbow Society**. There were 15 entries.

In the Open Show, the winner of the **AQUARIAN** Best in Show Award was Gordon Mackay, of **Solway A.S.** with a colourful Red-tailed Black Shark, *Labeo bicolor*.

Those of us who made it to the Show had an enjoyable time — but I should have known that a January fish winning in November was bound to be accompanied by relevant weather — 6 in. of snow!

1996 SHOW DATES

31 March — Northampton AS
5/7 April — Strathclyde Aquarist Festival
13/14 April — Yorkshire Aquarist Festival
21 April — Kilsaldy AS
4 May — Southend, Leigh & DAS
5 May — Musselburgh AS
5 May — Bracknell AS
12 May — Corby & District AS
12 May — CAST '88
19 May — Cardiff & District FS
19 May — Isle of Wight AS
9 June — Merseyside AS
9 June — Redcar AS
11 August — Salisbury AS
7 September — Hounslow AS

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).

TECHNICALITIES for beginners

How would I do...?

Peter Moon gets to grips with ambitious projects that beginners may fear to tackle

As aquarists, we strive to re-create conditions in our aquariums as near to nature as humanly possible, given the confines of closed systems. Let's take a look at how we can set up the typical, swirling, intermittent water currents as found on the natural coral reef for a reef tank system.

The need for water movement

Adequate water movement is essential for reef aquariums for a number of reasons, not only to bring nutrients such as oxygen, trace elements, calcium, strontium etc to sessile invertebrates but, just as important, these animals need to have waste products removed from around them which would otherwise settle on the animals and corals, slowly decay resulting in damage and possible death. Detritus settling on the substrate and rocks can also be prevented from accumulating by using strategically-placed powerheads, and also any 'dead spots' will be eliminated.

The equipment

Powerheads have been around for a long time since their higher flow-rate was preferred to that provided by air-stones in sub-gravel biological filtration systems. These can certainly provide constant energy but creating the intermittent turbulence calls for other devices. Wave-makers, or surge simulators have become available more recently; these use state of the art microchip circuitry to either constantly, or randomly, switch the powerheads on and off — some models can accommodate up to four powerheads.

Types of water movement

SURGE: The constant movement of water back and forth across the reef; the force moves corals to and fro, as if caught in a strong breeze.

TURBULENCE: Random movement of water in all directions on the reef.

Method

Opinions differ on how to duplicate natural water movements in the aquarium: some American magazines have reported aquarists using the 'Dump Bucket' method but this would appear somewhat cumbersome, and difficult to incorporate in the average aquarium. As suggested earlier, a combination of powerheads and a wavemaker should present a more elegant method of reaching the desired effect. One very important point: follow the manufacturer's instructions as closely as possible when installing and, before you buy, do make sure that the powerhead you want to use is capable of intermittent operation — again, ask the dealer or manufacturer.

The first thing to do is to think differently and constructively — don't look at powerheads as 'sit on an up-tube' items any longer; they are independent water impellers and, as such, can be used anywhere in the aquarium. Don't site them all on one level nor point them all horizontally. Built them into crevices in rockwork and don't be afraid to use a dab of silicone sealant to keep them in place. The best method is to direct the flow from one powerhead randomly upwards towards the next powerhead, not directly at the corals; the flow from a powerhead is laminar, ie in a straight line, and our grand plan is to create uneven lines of flow — turbulence. Turbulence can be increased by timing the powerheads to switch on and off, say, in 10 second intervals but do keep your eye on the corals, as any excessive current can make them close up; the answer then is to redirect the flow or adjust the output flow from the offending powerhead.

A wavemaker device such as this is useful for creating water movement, which is essential for marine aquariums.

CORAL REEF TECHNOLOGY/RED SEA FISH pharm

The above suggestions have been written with the reef-aquarium keeper in mind, but the same techniques can also apply to 'fish only' systems. With added water movement, feeding fish takes on a whole new meaning as the currents created swirls the food around the aquarium and by keeping it in suspension for longer, provides a more natural feeding pattern.

Whilst I have planned a series of topics for the whole year of *A&P*, if you have any special projects or technical problems you would like me to consider, or help out with, you can contact me through the Editor.

This Month's Weird Words

SYMBIOSIS: A case of two different genera living together for mutual benefit. Although most aquarists see the Clownfish/Sea-anemone as being a typical example, because no one is quite sure what the Sea-anemone gets out of it (unless it's bits of food from a messy eating fish!) this situation might be better described as **commensalism**.

PEDOPHAGE: This word is used to describe an African Lake Cichlid with the particularly nasty habit of sucking young fish out from the mouth of their incubating mouthbrooding mother.

CREPUSCULAR: The activities, or dusk/nocturnal lifestyles of some fishes, notably Catfishes and Loaches, which creep about on the tank floor.