DECEMBER 1991

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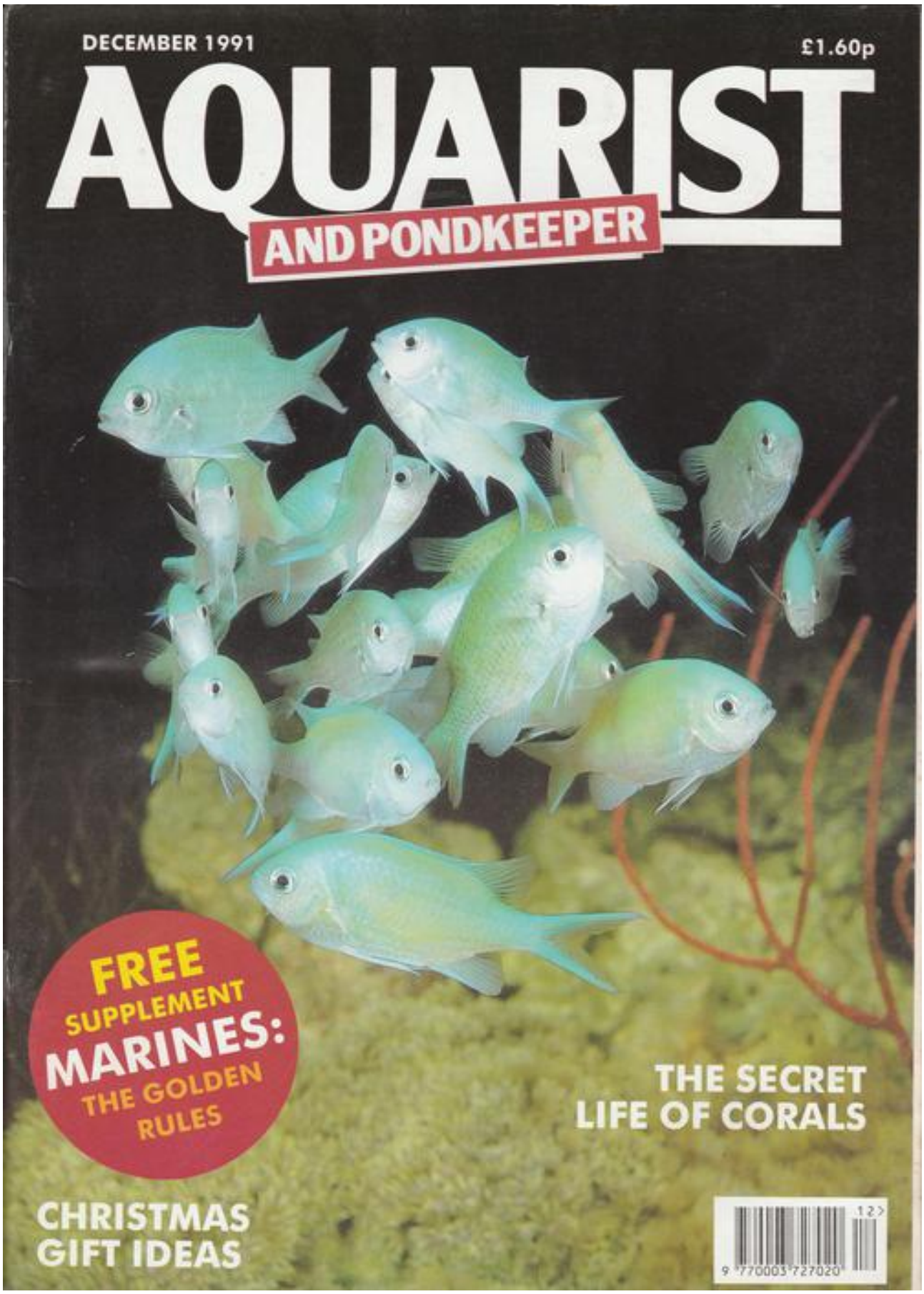
AQUARIST AND PONDKEEPER



FREE SUPPLEMENT
MARINES: THE GOLDEN RULES

THE SECRET LIFE OF CORALS

CHRISTMAS GIFT IDEAS

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AQUARIST AND PONDKEEPER

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EDITORIAL

NON-DISPOSABLE CHRISTMAS THOUGHTS

Some years ago, I was involved in a short series of discussions regarding a possible TV documentary on goldfish. I had suggested that one of the first issues that might be tackled could be the fundamental question of whether people should keep goldfish or not.

When asked what my opinion was, I had said that I regarded the matter as a 'Yes and no' one. If the potential goldfish keeper was a person who genuinely cared about the welfare of the fish, then both owner and pets were likely to enjoy a long, 'happy' relationship.

If, however, the fish were to be regarded as 'disposable items' that would have to take their chances and would be replaced without due thought or feeling every time an uncaring action resulted in disease or death, then that person should not keep fish . . . goldfish or otherwise.

Imagine my surprise (shock?) when, a short time later, I received a call to "inform" me that goldfish *were* disposable! I was obviously being naïve to think anything else, I was told.

"But that's despicable", I protested.

"Yes", came the answer. "But it makes great television, doesn't it?"

Am I missing something? Am I really naïve because I believe that the lives of fish are so important that only people who care sufficiently should keep them? Am I wrong in stressing over and over again to potential aquarists that they should do their homework first and that they should set up their aquaria well before they buy any fish? Am I way off the mark when I say that the welfare of the animals and plants in our care should be paramount?

If I am, then there's a lot of people I know (many of whom run highly successful businesses, or write for us) who are also missing something and are equally naïve, mistaken and way off the mark.

With Christmas just a few breathless weeks away and thoughts turning to suitable presents for loved ones, I would urge all those who might be thinking of starting a friend or relative off on the exciting, rewarding path to successful aquarium and pond keeping, to go about it the right way round. Leave the buying of the fish until everything else is well and truly sorted out.

Fish are *not* disposable items, despite what my caller might have thought. And they make *great* television . . . at least, when they are presented quite simply as the beautiful, graceful, tremendous creatures that they are.

Have a great Christmas!

John Dawes

John Dawes
Editor

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Tanks for the Christmas Present

Aquarium keeping, as **Jason Endfield** shows, is the ideal hobby for everyone . . . including budding poets!

I write to you from below the branches of a somewhat overdressed Christmas tree. As I try to gain inspiration for a Christmassy feature, a bauble dangles precariously over my head; perhaps it will fall and hit me like the proverbial apple and, 'voila' — an idea for a mind-stretching article . . . But let's suppose it doesn't. Actually, right now I'm musing over a poem that a young, promising poetess recited to me a few days ago:—

If I had a single wish,
I would like to have a fish;
Be it small or be it be big,
It is nicer than a pig.

It's very deep, I think, and there must be some psychological hidden meaning in there somewhere. I should say that the poetess in question was only six years old, but rather wise for her years, because, as verse two illustrates (yes, I'm afraid there's more), she is truly the weaver of wise words. It continues:

If you ask my mum and me
about a fish we both agree
that fish are easier to keep
than a pig.

It ends rather abruptly but makes its point very well, I think, despite the fettish with pigs. Basically, the message is that fish are the ideal pets for people and poets and peoples' poets of all ages. I see a big future for this young lady — though it may be in fishkeeping sooner than poetry . . .

Very conveniently, however, our young poet does bring home my thoughts this month very well indeed because my real point is that all you parents out there should perhaps consider treating your kin to an aquarium set-up for Christmas. These days, the cost of a modest tank, together with all the necessary equipment, and even some fish, is likely to be a fraction of the cost of a new BMX bike, a dolls' house or a Hero Turtle outfit, none of which are particularly educational.

Fish, on the other hand, are absorbing (especially for youngsters), educational (they make light work of the 'birds and bees' lesson . . .) and encourage a sense of responsibility.

Why, fish are even available in all the 'festive' colours — though do take care to explain to very young enthusiasts that fish do need to stay in the water! I recall the tale of a three-year-old with a squirming Goldfish in her hand who explained innocently that she was helping mummy to decorate the Christmas tree. Well, to a three-year-old, I suppose it's quite easy to confuse gold baubles with Goldfish, but I still shudder at the thought!

That, in turn, reminds me of the time (another Christmas) when I found one of my tanks festooned with tinsel (on the inside!!!) which someone (who I haven't spoken to since) had put there, among the *Cabomba*, for a joke. It proved to be non-toxic, thank goodness, and all was well, though it did mystify a rather stupid Molly who was busy grazing on a metallic green piece.

Anyway, returning to the point — I don't disagree with the RSPCA's annual advice against buying animals for Christmas, though I do think that fish may be the exception to the rule if dealt with responsibly. Fish do need looking after, but at the same time, they're not hard work. Unlike a dog, they don't need taking for a walk; unlike a cat, they won't ruin the upholstery and leave peculiar smells behind as they leave the room; and fish certainly won't screech through the Christmas television films like Budgies do (take my experienced word for that!).

Therefore, young recipients of Christmas fishes are more likely to give some of their precious time to looking after their new pets — after BMXing or playing happy families in the dolls' house — and the fish don't even mind their keeper dressing up in Hero Turtle suits (you can take my experienced word for that too) . . . but that's another story . . .

So if you're stuck for a present for the kids this month, then it's worth thinking about aquaria. I mean, even if they don't take to it, fishkeeping is your hobby isn't it (?), so you can, without feeling guilty, buy another tank "for the kids" (cunning, eh?). It's a trick that works at other times of the year too.

Seriously though, the hobby needs fresh blood, and it's more than likely that young recipients of an aquarium — with the fish following later, of course — will revel in it (not literally, one hopes) just like we did all those years ago. I still buy my fish their own Christmas presents — perhaps a new tank, or a new tank-mate, or some new plants . . . I'm so selfless!

Anyway, I'll draw to a close with my seasonal motto for this year and it's: "be festive with a fish" (don't read anything into that, there's no hidden meaning there . . .).

Meanwhile, my young poet friend is already showing signs of following in her fishkeeping father's footsteps and is displaying a natural flair for deciding what is really important in life, so I'll let her provide the finale to this feature:—

Last Christmas Daddy had a drink and said his New Year wish
Is that Mummy would grow fins and scales and turn into a fish.

* With thanks to 6-year-old poet Amy Lyre, who, together with me, sends you Seasons Greetings and all the best for the coming year.

Tomorrow's Aquarist

By David Sands

FESTIVE FISHING

Christmas is almost here! How on earth does Santa get down the chimney with a fish tank? A special prize awaits the **TA** reader with the funniest answer.

In the holidays you might find time to look at your fish a little more closely than before and catch up with your water changes. Of course, that's all except the poor outdoor fishes who have to freeze it out.

Don't forget to wish your fish a 'Happy Christmas' but, then again, do not have it snowing fish flakes in your tank!

If you want to treat your happy tropical or goldfishes, then give them some squashed peas and a 'fingernail-sized' lump of frozen Gamma shrimp. They'll thank you for it.

PEN PALS/FISH FRIENDS

Should those **TA** readers who correspond with others be called fish friends?

Pen Pal 'inventor'

My friend, **Joanna Beal**, from Spalding (who has still not forwarded a picture to me!) has written to me again on Garfield paper reminding me that it was she who suggested the pen pals part of the column.

Joanna flicks through back issues of *ACrP* and, on one occasion, she found my request relating to **TA** readers and 'careers in fish'.

Joanna described herself as a 'Fish Freak' (and why not?) who fancies being a fish biologist or ethologist (someone who studies fish behaviour — something I'm doing now at Liverpool University!)

She is at the GCSE stage and has completed two blissful weeks of work experience at **Lincolnshire Koi and Lincs Fish Health Consultants**. Joanna links up with **Alison Ronald**, another regular reader of our column.

I think it's smashing idea to allow school-based students (I hate the term 'kids') the opportunity to work in a real situation. Come on, all you retail outlets who are willing to give fish-enthusiastic **TA** readers a chance for work experience . . . Any retailer who lets me know that they are willing to participate in such a scheme next year will receive a plug in this column.

Thank you, Joanna. I *always* enjoy reading your letters and I hope that we can meet on my travels next year some time.

'Fish' careers

Another very regular reader of **TA**, **Jacob Cowing**, from Sutton Coldfield, wants desperately to be into fish, either as a diver, fish breeder or a fish researcher. WHERE DO I START? Jacob pleads.

I think it's like any profession. You have to study hard at school (English, Biology, Maths etc) and then look for college or university places with 'fish' subjects. Ask your science teacher to help you on a project relating to fish. If I can help, ask your teacher to write to me.

Upsetting diet

Martin Cranham of Kirby writes to tell me he is feeding his Shovel-nosed Catfish on Guppies and baby Black Mollies . . . that upsets me! I don't believe in feeding live fish to other fish.

To Martin's favour, he asked what else will his predatory catfish feed on. In my experience, all these predatory catfishes will eat prawns, small pieces of fish and earthworms (I suppose SPI, the Society for Protection of Invertebrates, will write in and attack me . . .)

Amy's help

E Maxwell from Gnosall, Nr Stafford, wrote in to tell me a story about a young lady called **Amy** who helps with fish chores (see a previous **TA**).

Every couple of weeks E Maxwell (who keeps her full name a mystery) is visited by a four-year-old who is absolutely fascinated by the red Comet Goldfish which are in a pond. When feeding time arrives, Amy is there "like a shot", shouting at the top of her voice when she can see the basking Comet.

"There, the red one, the red one!!"

Not only do the fish retreat, but so do the neighbours! E Maxwell writes that it is difficult to coax the fish back because Amy has to feed every time. Now Amy is taken back into the house for a snack while the fish enjoy theirs!

I'll send some pond sticks for Amy and E Maxwell, then Amy's screams will not seem so bad as she will have won a prize that benefits the red Comet and its friends.

Joe's favourites

Joe Hardcastle wrote to me from Wallasey, in Merseyside, early in the year enclosing drawings of a 'Butterfly fish' and a 'Glass catfish'. His list of favourite fishes is headed with the Blue-eyed *Panaque* and includes such wonders as *Corydoras arcuatus* and (one of my favourites) the Red-tailed Catfish! Included in Joe's list were Rummy-nosed and Emperor Tetras . . .

He's certainly got taste when it comes to fish lists. Joe likes the **Cover Story, Your Questions Answered** and the extremely brilliant **TA**!

Joe has a paper round to pay for his three-year-old hobby but, in his own words, he also enjoys playing guitar and headbanging to Megadeath, Slayer and Anthrax. I'm listening to Talk Talk while I'm writing this month, although I did play PM Dawn and Bomb The Bass prior to my favourites. Who am I to say that the three groups Joe mentions sound like they live down at the local *Slaughter House!* Keep on headbanging!

Club questions

Joe asks the perennial question "Is there a Fish Club in my end of town?"

I shall repeat last month's request. Do any of the big Federations around the country want to send me a list of clubs affiliated to them?

Finally, **Ben Owen**, lately of Llanberis in Gwynedd, asks the same question about clubs. Ben writes, "I don't think I would be able to join most clubs; after all, I'm only twelve. But I recently heard clubs were taking on junior fishkeepers . . ."

Can you read that, Federation secretaries? Our **TA** readers are under the illusion that fish clubs are only for old people!! I would suggest some clubs write in and correct that mistake.

HAPPY CHRISTMAS 'FISHKEEPING'.

Stan Kemp of Kingfisheries — seen photographed with me admiring one of his marine tanks — welcomes students on a regular basis to his aquatic centre.

Koi Talk

By John Cuvelier

CHRISTMAS RIGOR MORTIS

By the time this issue drops through your letter box, we shall be fast approaching that 'Never, Never Time' of the year better known as Christmas. You know what I mean, never enough time to do all that needs to be done, never enough money to do everything, assuming the time could be magically made available; never mind the turkey, feel my thumping head, etc, etc! I've even noticed that my flexible friends appear to develop a touch of 'rigor mortis' always around Christmas.

Why is it that if a pump is going to fail or a filter go down, it will always wait until Christmas Day to happen, when everything has shut down for a week or more? I'm really surprised that someone somewhere has not started a movement to abolish Christmas on the grounds that it can seriously damage your health. Now there's a thought!

WINTER PREPARATIONS

Seriously, though, I hope for your sakes, dear readers, that you've finished all those winter preparations and your Koi are all tucked up for the coming winter. Writing this in late autumn, my fish are still feeding ravenously and it's hard to believe that in just a few short weeks they will all have disappeared into their hibernating winter quarters, only rarely to be glimpsed should they stick their noses out from their cave for a swift look around.

I've been working like the proverbial trying to catch up on all the cutting back of rampant water plants, lilies, etc, of which there has been phenomenal growth this year. As our eight-year-old garden matures a little more each year, there appears to be an exponential rate of increase in the number of falling leaves which need to be cleared away, both from the pools and the surrounding grounds.

My own pet hate is in the form of a beautiful Arailia tree which towers above our header tank and cascades. This tree is unusual in that the branches are actually leaves and, being deciduous, the whole lot falls together, forming a large heap which, if not quickly removed, can very soon cause problems by blocking the cascades and diverting the water flow in a very unfriendly manner. You might not think this much of a problem until you feel the lethal spikes which adorn this particular species.

SEASONAL PUMP THOUGHTS

I've noticed on previous occasions that, at certain times of the year, readers begin to think about specific things associated with our hobby. This year it is the turn of vacuum pumps, as I have had no less than four enquiries about these devices in less than a week! A good vacuum system is probably the most important piece of equipment the Koi keeper can own, but obtaining the right type for the job can be a bit problematical.

The great majority of commercially available pumps are of the type known as centrifugal because they draw water in at the centre of the impeller and throw it out to the side and upwards. These pumps are not self-priming and are invariably fitted with a priming pot and filter mesh which needs to be primed with water prior to using. These pumps are also incapable of moving 'solids', hence the filter mesh.

Although they will do a good job of pumping, there is a snag (so what's new?). Well, much of the 'crud' which we vacuum from our pools consists of algae, blanket weed and the like which, if allowed to enter the impeller, will quickly choke it and stall the pump, or worse. This means that frequent stopping of the pump is required in order to clean out the priming pot and filter screen, a chore which rapidly becomes a bind.

There is an alternative, however, in the form of the 'Johnson', a self-priming pump with a neoprene impeller which will not only laugh off the sustained attack of any amount of blanket weed, etc, but will even spit out the odd small pebble which may happen along. I've just retired my own example after 12 years of impeccable service, its replacement already broken in.

I only purchase the pump head and fit my own third of a HP motor, probably the cheapest method. Mind you, at a cost of £177 for the pump head and two spare impellers, inc VAT, it's not exactly cheap, but what a performer! If anything, it's too efficient, as the amount of water it shifts is just ridiculous, requiring frequent pauses to allow topping up. The beauty of this pump is its simplicity: just stick the pipe in the pool and switch on and you're away! If you want trouble-free vacuuming, then this Swedish machine is the answer.

The picture shows the beast and further details can be obtained from: **Pumping Services (UK) Ltd, Whitehouse Street, Hunslet, Leeds LS10 1AD. Tel: 0532 446111.**

The full name of the pump is, The Johnson Pump AB model number F7B-8.

JOHN CUVELIER

For me, the Johnson 'self-priming' pump is the ideal solution to vacuuming my ponds.

BARLEY CONTROL TEST

You may recall that earlier in the year I mentioned an experiment using barley straw as a method of controlling green water. Well, I can only report that it seems to work.

Both pools have remained completely clear, the strange thing being that even after several months of total immersion, the straw still shows no sign of rotting.

I would be interested in hearing any comments from others who tried this method.

ANTI-HERON NYLON

I've just spent an interesting couple of hours stringing nylon fishing line over and around my pools in a further attempt to defeat our visiting herons.

I feel that this method must be more attractive than covering the whole things with netting which, let's face it, did not appear to deter the birds very much anyway, judging from the holes which kept appearing. Some 8-foot (2.4m) canes were just pushed into the ground and the 15lb (6.8kg) breaking strain nylon simply tied to them.

My memory being somewhat unreliable, I've also hung strands of red PVC insulation tape here and there which should, hopefully, prevent me garrotting myself!

Anyway, that would appear to be it for 1991, so I'll sign off with all my good wishes for a Happy Christmas and a prosperous New Year to you all and, stay lucky with your Koi keeping!

What's your opinion?

Billy Whiteside, BA, ACP

REMEDY PROBLEMS

Alan Ketch lives at 30 Tideswell Road, Great Barr, Birmingham. He writes: "I read with interest your column in the August issue — **Algal Remedy Scare.** I could write your column almost word for word in this letter. I added the appropriate number of drops — and immediately my fish were in trouble.

"However, in my case the treatment was a *snail killer* that clearly stated: 'Will not harm fish or plants'. The results that followed were, I think, far more serious than your experiences. Within minutes my fishes were dying. Loaches were the first victims, followed by White Clouds and Cherry Barbs. Some of the larger fishes — Gouramis — did survive and are still alive now; but they did develop body ulcers, and very severe fin damage — split and frayed, and in some cases dropping off completely. Plants turned black and eventually died.

"Ironically, the snails survived. I wrote to the manufacturers. They asked for a sample of the solution — but as yet, no reply. I've written to you as you said in your column, drop me a line if you've had a similar experience."

Kelvin Hughes resides at 7 Boyne Drive, Kettlethorpe, Wakefield, and his letter says: "On reading your article in the August issue of *AGP* I used (a common) brand (of algicide) and today I am suffering the same effects as you describe in your item **Algal Remedy Scare.** I have already lost two fish and am hoping not to lose any more as I have a lot of money invested in my fish and, being unemployed, could not afford to replace them. Could you let me know how you sorted out this problem?"

The next letter was written by **Richard Hurst**, of 6 Alpine Road, Hove, Sussex. "Regarding your experiences with algal remedy: I am an experienced aquarist and pondkeeper and, every year, I get green water in my pond at the beginning of the season. I usually treat this very successfully with Wardley's Algicide Tablets.

This year I could not obtain the tablets and bought a 'safe' powdered remedy. I read the instructions and followed them with regard to dosage. To my horror, within two days, all my pond fish were gasping at the surface. I quickly installed a second pump to help with oxygen levels. This saved my Goldfish, but, alas, I lost all my Koi — some six years old — and it destroyed all my plants, including lilies, over a period of three weeks."

The above letters speak for themselves. I have not written to the manufacturer of the product I used, but perhaps I should write and ask for an explanation. I shall certainly not buy any other products manufactured by the company in question! On numbers of occasions in the past I have used the Wardley's tablets mentioned by Richard Hurst and I have never had cause to complain that I can remember. Any other readers with information to impart about 'safe' cures? If so, please drop me a line.

DISCUS IN ABSENCIA

"I have been keeping fish for approximately 2½ years. I started with a 36in (90cm) community tank which now belongs to my mum. I then started reading *AGP* and soon saw the fish I wanted to keep — a Discus. I fell in love with it the moment I saw it. Since then I have become the proud owner of 13 Discus. A beautiful Red and Turquoise is the favourite of the clan. It was one of the first bought.

"Anyhow, as you can see from the address, I'm in prison and have been for the last 2½ months. I would like to say thank you to **Kev** and **Debbie** at **Lynchford Aquatics**, in North Camp, because when I started my sentence, they went round to my parents' house and removed all my Discus and my marine fish and coral and are now looking after them for me. I'm due for release in October so, all being well, I will have been able to see my beloved Discus once more by the time you print this letter. I've also been informed that a Discus I bought as a Red has changed to Cobalt. It's a shame I missed it."

I'll omit the writer's name and just refer to him as **No. 103,** H.M.P. Northeye, Bexhill-on-Sea, East Sussex. I've received letters from prisoners in the past. If I recall correctly, one had a number of tanks running in prison and bred *Tilapia*. No. 103 sent me a nice photograph showing five of his lovely Discus. Hopefully he'll be back with them by the time this appears in print.

POND/SCOTTISH ADVERTISERS COMPLAINT

J. E. Russell wrote to me from Drumwalls, Gatehouse of Fleet, Kirkcudbrightshire. As an Ulsterman, I know how to pronounce the name of that particular county — mainly because I'm an avid fan of the Scottish Terrier and I obtained one from an old couple who bred them on a farm in Kirkcudbrightshire over a decade ago. If one pronounced it as Kerr-coubri-shire it would probably be acceptable and understood. Incidentally, while in San Diego last month, I was surprised and pleased to note different people out walking Scottish Terriers on two occasions. The Scottie obviously has fans in the Wild West.

Mr Russell writes: "I have been taking your magazine for the last few months and frankly am most disappointed with it. Firstly, there is nothing in it about pondkeeping; and secondly, because it is totally English, with not a single advertiser in Scotland! Very occasionally we shop in Edinburgh or Glasgow — never anywhere near your advertisers.

"I have a garden pond of about 1200 gallons, stocked originally with oxygenators, two lilies and numerous snails, and a year later by Goldfish. The Goldfish have thrived: the original dozen must now be nearer a hundred. But this year half of the oxygenators have died and most of the snails. My wife, who has a keen sense of smell, says that the pond smells.

"The pond was stocked with a view to a balanced environment: no interest in optically-clear water which seems to be the sole interest of your magazine. There is a small island filter, about 24in × 36in × 18in deep (60×90×45cm), filled with gravel, from which a pump jets two jets of water about 8ft to form a Spanish-style fountain which hopefully aerates the water, acts as a biological filter, etc., but of course can only be run when the wind is not too strong."

I was sorry to hear of Mr Russell's disappointment with *AGP*. I've been a regular reader and contributor in the 1940s, 50s, 60s, 70s, 80s and 90s and have never found it disappointing. In response to the remark about there being nothing in it about pondkeeping, I got a comment from Editor, **John Dawes.** "What about our **Pond/Watergarden Supplements** and other *regular* features on the subject? Has Mr Russell really read *AGP* ? It's nonsense to say that optically-clear water is the sole interest of the magazine and, of course, we don't control where our advertisers come from!"

Try another copy or two, Mr Russell, and I'm sure you'll appreciate the good coverage of a wide range of topics in each issue. Although there are seldom any advertisers from N. Ireland in the magazine, I don't mind because I already know the aquarium shops in Belfast.

ROASTING LETTERS

When replies to topics in **W.Y.O.?** are addressed to our Editor, **John Dawes,** and not to me, I can be sure I'm in for a bit of a roasting — from the letter-writers, that is. I live in the North of Ireland where certain aspects of life, law and geography differ from those in England. Emotive words used in Northern Ireland tend to include references to religion and politics. I have always con-

sidered the word "countryside" to be a fairly neutral word; hence, I felt rather like Paddy the Irishman when I read the response from two English readers after they read a piece I wrote in the August issue about a youngster collecting a couple of plants from a bog.

A fax message headed Interpet Ltd. was sent by **Mike Clarke**, of 78 Lillibrooke Crescent, Woodlands Park, Maidenhead, Berks, to our Editor. Some of the emotive words that Mike Clarke used in his fax castigating me included: *dismay, most irresponsible, admission, disgusted, contravention, crass irresponsibility, fined, rob, irresponsibility, illegally, prosecution* and *admission*.

These are the sorts of words the tabloids use to report robberies, murders and rape; however, Mike Clarke is entitled to select his own language register. Perhaps I should clarify the facts: a youngster was taken to a farm in the Ulster countryside where the farmer permitted him to take a couple of bog plants for his pond. I most certainly did not suggest that readers should rush out and raid local habitats. I cannot speak for England, but in Northern Ireland, gardeners and horticulturalists and aquarists are usually delighted to pass on a few cuttings, plants or seedlings to interested people. I can assure Mike Clarke I am happy to encourage readers to obey the law concerning wild plants, wherever they live.

Jan Walters is a conservation assistant with the Avon Wildlife Trust, The Old Police Station, 32 Jacobs Wells Road, Bristol. She told our Editor that she "was surprised at the content of . . . " my paragraphs. She continued: "This article appears positively to suggest that members of the public should dig up Marsh Marigolds from ponds in the countryside for use in their ponds at home. You may be unaware that it is illegal, under the Wildlife and Countryside Act, intentionally to uproot any wild plant, except on your own land or with the landowner's permission. I would be most grateful if you would clarify the legal situation for your readers at the earliest available opportunity."

If Ms Walters reads my item again, *carefully*, she will see the plants were *not* dug "*from ponds* in the countryside" — and that I most certainly did not suggest, positively or otherwise, that members of the public should dig up Marsh Marigolds. Indeed, I made no mention of *members of the public* — a term I dislike because it tends to suggest a *them and us* attitude.

When I read articles in *A&P* about authors setting off to foreign parts to collect specimens of fishes and plants, or how about to keep tropical marine fishes and corals in a home aquarium, I certainly do not feel that the author is encouraging me to rush off to some countryside in a foreign country to raid its remote rivers or warm seas. I should imagine my readers are no more gullible than I am.

Having made those points I am happy once again to encourage readers to abide by the law. I should certainly like to apologise to anyone who was upset by my use of the word "countryside". Its various nuances of meaning obviously differ across the UK.

'ROASTING' POSTCRIPT

Since posting my column to the Editor I've managed to obtain copies of booklets about how the law affects wildlife in Northern Ireland, hence I'm hoping to add this bit as a postscript. The Wildlife (NI) Order seems to be similar to the Act mentioned by **Jan Walters**.

What I've read appears to say that all plants and animals are protected. There's a list of over 55 specially protected wild plants, eg, Cowslips, Orchids and *Eleocharis parvula* — a Sedge/Hairgrass. These may not be picked, removed, uprooted or destroyed without licence. It's an offence to sell these plants or their seeds if taken from the wild. It's also an offence to plant or cause to grow in the wild certain species of plants not native to the area.

It's also an offence to uproot a wild plant *except* on your own land *or* with permission. Without a licence, it is an offence to kill, take, possess or sell a specially protected wild animal; damage, destroy or obstruct access to areas used by such animals for shelter, protection or breeding; sell any such animal or any other native amphibian or reptile or anything derived from it; kill or capture certain mammals, eg, Badgers, Pine Martens, Seals and Hedgehogs or employ certain cruel methods of killing or capturing any wild animal.

The NI list of specially protected wild animals includes seven types of Butterfly and the Common Lizard. It's also an offence to *photograph* a protected species without a licence! (I've *never* seen a 'Common' Lizard in NI).

Birds, being animals, are specifically protected, but about 11 species in NI are listed as 'Pest' species of wild birds. A licence must be obtained to photograph a specially protected bird while it is on or near its nest.

These details apply specifically to Northern Ireland. I suggest all readers endeavour to obtain a copy of a booklet outlining the law as it affects wildlife in their own area/country. It would be sensible not to touch any wild plant or animal without checking the law and also checking with the owner of the land — unless, of course, you are the owner of the land. The law obviously permits you to cut the daisies in your lawn and to weed your flowerbeds!

I presume that licences such as firearms certificates and fishing licences, permit their holders to catch and kill certain species of animals — including certain birds and fishes — at particular times of the year. I wonder if those who pick, dry and sell bags of Dulse — a type of edible seaweed exposed when the tide goes out — are committing an offence.

Anyway, thanks to **Jan Walters** and **Mike Clarke,** I'm now more aware of the law. Other readers could enquire at a local library for information specific to their home area.

SPARE PLANTS

When I have a few aquatic plants to spare I like to give them to other aquarists — especially young aquarists on limited pocket-money.

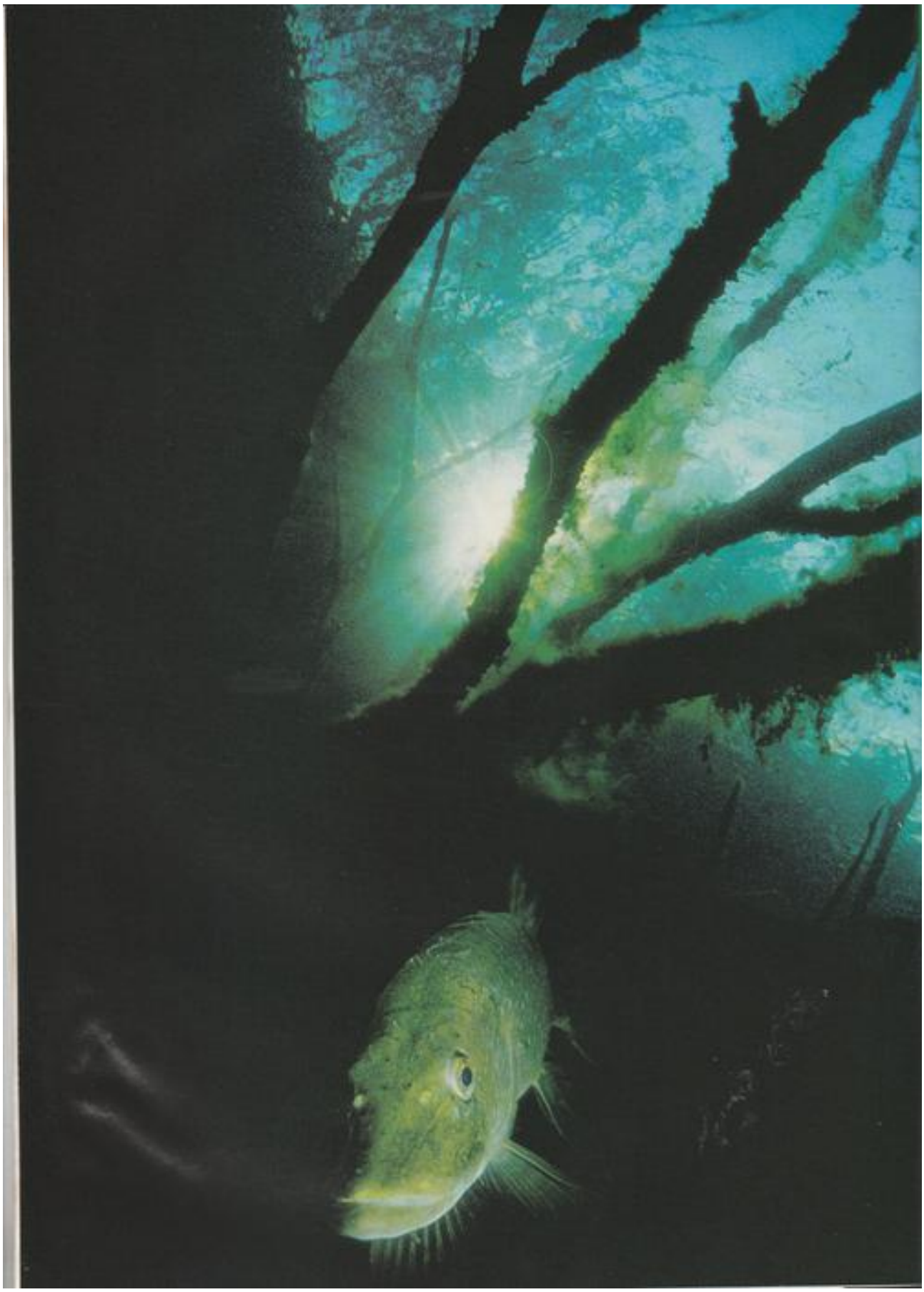
I'll close with the opening sentence of a letter from **Alan O'Brien** (not a young aquarist on a limited budget), of 86 Blumfield Crescent, Slough, Berks. He says: "I write in the first instance to say many thanks for the plants you sent me. It was a very nice surprise, and very kind of you. They were duly installed without delay and I will let you know how they get on . . . " Alan goes on to tell of his problems with commercial algae killers — but that'll have to wait for another time.

FUTURE TOPICS

For a future feature please send me your opinions on (a) air pumps; (b) cultivating *Cryptocoryne* species; (c) keeping fishes at temperatures outside the range recommended for them in books; (d) cultivating Waterlilies (see my photograph); (e) fish foods; and (f) breeding barbs.

Please write to me c/o *Aquarist & Pondkeeper*, 9 Tufton Street, Ashford, Kent TN23 1QN. I look forward to receiving *your* letter. Finally, I would like to wish you all a peaceful and joyful Christmas.

'What's Your Opinion?' . . . regarding Waterlily cultivation? Drop me a line.



Spotlight

THE PIKE
Esox lucius

Underwater photographer **Kevin Cullimore** profiles one of our best-known native freshwater predators

Photograph by the author

The Pike is probably our best known freshwater fish; its elongated body, large head and ferocious-looking jaws make it unmistakable. The large head is pointed and its large mouth is beak-like in appearance. The teeth are large, especially on the sides of the lower jaw, which protrudes over the top one. The teeth are angled back in such a way as to make escape for any prey unlikely.

Prey, which is usually fish, is taken across the body and turned to be swallowed head first. The favoured hunting technique is to hide among weeds or underwater obstructions until a suitable victim comes into range, at which point the Pike will burst into action, moving at about 9 ft (2·75m) per second. Driven by its powerful tail, the attack is over in seconds. If its first lunge fails, the Pike will settle back and await another chance.

FEROCIOUS REPUTATION

The predominant food is other fish, but Pike have been seen to take water mammals, ducklings and, on occasions, full-grown ducks. Even swans have been victims of attack, although I don't know of a case where a swan was actually eaten.

Pike have a reputation for their ferocious attacks, and this is certainly true to a certain extent. Stories often crop up from time to time of a Giant Pike that terrorises dogs at the local pond. These stories tend to be somewhat exaggerated, but the basic story of a Pike attacking a dog is definitely true. There are often cases where swimming dogs have been bitten, but that is as far as it goes. Pike, although capable of attacking large prey, are not equipped with the teeth for tearing flesh, so the stories we hear of dogs being eaten are fiction rather than fact!

Pike are also cannibalistic, and many small Pike end up the victim of a larger Pike. Their capacity for swallowing large prey is well recorded. One large female was found to have a 10lb (4·5Kg) salmon in her stomach which may explain why Pike are culled on trout and salmon rivers. Research done into the average consumption of a Pike records that a 4·5lb (c 2Kg) Pike will consume annually around 47lb (c 21·3Kg) of fish which could make quite a difference to fish stocks.

Pike can grow to enormous proportions given the right conditions and, although the average weight for a full-growth female is around 25-30lb (11·3-13·6Kg), larger fish do definitely exist. The current British record is 47lb (c 21·3Kg), but even this may be considered small if some stories are to be believed. The biggest Pike ever recorded as being caught on rod and line would seem to be a fish of 90lb 8oz (41Kg) caught by John Naughton in 1862 on Lough Derg, Southern Ireland — a truly giant Pike.

SPAWNING

Pike spawn around April time, depending on the water temperature. The males, which are much smaller than the females, usually no more than 10lb (4·5Kg) move into shallow weedy bays to await the arrival of the females. When the spawn-laden females arrive, they will be followed by one or more males. The females are much larger and sometimes after spawning, small males are attacked and eaten, but this is not common — fortunately for the males!

The female will lay her spawn among the plants and the male will release milt to fertilise the eggs. As soon as the eggs hatch, the fry are carnivorous, feeding on tiny insect larvae for the first few weeks. By the age of 6 months, they are already perfect hunters, feeding on small fish and, although only around 3-4in long (7·5-10cm), they can eat prey 2in (5cm) long.

If the young Pike continues to feed on a regular basis and can avoid becoming part of the food chain for a larger specimen, it should reach the 10lb (4·5Kg) weight in three years.

AQUARIUM CARE

From an aquarist's point of view, Pike are easy to keep. I kept one for 18 months, and it grew from just 2in (5cm) to over a 1ft (30cm) in that time and really was rather interesting to watch. Obviously, Pike have to be kept alone, as any other occupants would quickly be devoured. A word of warning, when clearing out, etc; if Pike haven't been fed for a while, they do tend to regard fingers as food and bite, and although this is not painful, it does make you jump!

I actually caught the small Pike while diving in a gravel pit and at this size, it seemed quite happy to eat worms. As it grew, I began to feed it with small sticklebacks and minnows caught at the local river.

I found that one good feed of, say, 10 small fish per week seemed to keep the Pike in good condition. Pike are sedentary creatures, but feeding time was when my Pike came into its own, striking its prey with lightning speed.

I also fed it with live shrimps and these were very eagerly eaten; 60 would last about two days, after which time, a very fat Pike would just lie on the bottom digesting its mammoth feast for a couple of days.

AGGRESSION

The picture opposite was taken in a gravel pit and is one of hundreds I've taken over the last 10 years while diving. I probably see Pike at their best underwater, where they are fascinating to watch and can be approached if one is quiet and slow.

I have only encountered an aggressive Pike on two occasions, and, in both cases, the fish was in a confined area of a submerged car.

They adopt an aggressive posture if threatened and this involves flaring their gill covers and snapping their jaws. I've seen this used on other Pike at spawning times and, if the warning is ignored, you can expect to be attacked.

I have been butted twice by an aggressive Pike, but fortunately, they were only small ones. I always move back if a large female sends these signals, as a large fish could cause you some injury.

TECHNICAL DETAILS

The camera equipment which I used to take the accompanying photograph was a Pentax LX camera in a perspex housing which I designed and built myself. The flash was a Vivitar — also in a perspex housing.

Editor's Note

Because of their predatory nature, weaning Pike off live fish onto prepared foods can prove difficult. Aquarists should therefore weigh this up very carefully before they decide to keep this beautiful, large fish in captivity. **John Dawes**

Seaview

By Gordon Kay

KEFALONIA TRIP

As I write this in mid-autumn, my wife Tracey and I have just returned from a wonderful two weeks on the Greek island of Kefalonia. We spent some time with the volunteers on the **Care for the Wild Marine Turtle Project** and I shall be telling you all about that in a future issue of *AGP*.

We went parascending (which was absolutely breathtaking!) and took part in other watersports, found time to get suntanned and spent hours snorkelling. I have to say that this last activity was more than a little disappointing. It would appear that the local waters have been over-fished somewhat and that most of the fish eaten on the island are imported from the mainland.

This was more than evident. Apart from a few gorgeous wrasses and a larger grouper, all that we saw were shoals of silversides. Sadly, most of the sites we snorkelled over were also almost devoid of any invertebrate life — although Tracey did see an octopus one day.

Another disappointment was the lack of dolphin sightings. Dolphins are reputed to be quite common around Kefalonia — especially around the northern coastline — but, despite taking several boat trips in an attempt to spot them, we didn't encounter a single one.

However, one of the many highspots of our stay was a day-long 'Marine Odyssey' which was run by a set-up called *Ionian Natural History Tours*. The organisers of this enterprise are **James Sutherland** — a marine biologist, who started the aforementioned Turtle Project — and **Russell Parkes**, who has worked for the Sea Mammal Research Unit and WWF with Monk Seals. The venture was started in order to show the locals that conservation and tourism can co-exist happily with no detriment to either side — and it seems to be working!

Anyway, the Marine Odyssey is a coastal exploration which introduces the tourist to the marine life in the area, with James and Russell giving small informal talks, and there is the opportunity to see the animals in their natural environment. In spite of the fact that we saw no dolphins (and precious few invertebrates), this was a terrific day and I would recommend anyone planning a holiday on the island to take a day out and go on the Marine Odyssey. You won't regret it!

GORDON KAY

Russell Parkes of Kefalonia's Ionian National History Tours demonstrates a turtle skull washed up on the shore during one of his informal 'lectures'.

GIFT IDEAS

Now, have you realised what month it is? Is it really a year since I wrote last December's **Seaview?**

Anyway, if you're looking for a present for a fishkeeper, then look out for two new powerheads in the **Aquarium Systems** Visi-Jet range. The new Visi-Jet 300 and 400 have increased flow rates of 300 and 370 gallons respectively, making them two of the most powerful pumps of their kind on the market. Each has a flat surface discharge at the top for aeration.

They also have a built-in flowmeter to facilitate accurate monitoring of the amount of water each is shifting, plus a flow adjustment stem so that you can direct the outflow from the pump anywhere you choose. And, what's more, they are the latest in a long line of superb products from Aquarium Systems — the makers of Instant Ocean. All of the Aquarium Systems range of products is distributed in Britain by **Underworld Products.**

Another gift that you could buy for your favourite marine aquarist is a year's subscription to the newly-named **International Marine Aquarist Association** — formerly called the British Marine Aquarists Association. The first issue of their new magazine — called *Marine Aquarium International* — was out recently and very promising it was, too.

IMAA's policy for the future is to commission articles from well known authors, making the contents far more interesting and authoritative. For example, there were articles in the first issue by **Dr Chris Andrews** (Baltimore Aquarium), **Richard Sankey** (Tropical Marine Centre), **Albert Thiel** (Thiel Aquatech) and our very own **Andy Horton**. There was even an article by a bloke called Gordon Kay, but we'll say no more about that one(!).

IMAA membership really is worthwhile, and to buy a year's membership will set you back £15.00. When you consider the price of the last fish you bought — that's peanuts!

Maybe he or she likes books. Two worth looking out for are the *Marine Aquarist Manual, Comprehensive Edition* by Dr P. V. Loiselle and Hans A. Baensch (**Tetra Press**) and *Jacques Cousteau's Book of Whales*. The first, I reviewed in *AGP* earlier this year, so I would refer you to that.

The Cousteau book seems to be making an appearance in those shops which sell cheap books (you know the ones I mean) and so you'll have to hunt a little for it. However, your search will be well worth it, for this is a gem of a work. It is a large-format book, with loads of wonderful photos, and all for around a tenner!

'REFLECTIVE' DOLPHIN PROTECTORS

My present? Well I've already had one of mine. It was a television news item which told of the **Operation Dolphin Alert** initiative to fit cat's eyes-type sonar reflectors to drift nets, which are used to catch tuna.

One million dolphins every year fall prey to drift nets and it is hoped that the reflectors will go some way towards redressing the balance. Experimental setups suggest that they will, which is wonderful news. The sponsors of the project are the Co-op — let's hope it pays dividends(!).

FREDDY INJURED

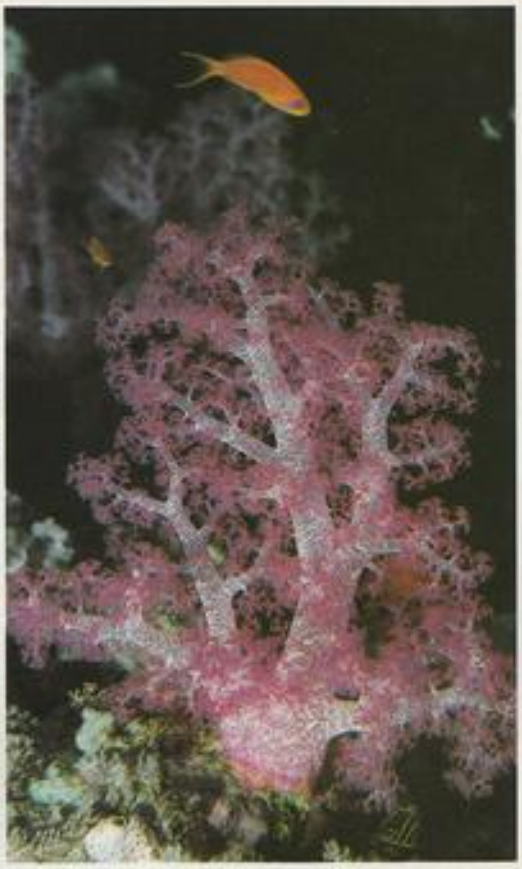
On a sadder note, the final days of September brought the news that Freddy (the dolphin who lives in the waters around Amble, in Northumberland) had been in a fight with a propellor and lost.

He is (or rather, was) in a bad way, with some very bad wounds, and so it is hoped and prayed that he will pull through. There is a Dutch vet with him all the time so, at least, he is in the best possible hands. Of course, if there is any news of Freddy, then I shall report it on this page.

Meanwhile, I wish you all a very Happy Christmas and a successful and peaceful New Year.

THE SECRET LIFE OF

After release and fertilisation, coral eggs (seen here as numerous tiny yellow spheres) settle on the reef to begin the colonisation process.



Far left, a mixed coral community in the Sudan Red Sea.

Top centre, soft corals are not as defenceless as they may seen. In this Egyptian Red Sea *Dendronephthya*, the white spiky sclerites used in defence are clearly visible.

Bottom centre, this Sudan Red Sea Staghorn Coral, *Acropora* sp, has some pink ripening eggs protruding from its polyps.

Above left, the Mushroom Coral, *Fungia fungites*, (this specimen was photographed in the Andaran Sea off Thailand) is a stony coral that consists of a single large polyp.

Above right, soft corals (this is *Dendronephthya* – one of the Tree Corals – photographed in the Sudan Red Sea) do not have the calcareous skeletons of their stony cousins.

CORALS *Part 1*

Jack Jackson reveals some of the most intimate details of how corals live and breed.
Photographs by the author

Corals, along with jellyfish and sea anemones, belong to the phylum Coelenterata or Cnidaria: animals with stinging cells called nematocysts for catching prey, and a simple body in which one opening is used for passing materials both into and out of the body.

BASIC STRUCTURE

A single coral animal, the polyp, has one or more rings of tentacles, which are usually retractable, surrounding a mouth leading to the main body cavity. The tentacles carry the nematocysts.

Stony corals, (true corals), have a calcium carbonate (limestone) skeleton and their polyps have smooth tentacles arranged in rings of six or multiples of six. They are therefore known as hexacorals.

Soft corals do not have a solid skeleton and their polyps have feather-like (pinnate) tentacles arranged in rings of eight. They are therefore referred to as octocorals.

Internally the polyp is partitioned by sheets of tissue extending inwards from the cavity wall, the mesenteries, on which the sex cells ripen each year to produce eggs and sperm. The walls of the polyp have three layers, the middle layer being the equivalent of the 'jelly' in jellyfish. Cells within the outer layer produce the skeleton which, in stony corals, forms the septa, and which also extends into the centre of the polyp. The shapes formed by the polyp wall and the septa are unique for each species.

Some species remain solitary but most corals are modular, a single polyp budding to replicate itself repeatedly to produce colonies that can cover several metres. Polyps can be male, female, hermaphroditic or asexual.

BUDDING

A single polyp commences producing a

skeleton when it settles as a larva on the substratum. Budding can occur in different ways. In one method, the circular ring of tentacles around the mouth becomes oval as the polyp divides, with the mouth moving to one end and a second mouth developing at the other. The tentacle ring then constricts between the two mouths and finally parts, leaving two identical polyps, each with their own ring of tentacles.

In some corals, several secondary mouths develop, resulting in several separate polyps. In other corals, incomplete restriction occurs, leaving two adjacent polyps with only partial separation.

Brain corals

In 'brain corals', lines of partially-budded polyps with many mouths appear in an elongated ring of tentacles with no separation between the mouths. This produces long meandering chains of closely connected polyps.

These forms of budding, where extra mouths appear within the original ring of tentacles, are referred to as *intratentacular budding*. A second form of budding, *extratentacular budding*, occurs when a new polyp grows outside the tentacle ring of the parent. This only produces single, completely separate polyps.

Cup and Mushroom corals

Cup and Mushroom corals remain as one large polyp and the corallite that it has constructed. With mushroom corals the dent in the centre is the polyp's mouth. Mushroom corals do not cement themselves to the reef, unless very young, but live as individuals. Young attached polyps grow upwards, but when the polyp gets too big for the stalk, it breaks off and the disk rolls away.

The stalk that remains on the substratum either dies or grows a new disk. Clumps of small unattached mushroom corals may be seen near to the parental stalk. These corals are able to move about by using their tentacles or expanding their body size to lift themselves, or even to right themselves if some disturbance has overturned them.

Branching corals

Branching corals are often broken by bad weather, large animals or man, and spread around. Some of the broken fragments survive and reattach themselves to another substrate to grow into a new colony. Whip corals 'intentionally' restrict small pieces at their tips that then break off in the current and start another colony where they land.

Branching corals of the genus *Acropora* have two different kinds of polyps, though one kind can change into the other. The axial polyps, which form the axis of the branch, grow longer and longer without pulling up and laying down base plates. As they grow, they bud off radial polyps. The axial polyps are cylinders, but the radial polyps have a distinctive wall structure.

SPAWNING

The above methods of reproduction produce polyps that are identical copies of the parent, but all living organisms gain from a mix of genes in sexual reproduction.

For a few nights each year, soon after a full moon in early summer, there is a synchronised mass spawning of many different species of coral, both soft and hard. The eggs begin developing some six months before, but the sperm in the testes need less time to develop.

When the waters warm up in the spring, the eggs become coloured, yellow, orange, pink or red, sometimes blue or green. Mostly, polyps contain both male and female gonads (testes and ovaries) but in some corals, the sexes are separate, every polyp in a colony being male or female.

When the time is right, bundles of about eight eggs with sperm wrapped among them are released. Those of most species float to the surface, where, by chance, they may cross-fertilise with their own kind. Once fertilised, the tiny larvae, now called *planulae*, disperse as part of the plankton, possibly even to another reef. The majority succumb to predators, but the survivors find a substratum in a suitable environment, change into a polyp, begin to secrete a limestone skeleton and then to bud.

In some corals, the eggs are fertilised while still in the polyp and the developing larvae are released over long periods.

SYMBIOTIC RELATIONSHIP

Tropical waters are low in nutrients compared to cold waters; yet they act as home to reef building stony corals, some of whose growth has been measured at more than 30 centimetres (12in) per year.

The reason for this anomaly is a symbiotic relationship between the coral animal and microscopic single-celled algae called *zooxanthellae*. These zooxanthellae, belonging to the single species, *Gymnodinium microadriaticum*, also account for the colours of most stony corals, which have little or no pigment themselves.

At night, or when light levels are low, coral animals extend their tentacles into the current and, with the help of their nematocysts, kill and devour any small plankton animals that brush against them. In most stony corals, the waste products (phosphates, nitrates and carbon dioxide) are then absorbed by the zooxanthellae.

Photosynthesis

During sunlight hours, most stony coral tentacles are retracted into the limestone skeleton (the corallite), and the tissues containing the zooxanthellae are spread out to catch as much sunlight as possible. These algae grow using photosynthesis and their waste products, oxygen and organic nutrients, are, in turn, absorbed by the coral animal.

The photosynthesis process also alters the chemical environment within the coral tissue, causing the precipitation of limestone. This, both increases the rate of skeletal formation, and cements loose debris together, thus increasing the rate of growth of the reef base. The shape of each colony is the result of the way the polyps and connecting tissue of each colony lay down this material. In well lit water, corals with zooxanthellae grow several times faster than those without them.

Some corals also ensnare bacteria and zooplankton in the mucus secreted by the polyps.

Temperature and salinity

Corals prefer water temperatures of 24–29°C (75–84°F), and a salinity of 34–36‰. Reef building corals growing in shallow, well lit water, pile their algae into many layers and often grow into branching colonies which maximises the number of algal cells per unit volume. In deeper water with less light available, they tend to flatten out.

Corals which live without zooxanthellae tend to be found in caves or under roofs.

Some corals can survive in cold water, even in the arctic and antarctic. While they have zooplankton to feed on, they will grow slowly.

(TO BE CONTINUED)

COVER STORY — Green Chromis *(Chromis viridis)*

Photograph: Max Gibbs, The Goldfish Bowl, Oxford

This delightful shoaling species of Damsel appears under various names in aquarium literature, the most common being *Chromis caerulea*, *Chromis caeruleus* and *Chromis viridis*. The confusion is such that, in one instance, the text even refers to *C. viridis*, while the picture is labelled *C. caeruleus*.

Whichever label is attached to the Green Chromis, it remains a great fish for a tropical marine aquarium, where a small shoal will provide a constant dazzling display. However, specimens kept singly will tend to be shy and will often remain either out of sight (except at meal times) or partly hidden.

In the wild, the Green Chromis can attain a length of around 4in (10cm). In aquaria, though, sizes around the 2in (5cm) mark are more usual for this undemanding colourful Damsel.

News

Surprise package for Herons

The Pondguard Fish Protector was developed out of necessity by **Tony Wood**, a water garden centre proprietor with a half acre of landscaped ponds, many filled with expensive fish. Each winter Tony would lose many of these fish to that wily predator — the heron.

Having studied their habits over many years, Tony tried out many different techniques to protect his fish. Initially, he netted the ponds, which distracted from the visual beauty he had created and was not wholly effective, as the heron was still able to poke its beak through the netting and, while not actually eating the fish, was still able to injure them. He noted that only one pond was free from attack and that was the Koi pool, which was 5 feet in depth and too deep, with its vertical walls, for the heron to be able to walk or jump into.

After months of testing and development, Tony settled on a design which gave him consistent and effective results. It is based on three essential ingredients: sudden movement, sharp sound and the ability to combine the audible and visual shocks close to the heron.

The Pondguard Fish Protector is well engineered and durable. Its spring loaded 'wings' are injection moulded in high impact polycarbonate and the support rod is steel plated. It is supplied complete with trip-line and percussion caps.

Tony Woods emphasises that setting up the system is easy . . . "There are no mains or battery-powered electrics . . . so you simply press the Pondguard's support rod into the ground and run the trip-line across the heron's natural approach path. You then secure the line to a cane or stake at one end and to the Pondguard's release clip at the other. Remove the safety pin and your Pondguard is ready for action."

So, if in the early hours of the morning, a heron lands in the garden, cautiously walks towards the pond, and touches the trip-line, the Pondguard snaps open, fires a percussion cap and reveals a pair of menacing eyes. This sudden assault on the senses will cause the heron to depart a shocked, but otherwise undamaged bird. Many of Tony's customers have now had direct experience of this when the Pondguard was recently demonstrated to them. They still jumped back 3 feet even though they knew it was about to be activated!

For further details contact **Tony Woods** at **Pondguard Products Ltd., 132 Tolworth Rise South, Surbiton, Surrey KT5 9NJ. Tel: 081 337 9605; Fax: 081 330 6916.**

OUT AND ABOUT

CICHLIDOPHILES AND ENGLISHMEN GO OUT IN THE FLORIDA SUN

By Mike Sandford
Photographs by the author

It is often the preconceived idea that, if it is larger than life, then it must be of American origin. This year the American Cichlid Association (ACA) held what can only be described as the greatest cichlid event since Mother Nature herself 'invented' cichlids. The event was the International Cichlid Conference II, held in Orlando, Florida, over the period 29 August to 1 September, 1991.

The venue was the Orlando Hyatt Hotel, offering both superb exhibition and lecture facilities, as well as serving for the residence for all those choosing to stay beyond one day. The programme was so varied as to make anything other than an extended stay undesirable.

Florida in summertime is hot (34°C – 94°F) and extremely humid, so any excuse to stay in the comfort of an air conditioned building was appreciated, though one did not need to seek this excuse for this international gathering of fish enthusiasts. This was an event that encompassed cichlid show, auction, trade show, and an unparalleled panel of international speakers, as well as organised visits to various local attractions and fish farms. 'Cichlidophiles', as cichlid enthusiasts tend to be known, flocked in their hundreds to this event, not only from the States, but also from Netherlands, Germany, Kenya, and — from Britain — represented by some members of the British Cichlid Association.

Many of the hundreds of entries in the show were open to auction on the last day of the conference. Unlike shows in the UK where relatively small distances of travel allow for ease of shipping tanks as well as fish, many contestants flew to Orlando with just the fish to be displayed, the tanks having been set up in advance by the organisers. Tanks were filled with dechlorinated water at a temperature of 25°C (77°F), and pH 7.5. All tanks were provided with air supply and sponge filters. I counted at least 400 entries in early stages of benching the fish, and, at that time, there was still a shortfall in available tanks of around one hundred!

The Hyatt Hotel, Orlando, venue for the 2nd International Cichlid Conference, boasted superb facilities for this event.

The trade show was staged in an adjacent hall, most of the exhibitors being sponsors for the entire show and conference, and without whose generous contribution such an event would be difficult to stage.

The fully packed programme left no time for late risers; first lectures started at 8.30am; half an hour earlier on the first lecture day! You may have entered the lecture hall with eyes resembling the cichlid hole-in-the-head disease, but you were soon jolted into the reality of the wide-awake world.

The speakers were as international as their audience, and with more than 24 lectures over a 4-day period, the choice was tremendous. Top line speakers included **Paul Loiselle**, Assistant Curator of the New York Aquarium and author of many fine books on cichlids. His subject was strangely titled *If cichlids are so good, why aren't there more of them?* Cichlid evolution was dealt with great skill by **Dr. Irv Kornfield**. African Rift Lake cichlids were covered by such eminent authorities as **Thierry Brichard** from Burundi and **René Krüter** from the Netherlands (Tanganyika cichlids), **Tijs Goldschmidt**, the Netherlands (Lake Victoria cichlids), **Laif DeMaison**, USA (new cichlids from Lake Malawi), with American cichlids covered by **Dr. Don Taphorn** from Venezuela and **William Heijns** from the Netherlands.

It was also interesting to note the high number of European cichlid authorities in attendance, such as **Stuart Grant**, whose illustrated talk provided a great insight into his fish collecting and farming operations on the shores of Lake Malawi.

Lectures were not limited to just cichlid topics, though. Disease prevention, nutrition, filtration, and aquarium hobby regulatory concerns completed the diet of morning lectures. Yes — morning lectures. These were completed by 1.00 pm each day to allow a quick bite of lunch, then boarding a coach for the afternoon excursion.

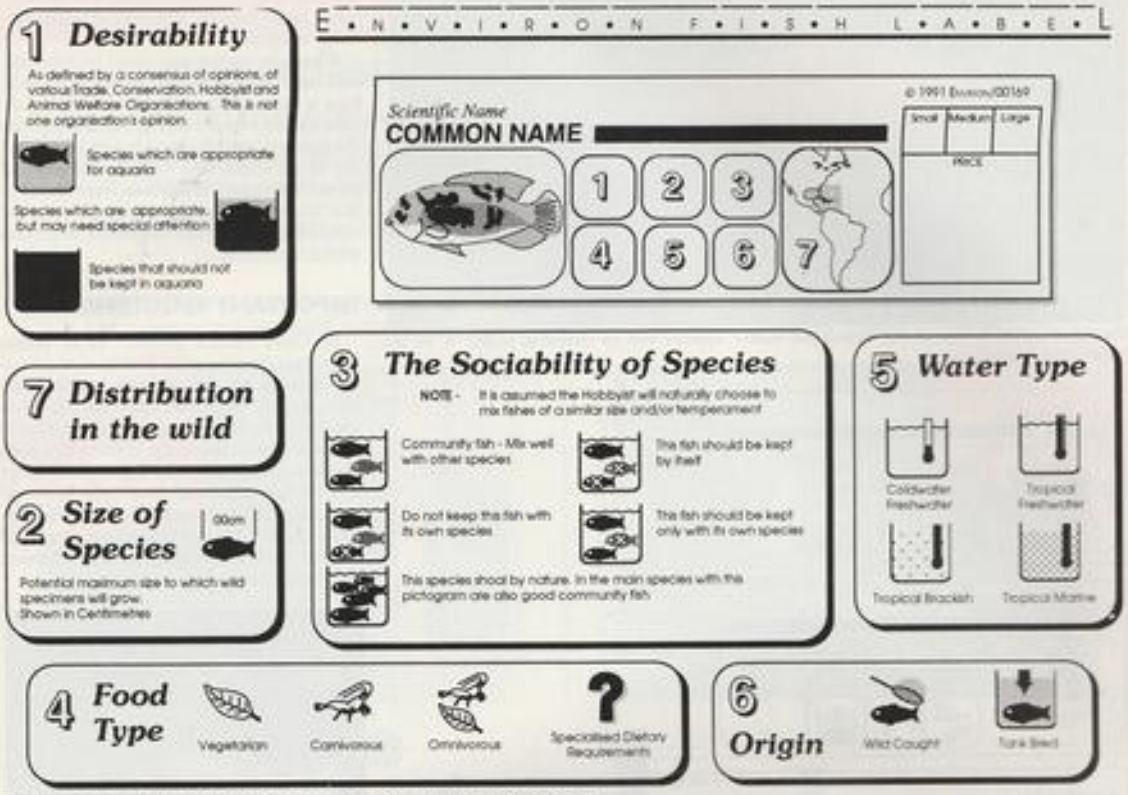
The audience for the major speakers was around 400 to 500 strong. Some feat for first thing in the morning! Further special interest groups met in the evening to continue discussion on a number of topics.

Friday evening was set aside as an evening with the famous German collector and explorer, **Heiko Bleher**. His subject was centred on what he aptly described as the *Dream Lake*, a lake virtually unknown, except from ancient descriptions, located in Zaire, Central Africa. The lake, as shown in his slides, was of unbelievable clarity, supporting a number of undescribed endemic cichlids. Heiko had only just made the lecture in time, having contracted malaria a fortnight earlier while visiting the dream lake of his talk, and had barely recouped his health.

One could not fail to be impressed by the American Cichlid Association's organisation, with lectures running to time, maintaining the tight schedule of events throughout the day. All sales, auction and show entries, as well as registration were controlled using a computer (or rather four computers).

The nature and variety of this event was value to anyone who has a deep interest in the fish, whether or not an ardent cichlid enthusiast. Will I be going next time? I hope so. My purse is open to contributions, though I daresay I'll be there!

There were few furnished tanks on display — some featured Malawi cichlids.



The key and explanatory notes for Environ's pictogram labelling scheme.

Pictogram Labelling

A&P editor **John Dawes** reports on a revolutionary approach which is designed to help everyone involved in aquatics . . . *and* provide a route of communication between the trade and the conservation movement.

The idea seemed, at best, challenging (not to say daunting). It was certainly exciting. I first learned about it from its originators, **Colin Grist** and **Nigel Cruickshank**, exactly one year ago, at the Supreme Weekend of Fishkeeping held last November in Weston-super-Mare.

The basic idea was to produce a new fish labelling system for use in shops. Simple enough, you might think . . . except that each label would provide details of the distribution of the depicted species in the wild, its temperature requirements, its sociability, its maximum size, its origin (whether wild-caught or captive-bred), its diet, its price and, most importantly, its desirability. All this on a single label?

Unflustered by the magnitude of the challenge involved in listing over 4,000 species of freshwater and marine fish, Colin and Nigel set to with a determination that defied description. The fact that they've actually succeeded, after a year's efforts, to produce the system, and are now ready to launch it, says a lot, not only for their tenacity, but also for the positive reception that the trade, hobby and conservation bodies have all given the project.

THE SYSTEM

The **Environ Fish Labelling System** (as it is known) has three key elements.

① Firstly, the system offers professional Point-of-Sale tickets or labels. By showing price, identification illustrations and a series of simple-to-understand pictograms depicting husbandry requirements (explained in the accompanying diagrams), these are designed to work hard for the retailer by allowing hobbyists to select those fishes most suitable for their home aquarium easily, without taking up the retailer's time asking those all-too-familiar basic questions.

The most valuable of the pictogram categories is, in my opinion, **Desirability**, the ratings for which are arrived at by consensus of opinion from a balanced selection of aquarium trade/hobby, conservation and animal welfare organisations and individuals.

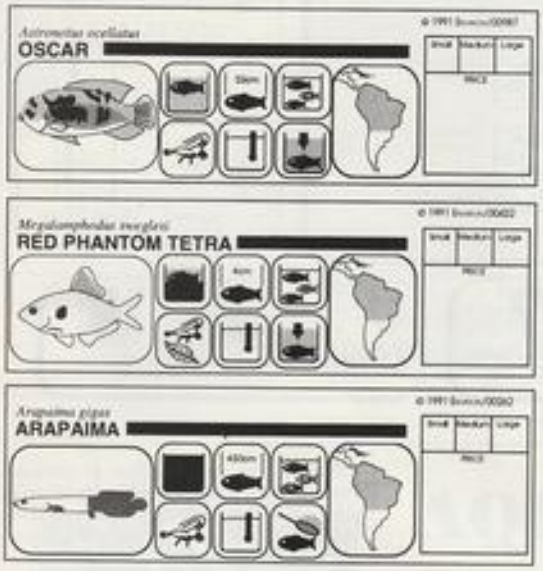
② The second element is a loose-leaf book in which around 4,000 currently available aquarium species are included. Information in the book is, quite understandably, more comprehensive than on the labels themselves, and will include important details on the very few species that are recognised as unsuitable for aquaria (at least, at this stage in the hobby's development).

The book will be available as a complete volume, in sections, or as just single pages. There will also be regular updates as new information is received.

③ The final element in the system is a computer database that will allow retailers and hobbyists to produce factsheets covering species that command particular interest.

HARRY GRIER/FLORIDA TROPICAL FISH FARMS ASSOCIATION

Swordtails, Platies and all the 'bread-and-butter' species will be classified under 'A' on the 'Desirability' criterion.



Three typical species labels.

DESIRABILITY EXPLAINED

The **Desirability** category shows that, in the main, the most popular species — those which are imported in the largest numbers, and are generally farm-bred — fall into the 'A' rating, this being the most acceptable.

However, there's also a large number of species imported in lower quantities where, although many may still be acceptable, questions need to be asked before purchasing. It may be that a given species can grow too large for the average home aquarium, or that special water conditions need attending to . . . or whatever. These will be rated as 'B'.

Then there are others, and it must be stressed there are very few indeed, that are rated 'C' and should not, in the opinion of those consulted, be in trade. The reasons could be that their husbandry is generally recognised as impossible at this time, or that they are entered in the *IUCN Red Book Of Endangered Animals*. Whatever the reason, the 'consensus', consisting of the opinions of individuals, trade members, hobbyists, conservationists and animal welfare specialists, decides. No single person or organisation can do this.

Colin Grist and Nigel Cruickshank have attempted to produce a system that positively helps to narrow the divide between the trade/hobby and the environmentalists. As the ratings for Desirability are a true consensus, that is, they will never be derived from the opinions of only one organisation, the radical ill-informed view will be eliminated, and hobbyists should be able safely to select fishes from the best educated opinion currently available.

What is more, the originators believe that, with this scheme, environmentalists will have a useful tool with which to pass on information to the hobby. It will also provide the industry with the opportunity of displaying to all concerned — from the seats of power in Brussels, to our own front rooms — that it (the trade) concurs with all 'sensible' opinion regarding the suitability of species within the hobby.

LAURENCE E. PERKINS

Under the initially proposed categorisation, *Apistogramma agassizi* would provisionally be placed under 'B' in terms of 'Desirability'.

IMPORTANT REQUIREMENTS

In Colin Grist's words: "It is vitally important that the need to ban, or 'negative list' through legislation, never comes about. It is equally important that the hobby is allowed to further its research into fishkeeping and captive breeding. If there had been the same radical attitudes ten to twenty years ago, there would be far fewer species available today. However, many of those 'impossible' species of yester-year are now regarded easy as more knowledge has been gleaned. This trend must continue.

S.JAMES NHOF

A definite 'C' category fish — *Arapaima gigas*.

"Fishkeepers, by their very nature, are lovers of wildlife, and as such, can offer much, through their practical expertise, to the conservationists. We see the **Environ** system as a useful vehicle for this purpose."

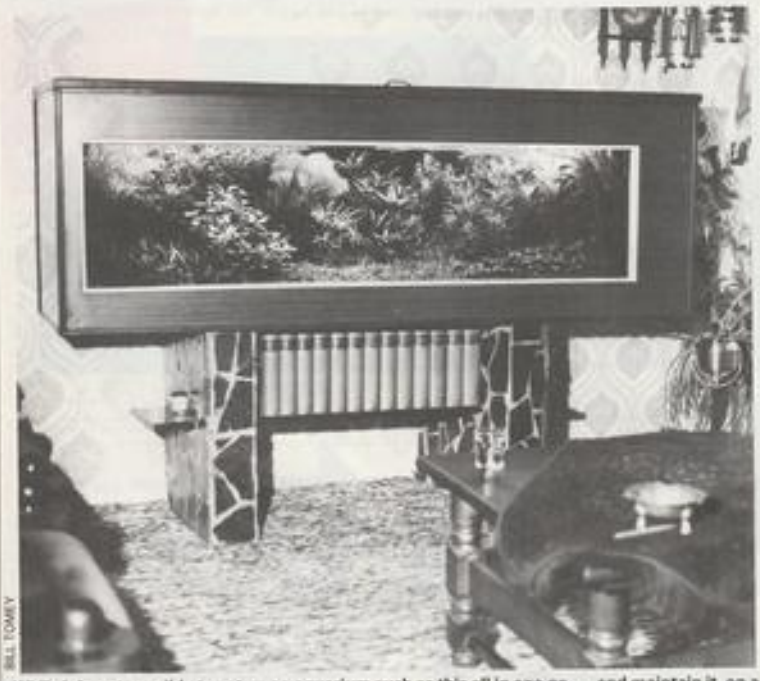
The system is currently being launched within the UK, and its use will, hopefully, help to show anybody willing to legislate against the aquatic industry that the trade is prepared to improve its image and attitude even further than it has already done.

Environ Fish Labelling is a commercial venture, to ensure that its development is self-financing and, therefore, self-perpetuating. However, it is believed by its originators that its advantages to the trade and hobby are numerous, not only for the fact that the products are useful in their own right, but also because information is at last being freely issued between the fishkeeping fraternity and the conservation organisations . . . and all towards the same aim: conserving living organisms.

For further information, contact **Colin Grist** and **Nigel Cruickshank, Environ, 3 Jubilee Terrace, Paulton, Avon BS18 5NU. Tel: 0761 415153; Fax: 0761 413347.**

CONFESSIONS OF A CHEAPSKATE AQUARIST

Faced with the real possibility of having to give up aquarium keeping through lack of funds, **Phil Taylor** decided to take a look at ways of cutting down expenses. As a result, he's still in the hobby. . . and enjoying being so.



BILL TOMEY

While it is not possible to set up an aquarium such as this all in one go. . . and maintain it, on a low budget, it is still possible to have effective, attractive set-ups at a modest price.

The modern aquarium is an Aladdin's cave of high-tech equipment, de luxe hardwood cabinets to blend in with the most elegant drawing room, and beautiful fishes imported from every part of the world. There are times when the sight of all these goodies can be discouraging to the aquarist with a tight budget.

Having just spent a year as a student without a grant, and several months of intermittent employment, I have been faced with the choice of either curtailing my hobby, or finding ways of trimming my expenditure to the lowest possible level. As there must be plenty of others in the same circumstances, I would like to pass on a few ideas for saving money which I hope will be useful and may help those who feel they are having to give up the hobby, to remain within it, albeit at a more modest level than they would ideally like.

The first and most important piece of advice is to join your local aquarium society. The few pounds it will cost you for 'subs' will be well spent, as you will soon build up a circle of fellow enthusiasts (or fanatics as we must appear to those outside the hobby). Aquarists are never satisfied, and we are constantly looking to sell, or swap or give away fish, plants and other items which are surplus to requirements. If you breed fishes, you will also find an outlet for your fry which is much more satisfactory than taking them to a dealer who may not really want them and is unlikely to offer very much in exchange.

After that, you should operate on the principle that nothing should be thrown away — almost anything can be fixed, or cannibalised, or used for some other purpose. Now let's take the aquarists' usual items of expenditure one by one.

TANKS

These are, in real terms, cheaper than they have ever been. If you enjoy DIY, you can make your own aquaria, but if you have to pay retail prices for glass and sealant I am sorry to have to tell you that the price of materials may well be as much as you pay for the finished article in the shops, especially if you look for bargains in the aquarium press. Tank-makers can use off-cuts from the glass industry for which they pay low prices — something that helps them stay in business.

What you can do, if you feel you can't afford a new tank, is buy second-hand. Look through your local papers and newsagents' windows, and you will soon find someone "selling up". Be warned — you will probably get stuck with fish and items of equipment that you don't really want by buying this way. Be also prepared to talk the price gently down — the inexperienced are often under the impression that they can get back what they paid for their set-up.

HOODS

These are always expensive, but, at a pinch, you can do without them by covering your light tube with a length of fluorescent light diffuser (often found on skips, especially those associated with office buildings). However, this is always second-best.

LIGHTING

Another warning here — second hand 'aquarium' tubes are almost useless, having lost most of their output in the first 6 to 9 months of use. One idea is to use industrial tubes, the kind which have their own starter built into the assembly. These have no re-sale value and are often thrown away by decorators etc.

As I write, I can see a magnificent Amazon Sword taking up almost half of a four-foot (120 cm) tank and a large clump of *Cryptocoryne* in one corner. This tank is lit by a 4 ft (120 cm) 40 watt industrial white tube.

Years ago I was often told that white lighting made livebearers sterile. All I can say is that I have not observed this effect yet. You can use ordinary light-bulbs of course, and the results in terms of plant growth are often good, but running costs are high and the heating effect is not always welcome.

HEATING

Don't cut corners with heater-stats — the consequences of a failure are too dire. You can minimise heat loss by tightly covering your tanks and by sticking polystyrene on the backs and sides, but I must admit that I don't bother.

Space heating of a room or shed by means

of fan heaters etc is cheap in terms of initial outlay, but not in terms of running costs. It makes more sense to heat the water directly rather than the air around it.

PUMPS

It makes much more sense to use fewer, large pumps, than more, little ones. The big fish shows, like Sandown and Doncaster, are good places to pick up cheap pumps.

Don't re-use ancient air line — it becomes very stiff and is a false economy.

FILTERS

It's quite possible to make your own undergravels from corrugated plastic and plumbers' pipe . . . if you can be bothered.

Power heads and undergravels are more efficient than using the same power heads as part of internal power filters, although harder to clean.

FILTER MATERIALS

Old sponges and old filter wool can be cleaned and re-used. Ly-tag is a good filter material for your power filters, but the cheapest, and one of the best (in my opinion) is gravel!

If you don't believe me, try running one box filter full of wool and one full of gravel for a month and see which traps the most dirt. It works better biologically too — its only disadvantage is the hassle of cleaning it out.

SUBSTRATE

Never throw gravel away. Even if it has become black and anaerobic, it can be rescued. Put it outdoors and soak it in a dilute solution of household bleach (the runny stuff — not the thick stuff). It will regain its original colour through the bleach's oxidising effect. Then rinse it many times with cold tapwater and, finally, allow it to dry. If it no longer smells either of bleach or sulphur, it is safe to re-use after a final rinse.

The so-called 'honey sand' is, in fact, swimming pool filter sand, which can be obtained in large sacks from swimming pool equipment shops. A club could usefully buy a couple of sacks and divide up the contents.

ROCKS

The cheapskate usually uses house bricks (new only), roof slates and lengths of plumbers' piping.

WATER CONDITIONER

Dechlorinators are based on sodium thiosulphate which is photographer's 'hypo'. I haven't tried using this, but it's cheap.

In fact, I buy pond dechlorinators which are cheaper and appear to be more concentrated, although they don't contain 'aloe vera' or whatever that slimy stuff is which is supposed to coat fish's gills.

FOOD

The cheapskate's stand-by foods are earthworms, frozen vegetables like peas and spinach, and beef heart. I cut up cubes of heart and put it in ice cube trays in the freezer. One food I can't get cheap is *Tubifex*, and this, in fact, is my main outlay.

Goldfish flake food is much cheaper than tropical, and for fishes which are naturally part-vegetarian (this applies to many cichlids) it is worth a try. Don't be misled into thinking that the higher the protein in the food, the better it will be; it doesn't always follow.

BILLY MERTSOK

Inexpensive, robust, easy-to-grow plants like *Egeria densa* are ideal if you are trying to keep down costs.

PLANTS

I don't buy plants anymore, I grow them. Once you have experimented and found which species you can propagate successfully, you will be able to supply your own needs, just as I do. In my case, these are Giant Hygrophila (*Nomaphila stricta*), *Egeria densa*, Java Moss (*Vesicularia dubyana*) and Duckweed! They're better than nothing. I use old flake tubs as flower pots.

FISH

If you have a particular speciality (livebearers, cats, cichlids, anabantoids etc.) it pays in the long run to join a specialist society and to attend their functions. You will find auctions full of bargains, and meet fellow enthusiasts with fry or breeding stock to sell or swap.

You will probably still want to buy fish in the dealers' shop of course, in which case the golden rule is that little fish cost less than big ones. If you're short of money, why buy a five-inch fish for £10 each when you can buy several babies for £2 and grow them on? You stand a much better chance of getting good pairs by using this method anyway. Also, don't despise 'bread and butter' fish — a good specimen gives just as much pleasure as a costly rarity.

I hope this illustrates the fact that even when funds are short, one doesn't have to give up the hobby. Far better to be in it at a modest level, than not be in it at all. There are always ways of saving money, though, and I know quite a few low-budget fishkeepers whose successes, both in breeding and on the show bench, compare favourably with their better-off counterparts.

HARRY GINES / FLORIDA TROPICAL FISH FARMS ASSOCIATION

If you are interested in particular types of fish, such as livebearers, then joining a specialist society will prove extremely useful.

suppliers, especially those which import from South-east Asia, and from the numerous herpetological societies who produce a newsletter sometimes offering the more common species in their members' adverts sections.

In parts of the USA, apart from having several indigenous species of its own, these snakes have been successfully bred on numerous occasions. If you are able to gain the import licences and administration documents required, then this is an excellent source of healthy captive-bred snakes.

CAPTIVE CARE

Worm Snakes must rank as one of the easiest genera of snakes to house in captivity as their requirements are simple and few. The majority of species rarely grow to be more than 1½-2 feet (45-60cm) and so, several specimens can be housed in a relatively small vivarium, ideal for those with limited space.

Containers

There are two main types of housing for Worm Snakes, both having their advantages and minor difficulties:

Plastic containers

Some of the smaller more delicate *Typhlops*, such as the West African Blind Snake (*T. caecatus*) and Hallowell's Worm Snake (*T. hallowelli*) rarely grow larger than 10-15cm (4-6in).

Also, the young or hatchlings of most species are miniscule and need a close eye kept on them. If they are contained within a small area this makes maintenance far easier, and the plastic lunch boxes available from most supermarkets or discount shops are ideal for this purpose.

Alternatively, gallon ice cream tubs are just as adequate. Initially to allow for adequate ventilation, a circular hole about 3-4cm (1.2-1.6in) in diameter needs to be cut from the lid. Then cut a piece of wire mesh (as used for car body repairs) the same shape but 2cm (0.8in) wider in diameter. Heat this up over a flame until it appears red hot before placing it over the hole. It will then firmly weld itself into the plastic to make a permanent ventilation hole.

Aquaria

Small aquaria up to 18in (45cm) in length are ideal for the larger *Typhlops* such as Peter's Blind Snake (*T. dinga*), although the dimensions should be in relation to both the size and the number of snakes kept.

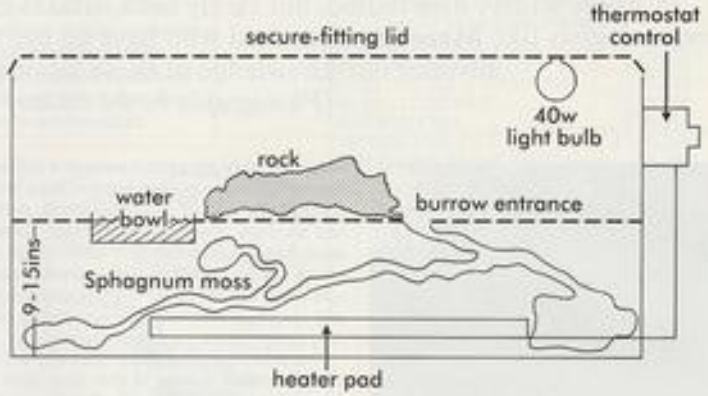
Most important is the need for a secure, escape-proof lid, as these snakes, especially juveniles or smaller types, will adhere to any condensation on the glass to slither up and out.

Decoration

As most Worm Snakes enjoy burrowing in moist (but not wet) substrates, choose, ideally, from live sphagnum moss, sphagnum moss peat or horticultural river sand (avoid fine silver sand, the dust of which may be inhaled through the nostrils and cause respiratory difficulties).

The depth of the substrate should be around 4-12in (10-30cm) and, on the top, a few flat stones or pieces of tree bark should be added. If it is sufficiently damp beneath these, then they will be a favoured haunt of the snakes. Just in case the substrate does dry out, a shallow water dish should be provided.

Heat can come in the form of an incandescent light bulb, undersoil heating cable/heater pad, or by simply situating the vivarium in a warm room. For all species, the summer daytime temperature should be within the range 24-29°C (75-84°F), falling to around 20°C (68°F) at night. Approaching winter, the daytime temperature should be gradually decreased by around 2-3°C (3.6-5.4°F), except for those aforementioned species.



Typical aquarium set-up for *Typhlops*.

Another possibility is to construct a solid concrete base some 4-10in (10-25cm) thick, which slots into the aquarium. In this, a series of narrow tunnels and holes leading to hollows which can be viewed through the aquarium should be incorporated. To give the effect of darkness, place a black card sleeve around the outside of the vivarium to cover the hollows, only lifting the card when the snakes are to be observed. These hollows need not be too large, as Worm Snakes prefer closed spaces.

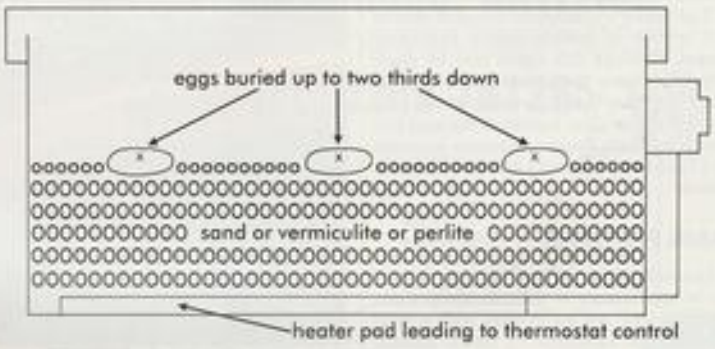
Heating, Lighting, Climatic Conditions

All *Typhlops*, except the European Worm Snake (*T. vermicularis*) and a few North American and Central Asian species, will require some heat all year round. Temperature and, especially, lighting (photoperiods) are not as critical as in other snakes because of their adaptability and underground existence.

In an aquarium, the heating and lighting can be combined. A dimmer bulb (25-40W) left on for ten to twelve hours per day is suitable, this being backed up by a low wattage thermostatically controlled horticultural undersoil heating cable or heater pad (as used for beer brewing). This heat source can then be left on permanently at the night-time setting as the incandescent bulb should boost the temperature those extra few degrees during the day.

A room heated to around the required temperature is a better proposition if several aquaria are present. This is also better for a small container, as it would be difficult and unwise to heat it in situ. Alternatively, several plastic containers could be placed in a heated and lighted vivarium. Never position vivaria in direct sunlight, as overheating will almost certainly occur.

Although Worm Snakes prefer and thrive in high humidity, they will tolerate drier



Container for incubating *Typhlops* eggs.

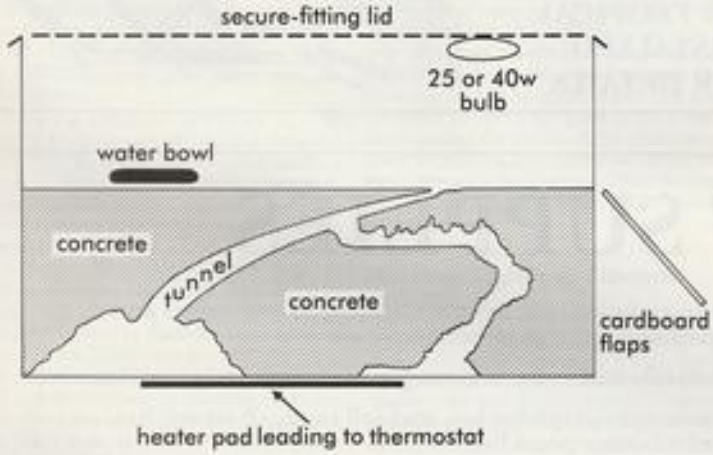
conditions. Similarly, they dislike being kept permanently soaked, so aim to compromise between the two, making certain areas damp, underneath rocks and bark for instance. With a heating cable or pad in place, the substrate will dry out fairly rapidly and, in my experience, it needs a thorough misting with tepid water twice a day. Live sphagnum moss will be difficult to keep alive if a heater pad is used, but it survives fairly well in a heated room if kept moist with soft water (ie boiled rainwater).

Hygiene

Worm Snakes are clean creatures able to tolerate most diseases and ailments. The vivarium will need cleaning out every three or four weeks, with the substrate either discarded for fresh, or sterilised with steam if it is sand or moss peat (thoroughly rinsed out in cool but pre-boiled rainwater if it is live sphagnum moss). The vivarium is then washed with 1.5% sodium hypochlorite (household bleach) before being thoroughly rinsed out and dried. This is repeated for any decorations such as rocks, logs or bark.

Obviously, check to make sure no small Worm Snakes are still hiding in the substrate when it is discarded or sterilised.

The 'widely travelled' all-female Flower-pot Snake *(T. braminus)*.



Aquarium set-up for Typhlops species using a concrete mould with burrows and tunnels. Lifting flaps of cardboard should be attached to the side of the glass to cover up the tunnels.

Few ailments are likely to affect *Typhlops* kept hygienically and fed with clean food. Occasionally, the odd sore caused by a combination of dampness and ever-present bacteria may arise, but these are simply dressed with a full strength iodophor available from chemists or pet shops.

Feeding

During most of the year, finding food for *Typhlops* should present no real problems, with gardens and parks abounding in caterpillars, grubs, spiders and grasshoppers for larger species, while small or chopped earthworms and ants are suitable for small species or juveniles.

Virtually all *Typhlops* seem to be partial to ants' eggs and their soft-bodied larvae. The smallest ants' eggs, in particular, are probably the only food items hatchling *Typhlops* can swallow, and these should be dusted in a vitamin powder such as Vionate. Turning over rocks and logs in woodlands and gardens may reveal a good supply and, if large quantities are collected, these can be stored in a freezer until required.

It is during the frost and snow of winter that it is often impossible to find small, soft-bodied invertebrates. Tropical fish suppliers do occasionally stock small containers of ants' eggs used for feeding fish. These should be moistened with a little water and placed beneath the rocks and bark in the vivarium. Hatchling crickets and wax worms are also eaten.

Frequency of feeding depends on the species and size of the snake, but, basically, Worm Snakes feed more often than other serpents due to the size of the food taken.

Worm Snakes can sometimes be bred in captivity. These are the eggs of the European Worm Snake *(T. vermicularis)*.

BREEDING

Very little is known about the breeding habits of Worm Snakes, owing to their secretive nature. At least one Worm Snake — the common Asian species *Typhlops braminus* — consists of entirely female populations, reproducing by the method of parthenogenesis (development of unfertilised eggs to form new individuals).

In tropical species it is possible that a certain stimulus is required for courtship to commence, for instance an increase in humidity, rainfall or food availability. In captivity it is worth experimenting with temperature, lowering it as previously stated by 2-3°C (3.6-5.4°F) for several months in the winter. The European and Central Asian species respond well to a greater drop of 8-12°C (14.5-21.5°F), with mating commencing almost immediately on warming up to near-normal temperatures.

Most tropical Worm Snakes, especially females, also have scent glands located within the tail, from which is secreted a noxious liquid. Although this deters potential predators when disturbed, as in

many snakes such as our own Grass Snake (*Natrix natrix*), in *Typhlops*, its primary purpose appears to be to attract the opposite sex.

Once copulation has taken place, the female will undergo a short ovulation period (as little as thirty-two days in the Ethiopian *Typhlops blandfordi*).

Most species are egglayers but a few are viviparous, such as the 7in (18cm) *T. diardi*. Eggs will invariably be deposited beneath a log or, more rarely, a rock. In comparison to the slenderness of the snake, the elongate eggs are relatively large, ie in the 15-in (38cm) Bribron's Worm Snake (*Typhlops bribroni*) 6-10 eggs are laid measuring 2cm by 0.9cm (0.8 x 0.35in), equivalent to a thirty-foot (9.1m) python laying the same number of eggs, each over 18in (45cm) in length!

Incubation/Hatching of Eggs and Care of Young

Once deposited, the eggs should be carefully removed without being turned. Ideally, use a small closed container such as a margarine tub punctured with several holes for ventilation and half-filled with an incubating substrate (either perlite or vermiculite, because both are inert and retain moisture more evenly than sand or peat).

The substrate should first be sterilised in boiling water; then, on cooling down, the excess moisture is squeezed out by hand. The eggs are buried so that just the top third shows, and the whole container is placed in an airing cupboard or heated propagator at around 25°C (77°F). Hatching will take place 45-60 days later. Viviparous species will gestate for around 65 days.

Upon hatching or birth, the baby snakes are miniscule — just over 1.5in (3.8cm) in *Typhlops hallowelli*. At this stage, they are very delicate, requiring the utmost care when handled to be placed in a plastic lunch box container situated in a warm place with high humidity. Feeding can be difficult, with newly-hatched crickets, aphids or small ant eggs being taken. Maturity is attained within 2-3 years.

SELECTED SPECIES

The list below represents those species which have been offered for sale within this country over the last few years:

Asian Blind Snake or **Flower-pot Snake** ***(Typhlops braminus)***
A dark brown or rust-coloured snake that attains 15 inches (38cm) in length. It is parthenogenetic, so all specimens are female. This is the most commonly offered species, originating from Saudi Arabia down to the Indonesian Archipelago.

It gets its name Flower-pot Snake because it has managed to find its way throughout the world, particularly in South Africa, Hawaii and Mexico, by seeking and hiding in the roots of potted plants.

European Worm Snake ***(T. vermicularis)***
A common but shy snake, occurring throughout the Balkans and into Turkey, Cyprus and Syria. Grows to 12 inches (30cm) and lays up to eight eggs in early May.

I once found what I thought was a large slimy earthworm under a rock in Turkey, only to look closer and discover it was this snake, the resemblance being near perfect.

Quite easy to breed in captivity and also able to withstand low temperatures (I kept a few specimens in an outdoor reptiliary during the winter of 1989/90).

Giant or **Schlegel's Blind Snake** ***(T. schlegelli)***
The largest species from the Transvaal region of South Africa, growing to around 3ft (90cm). The body is thick and cylindrical, looking like a grey hose pipe.

Feeds on earthworms and even small legless lizards. Old females can lay up to sixty eggs.

Other Species
Other species that have been offered on odd occasions include the 30-inch (c76cm) **Peter's Blind Snake** ***(T. dinga)***, the desert-dwelling ***Typhlops lalandei*** and the miniature 4-inch (10cm) **Reuter's Blind Snake** ***(T. reuteri)***.

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The list below represents those species which have been offered for sale within this country over the last few years:

Asian Blind Snake or **Flower-pot Snake** ***(Typhlops braminus)***
A dark brown or rust-coloured snake that attains 15 inches (38cm) in length. It is parthenogenetic, so all specimens are female. This is the most commonly offered species, originating from Saudi Arabia down to the Indonesian Archipelago.

It gets its name Flower-pot Snake because it has managed to find its way throughout the world, particularly in South Africa, Hawaii and Mexico, by seeking and hiding in the roots of potted plants.

European Worm Snake ***(T. vermicularis)***
A common but shy snake, occurring throughout the Balkans and into Turkey, Cyprus and Syria. Grows to 12 inches (30cm) and lays up to eight eggs in early May.

I once found what I thought was a large slimy earthworm under a rock in Turkey, only to look closer and discover it was this snake, the resemblance being near perfect.

Quite easy to breed in captivity and also able to withstand low temperatures (I kept a few specimens in an outdoor reptiliary during the winter of 1989/90).

Giant or **Schlegel's Blind Snake** ***(T. schlegelli)***
The largest species from the Transvaal region of South Africa, growing to around 3ft (90cm). The body is thick and cylindrical, looking like a grey hose pipe.

Feeds on earthworms and even small legless lizards. Old females can lay up to sixty eggs.

Other Species
Other species that have been offered on odd occasions include the 30-inch (c76cm) **Peter's Blind Snake** ***(T. dinga)***, the desert-dwelling ***Typhlops lalandei*** and the miniature 4-inch (10cm) **Reuter's Blind Snake** ***(T. reuteri)***.

News

Carp Vaccine Breakthrough

Aquaculture Vaccines Limited (AVL), specialists in the development and licensing of a range of vaccines against the major diseases of farmed fish, have recently announced the licensing in the United Kingdom and Germany of a new vaccine, Aquavac – Cyprivac CE, for the prevention of Ulcer Disease (Erythrodermatitis) in carp.

The vaccine is immersion-applied, which simply involves the dipping of fish into diluted vaccine for 60 seconds. Field trials in support of the licence application have been conducted in Germany on 'table carp' and in the UK on a range of ornamental fish.

AVL's Managing Director, **Dr Patrick Smith**, commented: "Vaccination has now become established as a safe and cost-effective long-term protection against the major bacterial diseases of fish, and has become an accepted part of the fish health programme in the majority of fish farms worldwide. Not only is this vaccine applicable to food fish, but it is also a first in the ornamental fish industry. Our UK field trials indicate that the vaccine can produce long-term protection in a wide range of ornamental Cyprinids".

Several other products have also reached their final stages of development, and AVL are looking forward to a continuous flow of new vaccines over the next few years against the major diseases of both food and ornamental fish.

Further details from **AVL, 24-26 Gold Street, Saffron Walden, Essex CB10 1EJ. Tel: 0799 28167; Fax: 0799 25546.**

Homoeopathy for Pets

More and more people are becoming interested in homoeopathy and other forms of complementary medicine, and interest has really boomed since the Channel 4 QED programme earlier this year when homoeopathic vet **Christopher Day** demonstrated his skills.

All too often, people are uncertain how to use homoeopathy most effectively. So, to help pet owners, Wigmore Publications have produced a useful little pamphlet that lists some of the book titles on homoeopathy and herbalism that readers can obtain directly from them.

Wigmore have specialised in this area for nearly ten years so they should know what they are talking about. But, to make quite sure, they have now appointed an advisory panel of top level practitioners to help them select the books that are most helpful.

As an introduction, their booklet **Homoeopathy for Pets**, by George McLeod MRCVS, DVSM, at £1.25 (post free) represents good value for money, although there is nothing that appears specifically appropriate to fish, amphibeans or reptiles.

For further details write to: **Wigmore Publications Ltd., 10 Church Street, Steeple Bumpstead, Haverhill, Suffolk CB9 7DG.**

The Tetra Club box is full of goodies for children to enjoy all year round.

Fishy Christmas Gift for Children

If your child has a goldfish for a pet, then Tetra have the ideal Christmas gift: membership to the Tetra Club — a brand new fishkeeping club.

For only £6.00 subscription, members will receive a box of attractive fishkeeping goodies which includes sample products, £20 worth of discount vouchers to attractions such as the Sealife Centres and London Zoo, a transfer kit, badge, pen, sticker, and a full-colour information booklet. Club members will also receive a regular newsletter with lots of helpful advice, competitions and news.

To enrol in the Tetra Club, send a cheque made payable to Tetra Club to: **Tetra Club (KP), Lambert Court, Chestnut Avenue, Eastleigh, Hants SO5 3ZQ.**

To guarantee delivery in time for Christmas please submit your cheque *no later than 4 December.*

Nausicaa Nets Its First Half Million

Almost half a million people have stroked a skate, fondled a starfish and come face to face with sharks in just five months since Nausicaa, the world's largest sea centre, opened its doors (see **Submerged in the Hobby** by Brian Deaville and Gill O'Donnell in the October '91 issue of *A&P*).

Now Nausicaa is set to net thousands of British visitors to experience its unique approach to marine discovery and aims to attract at least 150,000 over the coming twelve months.

Just across the Channel in the French port of Boulogne, Nausicaa is more than just a normal 'aquarium'. Its 3,000-plus fish range from 2.5 metre sharks to conger eels; shoals of tuna to tiny shrimps; and colourful tropical species to the coldwater cod. Further, the fish are not simply displayed in glass tanks, but in ways designed to illustrate how fish live, feed, communicate, cope with pollution and avoid danger by camouflage or massing in shoals.

Nausicaa was completed in May '91 at a cost of £16m and is aimed at making visitors aware of all aspects of the sea — from fishing and farming, to pollution and conservation — and in particular, the importance of careful management by man in the future.

Helped by dramatic lighting, atmospheric music and state-of-the-art technology, visitors are transported into an underwater world where they can interact with the fish.

"Following the success of Nausicaa's launch in France, we are now casting our nets further afield to get our message across to more visitors", says director Phillipe Vallette. "We think our unique and lively approach to giving visitors a complete underwater experience — without getting wet — will appeal to British tourists."

Nausicaa also houses a library with over 5000 books and slides, as well as 500 videos, a cinema, shops and a restaurant overlooking the beach. A research centre will come into use next year.

Located on the Boulogne seafront, Nausicaa is easily included in a day trip or short break to France and is open daily from 10.00 am until 6.00 pm. Admission is 45f (£4.50) for adults and 30f (£3) for children. For further information, contact **Jane Lawrence Tel: 071 353 8403.**

New Bach fish collections

New ranges of exotic fish are to be introduced by Bach Aquatics Ltd. of Stoke Poges who, with the launch of the new collections, will be staying open all year.

Introduced in response to demand from their growing customer base, the new collections will include Pearlscales, Black Bubble Eyes, Sarasa Fantails and Chocolate Orandas.

Bach's network of suppliers in Israel, Germany, the USA and China will be the principal sources, enabling them to maintain quality consistent with their existing lines. The new lines of fish will be available from their Stoke Poges headquarters and their northern distribution depot at Bury.

A guaranteed overnight delivery service is provided for orders placed before 3 pm, Monday to Wednesday. Orders for the weekend can be despatched overnight if placed before 10 am on Thursday.

Telephone ordering can be arranged, together with weekly faxing of availability lists.
Bach Aquatics Ltd., Stoke Place Farm, Stoke Poges, Slough, Bucks SL2 4NL. Tel 0753 692595.

HERPETOLOGY

BREEDING TERRAPINS

I would like to breed my Red Eared Terrapins in my aquarium. Is this possible? If not, what conditions do terrapins require for egg-laying, and how do I look after the eggs once they've been laid?

Female terrapins lay a clutch of eggs in a nest excavated on land. It is difficult to provide a suitable nesting area for terrapins kept in an indoor aquarium. Thus, adult females have to release their eggs in the water, usually one at a time over a period of several days. Eggs released singly and underwater seldom hatch if incubated.

Therefore, to breed terrapins successfully, a suitable nesting area must be provided. For European species — European Pond Tortoises (*Emys orbicularis*) and Spanish Terrapins (*Mauremys leprosa*) — and large, adult Red Eared Terrapins (*Pseudemys scripta elegans*), this can be provided as a terrace around a garden pond. The terrace must not be shaded from the warming rays of the sun, yet it must be surrounded by a low wall. This will prevent the terrapins from escaping.

British summer temperatures are not hot enough, or long enough, to incubate eggs laid in these terraces. Terrapin eggs laid out-of-doors must therefore be carefully collected and incubated indoors in moist Vermiculite at a fluctuating temperature.

Most species of terrapin lay eggs with flexible shells. During incubation, water can be lost to dry surroundings, resulting in dehydration of the egg. Alternatively, water can be absorbed from a moist environment, causing the egg to expand. Moist Vermiculite prevents dehydration of terrapin eggs (Red Eared Terrapin eggs 'buckle-up' as they lose water).

The absorption of water by flexible-shelled eggs allows the developing embryo to use the food reserves in the yolk fully. Thus, the embryo can grow larger before hatching. Larger hatchlings have a higher survival rate than smaller terrapins.

Terrapins (and tortoises) don't have chromosomes for the determination of their sex — being either male or female is controlled by different environmental temperatures experienced during incubation. Therefore, fluctuating temperatures should be used to incubate eggs laid under captive conditions. A temperature of 24° to 27°C (75–81°F) is suitable for Red Eared Terrapin eggs and will ensure a mix of males and females among the hatchlings.

JULIAN SIMS

Female Red Eared Slider laying an egg. A suitable site for this purpose is essential.

TROPICAL

PROBLEM LOG

For some time I kept a log in my coldwater aquarium with no problems at all. However, soon after I transferred it to my tropical aquarium, a colourless 'furry' growth appeared on the wood. Then the base of my Fountain Plant became surrounded by a clear jelly-like fungus which has now spread and has caused many plants to flop over and disintegrate. In addition, the wood has developed black spots. What's gone wrong?

Your problem is that the log is not completely petrified and so contains biological material. Fungus is feeding and growing on this material, made available by the higher temperatures of the tropical tank.

With such wood, doing things like boiling or sun-drying will not remove the biological content. You need to put a barrier between the aquarium water and the wood.

I would therefore suggest that you take out the wood from the tank, give it a good scrub (NO DETERGENTS!) and allow it to dry. After thoroughly drying, paint with several coats of a good polyurethane clear varnish. Or replace it with Simlawood or a similar product!

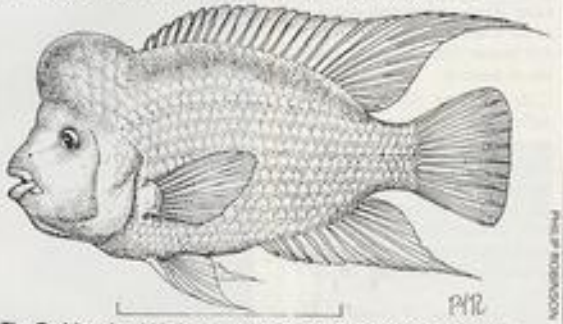
RED v YELLOW DEVILS

I have recently bought a Red Devil cichlid measuring 7 inches (c17.8cm). However, since purchasing it, I have been unable to find much information in general aquarium books. Anything you can tell me about this fish would therefore be appreciated.

The Red Devil is one of those species that can be various fishes, with consequent confusion in the literature. The FBAS recognise the Red Devil as *Cichlasoma erythraeum*, whereas books usually name it as *Cichlasoma citrinellum* which is more of a 'Yellow Devil'.

Devils are not usually included in the hobby books because they are not generally considered aquarium fish, being too aggressive for any community tank. The fish (usually the Yellow Devil listed as a Red Devil) is seen in public aquaria where it grows to 12in (20cm) and males have a large hump on the head (breeding display).

They prefer neutral water of medium hardness and a carnivorous diet. I doubt that your specimen will accept any other fish in your tank. I have seen a Red Devil banging on the glass in an effort to get at me to bite me (they have a row of tiny but sharp teeth!). I have also seen the fish mix with other larger fish in public aquaria, but they have usually been raised together and the water volume is very large. They are egg layers and a true pair will readily breed, but what you then do with hundreds of aggressive Red Devils is the next problem . . . !



PHILIP ROBINSON

The Red (or should it be Yellow?) Devil, *Cichlasoma citrinellum* — large, beautiful . . . and aggressive! The scale in the drawing represents 6in (15cm).

one plant for a minute, before moving on to the next.

For some reason, male Horsefield's Tortoise are very much smaller than females. It was a comical sight to see the diminutive males trying to seduce the formidable females by pecking at their front feet and running round them in circles. These attempts were nearly always unsuccessful, but, one morning, I was treated to a unforgettable sight of a pair of tortoises copulating on a bed of tiny red flowers. Mating continued for at least 30 minutes, interrupted only briefly by a move into the shade of a Saxaul Bush. Thermoregulation takes priority over everything!

The nicest thing about a tortoise to the casual observer of nature is that it neither runs away nor freezes in a death-like posture when approached. They give intruders a wary eye, and may even retreat into their shells for a few seconds, but time is short for Stone Frogs and they quickly resume their business, regardless of the company.

Fast lizards

Not so the lizards and snakes; at the first sign of trouble they run for it. Even a tiny lizard can easily outrun an Englishman in the desert. As a result, it is difficult to make any observations of their behaviour, other than escape techniques.

For some reason, small lizards are easier to approach then larger ones. *Rhynocephala interscapularis* was by far the most commonly encountered reptile around Repetek. I saw them only on exposed sand dunes with sparse vegetation.

These tiny lizards can tolerate very high temperatures; I saw them, for instance, active on the hottest day of my trip, jumping at insects on the sand heated to 115°F (46°C).

When disturbed, they wave their tails up and down, drawing attention to the black and white stripes on the underside. When the danger comes too close, they run at a considerable speed for a short distance and resume tail wagging. I presume that the purpose of this is to entice a predator to attack the tail, which can be shed, allowing the lizard to escape. After prolonged chases, they sink into the sand with a swift wriggle.

Agama sanguinolenta was another common lizard. They seemed to be absent from the exposed dunes frequented by *R. interscapularis*, preferring the flatter areas with plentiful cover of Saxaul Bushes. Young specimens are a uniform brownish colour which blends perfectly with the parched vegetation.

Adults in breeding conditions are much more brightly coloured; the males are green, and females blue. Perhaps it is because of their conspicuous coloration that they are much more wary than the youngsters. I never saw more than the last third of one as it disappeared into a hiding place.

Agama mystaceus is a popular lizard among photographers of Middle Asia. When alarmed, they open their mouths wide and raise flaps of skin at each side to give themselves a much wider gape than they really have. In adults, this must produce a

sters were commonly seen and easy to catch on account of their curiosity (they love to chase dental floss!) those that live long enough to attain maturity must have learned to keep out of mankind's way, for that is exactly what they did.

The most beautiful gecko that I have ever seen is the Sand Gecko, *Teratoscincus scincus*. It has a much smoother skin than most other geckos, and must be handled with great care because the delicate skin is shed as readily as the tail. They were found at night, patrolling the sand roads around the reserve buildings. This gecko is entirely insectivorous, feeding on beetles, ants and scorpions.

Secretive snakes

The snakes of the Kara-Kum are very secretive. They include at least three venomous species: a cobra (*Naja oxiana*), and two vipers; the Saw-scaled Viper (*Echis carinatus*) and the Blunt-nosed Viper (*Vipera lebetina*). Cobras are very rare around Repetek, I didn't see a single specimen, but the vipers are more common. Viper venom is haemotoxic; it destroys muscle, blood cells and blood vessels.

The Saw-scaled Viper, found over a wide part of Africa and Asia, is a small snake rarely exceeding 60cm (2 feet) in length. In captivity, at least, it is said to be a short-tempered snake. In India it bites more people than any other species.

The Blunt-nosed Viper is the largest member of its genus, attaining a length in excess of 5ft (150cm) and, as a result, is considered to be the most dangerous snake in the region.

that they were even more frightened of me than I was of them. When approached, they made straight for the cover of bushes. Because of their shyness, it seems unlikely that they would voluntarily enter into a direct confrontation with mankind, but my daily searches for Monitor Lizards, which involved investigating every likely burrow, were conducted very nervously at first.

Most dangerous animal

In the event, the most dangerous animals I came across were the bull camels, which are allowed to wander through the desert, and are only taken to the farms once a year to service the females.

They tolerate humanity at a distance, but too close an approach is discouraged by shakes of the head and pawing of the ground. I kept my distance!

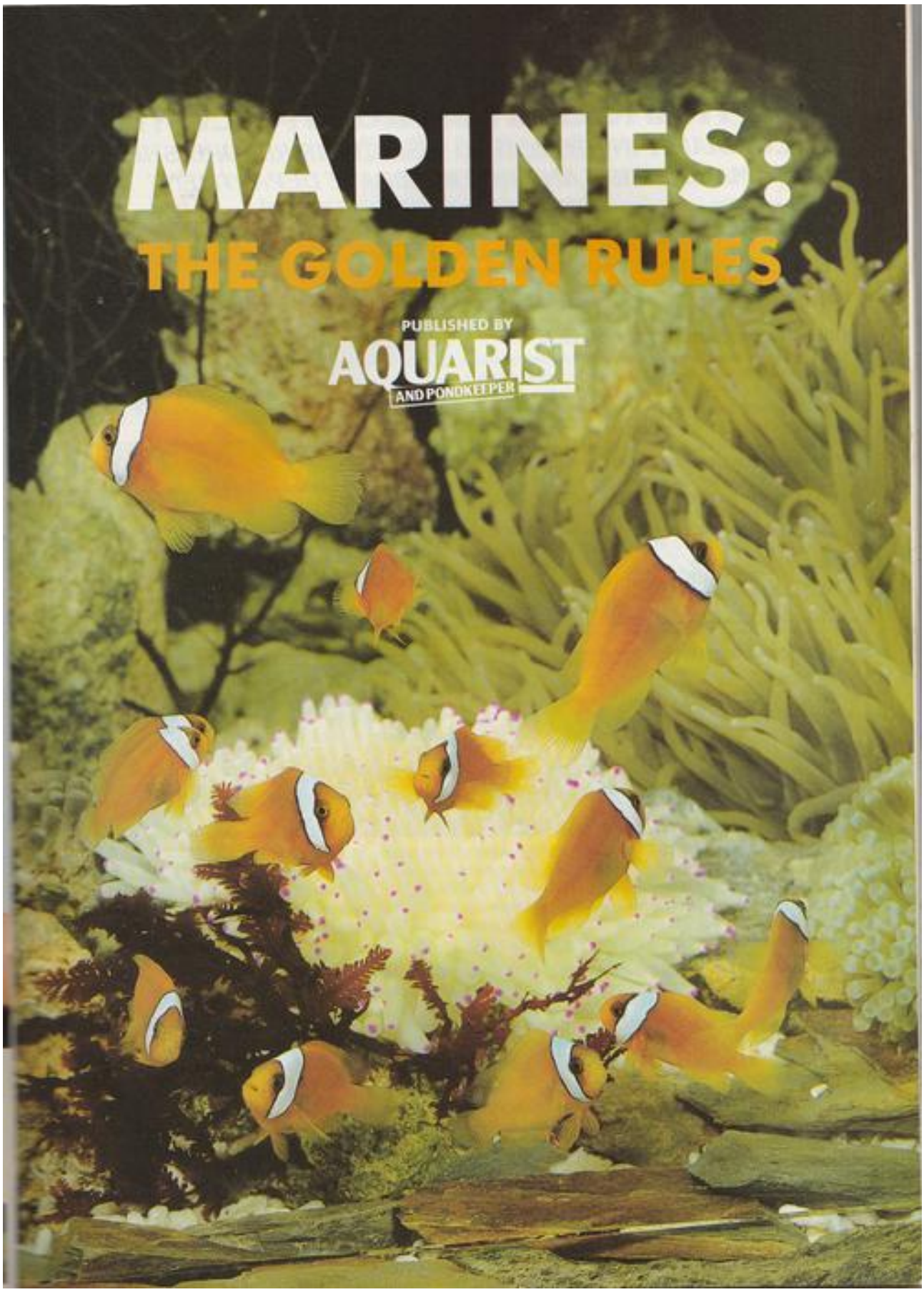
PARTING ADVICE

I will end this first instalment with a word of advice to anyone travelling anywhere in the Soviet Union: take plenty of camera film. Colour film is of poor quality and virtually unobtainable anyway. Western brands are only available in Moscow, and at astronomical prices.

I am very grateful to my friend Andrej Fegatov, of Kostroma, for allowing me to use his photographs here. The second part of this article will deal with the main object of my trip, the magnificent Caspian Monitor Lizard.

(TO BE CONTINUED)

"Well done, Santa! It's JUST what I've always wanted for Christmas . . ."


MARINES:
THE GOLDEN RULES
PUBLISHED BY
AQUARIST
AND POND KEEPER

MARINE AQUARIA:

Questions and Answers for Beginners

By Dave Garratt

CORAL WORLD - ELAT

The coral reefs which surround tropical islands are very stable habitats for fish, plant and invertebrate species, many of which can be successfully kept in aquaria.

There are numerous questions that any new aquarist needs to consider. In the following paragraphs I have selected some of the topics which I feel are of vital importance. Other articles in the **Supplement** will provide further food for thought, while the selection of literature which I have chosen should help both new and established marine aquarists build on the basics that we can offer in the form of articles.

ETHICS

Q *Can the keeping of marine aquaria be morally justified?*

A Although this article is not going to develop into a conservation debate, the question must be asked and answered. Increased public awareness of conservation, animal cruelty and 'green' issues, plus the ever nearer 1992 scenario, demand that the hobby must take a long hard look at itself. It is difficult to argue that anyone has the right to take a living creature out of its natural environment and keep it in artificial conditions. However, humankind has evolved and overruled such objections and produced arguments to explain its behaviour, so we must look at the pro's and con's involved.

The fishkeeping hobby gives joy and contentment to countless thousands. Hobbyists also include many disabled people, along with young children just grasping the rudiments of living creatures. Medical and industrial research has also followed on from what was often an original passing interest of a researcher or scientist. To ban all marine fishkeeping would be to destroy all these factors at a stroke, a move I and many others could not support.

I feel the coral reef has far worse enemies than the marine aquarist. The reefs are at great risk from deforestation and consequent silting over; being used as building material; overfishing by indiscriminate fishing methods; poisonous collection methods, eg. cyanide; and collection for the trinket trade. However, I always feel conservationists are looking for 'soft touch' targets with a high public profile. I feel the marine trade should be looking to put its house in order (this is actually happening in certain quarters at the moment) before someone does it for us in a heavy handed way. A number of ideas could include:-

1. No coral to be collected for tank decoration purposes.
2. Severe restrictions on what (if any) hard corals could be kept in captivity.
3. No imports of fish that are impossible to feed in aquaria.
4. No imports of fish with a short aquarium lifespan. This category would be the most contentious, but bear in mind that, in some cases, our knowledge is so limited that these fish are consequently sentenced to a lifespan of a few weeks in the vast majority of cases.
5. No imports of endangered species.

This would still leave great scope for fish and inverts, while being seen as taking positive action.

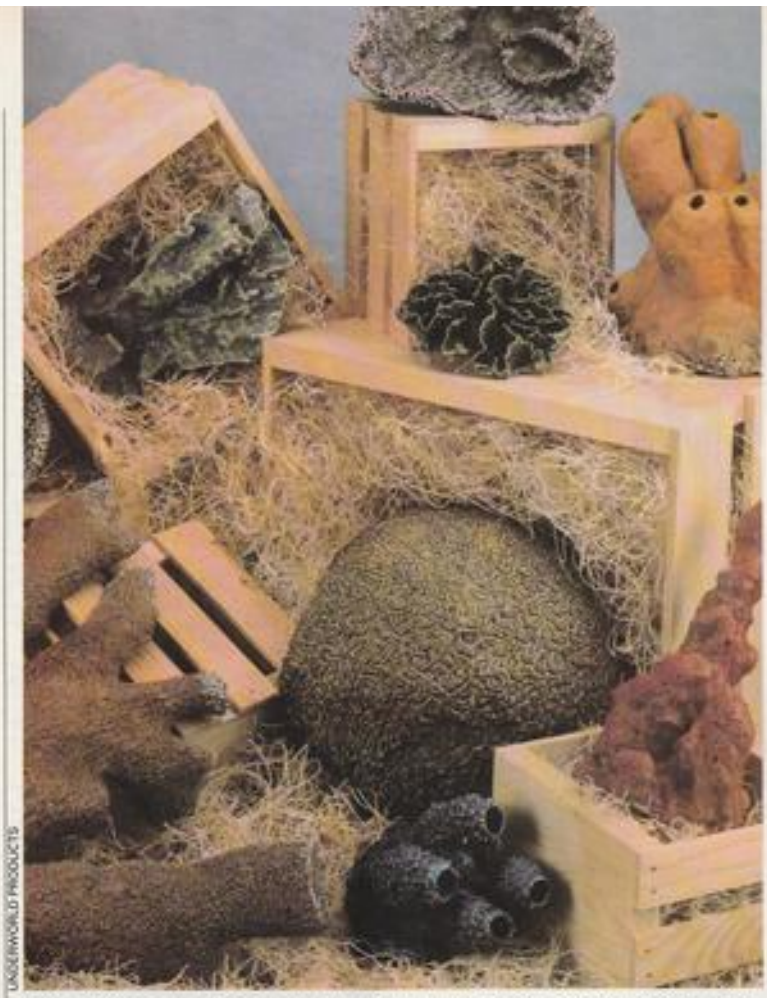
VIABILITY

Q *Are marines a viable proposition for a complete novice?*

A With all hobbies, a little practice goes a long way, and it would be a help for the beginner if he/she had some experience in

MAX GIBBS - GOLDFISH BOWL, OXFORD

A healthy colourful mixed community in a well established tropical marine reef tank.



UNDERWORLD PRODUCTS

Hand-made high-quality artificial coral pieces form excellent decor for tropical marine set-ups.

fishkeeping, but this is by no means essential. If the would-be aquarist follows basic well established methods and reads a fair amount of literature before attempting to set up the aquarium, then all should go well.

It is of paramount importance that a full understanding of biological filtration is obtained. Also, the aquarist must be aware of the inherent stability of the natural coral reef environment and also of the osmotic differences between freshwater and marine fish (see, for example, **Seaview** in the November '91 issue of *A&P*). If the beginner masters these three topics, an overall understanding of marine aquariology will be very much easier.

EXPENSE

Q *Compared to its freshwater counterpart, is a marine tank an expensive proposition to buy, install, stock and maintain?*

A Expense is a very relative topic, but I will endeavour to offer some guidelines.

Tank lid and cabinet:

Same as for freshwater, unless a specialist marine system is used.

Filtration:

A great deal of money can be spent on a specialised marine system. However, as stated elsewhere in this article, I think, for a beginner, a basic undergravel set-up is advisable. The basic essentials of this, ie, coral sand and 'calcium plus' or coral gravel, are more expensive than freshwater gravel. Rockwork for decor is also more expensive than for the freshwater tank.

Equipment:

Power heads, as opposed to an air pump, will be required to run the undergravel system; two are recommended so as to back each other up. An air pump will still be required to run the air-operated protein skimmer, an essential 'extra' only applicable in the marine environment. Extra lighting will also be required, as will a back-up heater-stat.

Setting-up:

A hydrometer, nitrite and nitrate test kits will be required. A few basic treatments would also be useful as a stand-by.

Maintenance:

The biggest item will be salt for water changes. Charcoal and polyfillers will also be required.

Stocking:

As with all fish, this depends on species. Unlike the small freshwater community fish available at under £1.00, you will not get a marine fish under £4.00. Marine fish are available from £4.00 to £140.00, but there are a good number of fish suitable for the beginner in the £5.00 to £30.00 bracket.

Summary:

Allow £100.00 to £140.00 on top of a freshwater set-up to establish a marine aquarium. This is a very general figure and most dealers will do a deal on a complete system. The cost of fish is entirely up to the hobbyist, but they are generally dearer for the marine aquarium. However, stocking levels are lower.

FILTRATION ET AL

Q *What is biological filtration? What filtration should I use? What is the 'nitrite' crisis? When can I add my first fish?*

A These questions are all closely linked in their answers.

Any marine tank will require a biological filter to break down toxic waste products from the fish, dead algae and decaying uneaten food. In the closed confines of a tank, the fishes' own waste would quickly bring about their demise.

A biological filter is a device employed to cultivate large numbers of de-nitrifying bacteria. These bacteria break down ammonia-based fish waste (highly toxic) to nitrite (toxic) and finally to nitrates. Nitrates are relatively non-toxic and excess levels can be kept in check by regular partial water changes.

This is where the term 'nitrite crisis' occurs, ie, the point at which the nitrite reaches its maximum level. The accompanying maturation graph shows the rise and fall of these waste products in a maturing tank. When the nitrite has reached zero, it must be checked daily to ensure maturation is complete.

When it has fallen to zero and stayed there for two weeks or so, the tank is ready for its first fish, providing they are fairly hardy. Personally, instead of adding fish, I would perform a 25% water change and monitor nitrites for a further two weeks before adding livestock.

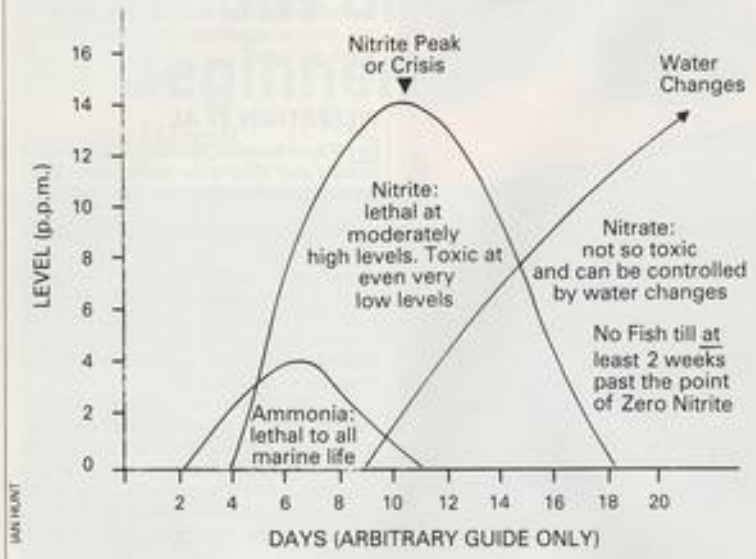
On the point of filtration, at the risk of being considered old-fashioned, or behind the times, I would recommend a basic undergravel filter, powered by power heads and matured with a traditional maturing agent such as Waterlife's Sea-mature.

In my defence I would re-iterate that this is a beginner's article aimed at helping the hobbyist to establish a marine tank successfully without breaking the bank. I am well aware and heartily endorse the excellent texts written by De Graaf, Theil, Moe, Sankey, Spotte etc, but I do not feel the need to thrust them onto a beginner. I think the traditional method will help the aquarist better to understand the process of maturation and biological filters. Once successfully established (s)he can look to expand his/her horizons.

PROTEIN SKIMMING, OZONE, U-V

Q *Are protein skimmers, ozonisers or ultra-violet necessary to operate a successful aquarium?*

Diagram showing main events of Maturation in a Marine Aquarium



A Anyone who has read any of my articles before will know that I believe protein skimmers are essential to marine aquaria.

Ozone and ultra-violet are not such essential items and are best looked at after the aquarist is more experienced.

This item is too complex to be dealt with, in the short space available here, but I would refer the reader to the following.

① *Aquarist & Pondkeeper*, **Tropical Marine Supplement** Oct 1988. D Garratt.

② *Keeping Marine Fish* by Graham Lundegaard — **Blandford Press**. A cheap paperback now out of print, but available without too much searching.

AQUASCAPING

Q *Is aquascaping important for a marine tank and, if so, what type of decor may be used?*

A For a fish-based marine aquarium, a good standard of aquascaping is important to the well-being of the fish, apart from any aesthetic considerations. Everyone wants their tank to resemble a miniature piece of reef, and such a set-up will be beneficial to the tank.

It is essential that fish feel secure in their environment and not stressed. To help achieve this, a fish will use a nook or cranny as a bolt-hole and source of security and escape if it feels threatened or is suddenly frightened. The more nooks, crannies, swimming channels and caves that can be created by good aquascaping, the more contented and peaceful the fish community should be.

The choice of material to accomplish this aquascaping is restricted owing to the possibility of interaction between the salt water and the rockwork. Slate is a possibility, but does not look very natural in a marine tank. Dead coral has been traditionally used but will soon, quite rightly, in my opinion, be unobtainable.

There are other three main possibilities to choose from: ceramic rock, Tufa or artificial coral skeletons. The ceramic rock is an artificial product made to resemble a volcanic ash type of rock. It is very light and thus causes little water displacement; it also looks very natural from the first day it is added to the tank. However, it is not cheap.

Tufa, a limestone rock, will help pH buffering (ie, prevent fluctuations in pH) and is cheap. It can also easily be hollowed out and shaped owing to its extremely soft nature. Tufa will displace more water than ceramic rock and it will require a few weeks of algal growth on it to make it look natural.

The final choice is that of artificial coral, which, in the past, had the disadvantage of looking obviously artificial. However, there is now a hand-made variety on the market that is expensive but realistic.

The final choice lies with the individual and the size of his/her wallet!

QUARANTINE

Q *Should I quarantine my fish before adding to my show tank?*

A The harsh nature of a newly matured tank, and the inexperience of the beginner, make for ideal conditions for disease to overwhelm the tank. For this reason, unless the hobbyist develops a good relationship with a reliable dealer, quarantine facilities are a must.

Some people would argue that quarantine places an extra stress on the fish. On the contrary, a quiet peaceful quarantine tank is probably ideal for a fish just getting used to captivity. Quarantine, which must, I feel, be for about 21 days to allow all parasite life cycles to go to completion, also lets the aquarist observe the habits and health of his/her purchase.

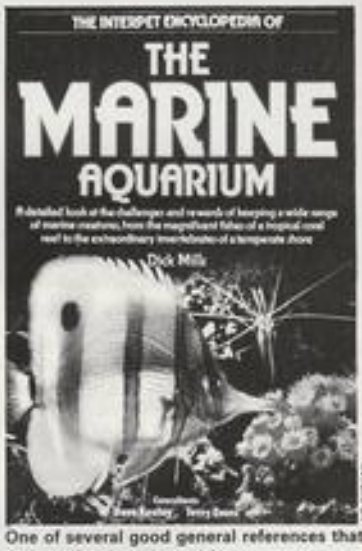
LITERATURE

Q *What literature do you recommend for a beginner? What about a choice of later material?*

A I would recommend a range of books, from the basic beginners' texts, leading up to advanced texts at a later date. I would list them in ascending order of complexity.

① *An Interpet Guide to Marine Fishes* by Dick Mills; Pub: **Salamander.**

② *The Interpet Encyclopedia of the Marine Aquarium* by Dick Mills; Pub: **Salamander.**



One of several good general references that no aquarist should be without.

③ *Keeping Marine Fish* by Graham Lundegaard; Pub: **Blandford Press.**

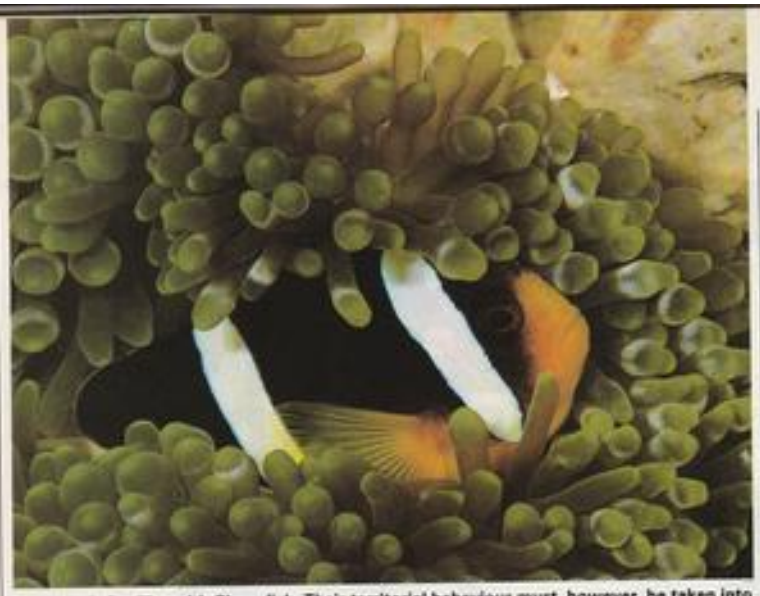
④ *The Marine Aquarium Handbook: Beginner to Breeder* by Martin Moe Jnr. Pub: **Norns.**

⑤ *Marine Tropical Aquaria Guide* by Frank de Graaf. Pub: **T.F.H.**

⑥ *Small Reef Aquarium Basics* by Albert Thiel. Pub: **Aardvark Press.**

⑦ *The Marine Aquarium Reference, Systems & Invertebrates* by Martin Moe Jnr. Pub: **Green Turtle Publications.**

If you want a single book I would suggest No. 2, although 1 and 3 are cheap enough to merit buying as well. The originals of books 4 and 5 are out of print but will give the beginner — if a copy is found — food for thought after (s)he has mastered the basics. Books 6 and 7 cover more advanced topics.



Everyone is familiar with Clownfish. Their territorial behaviour must, however, be taken into account and numbers of conspecifics kept within limits.

FISH-ONLY

Having opted for an 'invertebrate-free' community, what other points do you need to consider? **Gordon Kay** has some suggestions.

Photographs by Max Gibbs, The Goldfish Bowl, Oxford

Elsewhere in this **Supplement**, you will find a **'Questions & Answers'** article by **Dave Garratt.** Read it before you read this one, since I am assuming that the basic points of tropical marine aquarium keeping will have been sorted out before you turn to buying your stocks of fish, invertebrates and plants.

SPECIFIC GRAVITY

Most books traditionally recommend a specific gravity (SG) of between 1.022 and 1.024. This seems to be based on a mean average of specific gravities in the different areas whence our fishes come. This is all well and good as far as it goes, but there is a growing school of thought which considers that the lower SGs make for healthier fish aquarium fishes.

This would certainly seem to carry a lot of weight. There is more dissolved oxygen in water of lower SG; also, parasites fare less well in water which is less dense. Furthermore — and perhaps more importantly — lower SGs mean a reduced metabolic workload on the fish.

It would seem that a specific gravity of around 1.020 is becoming more widely used among aquarists nowadays. I, personally, have gone one further than this during the past year or so, keeping my own aquarium at 1.018 with absolutely no detriment to the fishes whatever. More positively, they seem to settle in more easily and I get more water out of a packet of salt, but, as I buy and use the same amount of salt each month, this means I use more water — which has to be good!

STOCKING

Many years ago, Graham Cox, of Waterlife Research Industries, laid down a simple rule on this very subject. The rule reads as follows:

A maximum of one inch of fish to every four gallons of aquarium water for the first six months, with a maximum of one inch of fish to every two gallons of aquarium water thereafter.

It should be remembered that these maxima should be achieved gradually. This rule may seem extremely simplistic but to date no-one has come up with anything better, and so it is the stocking rule which is still used and quoted in almost every aquarium book one reads.

Despite its delicate appearance, the Long-nosed Butterfly — like most other Butterflies — will not tolerate other 'long-noses' in its territory, unless the tank is of very large dimensions.

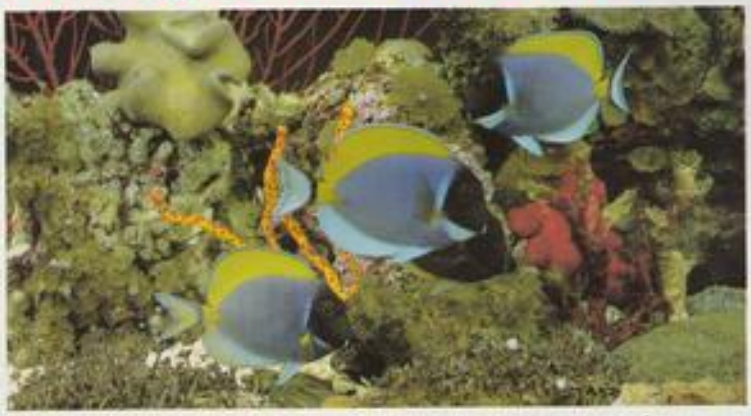
Selecting Fish

No-one can tell you which species to buy for your aquarium. You will have to look at one of the many 'Fish Catalogues', decide which ones you would like to keep, delete those which are not compatible with the

Like other Trigger fish, the Clown Trigger is aggressive towards members of its own species.

Food must be adapted to the species of fish being kept. In the case of Mandarins, these foods must be small — to match the size of their mouths.

AQUARIA



Most Tangs, including Powder Blues, should be housed with other robust species.

others, or which you cannot keep, and then proceed accordingly. There are, however, a couple of guidelines which I would remind you of:

① Buy species which are fairly easy to start with. That is, do not buy a sensitive species which will not tolerate the potential fluctuations in water quality that are inherent in any newly set up aquarium.

② Buy species which you are able to feed. You are what you eat, and in the same way, fishes that do not eat properly will not stay robust enough to ward off infections.

③ Get the 'stock mix' right. This means buying only species of a similar disposition and feeding enthusiasm. Shy species housed with bullies, or enthusiastic feeders, will feel intimidated and simply waste away, after they have been through a series of stress-related illnesses on the way. One other, more insidious, danger of this type of mix is that overfeeding of the tank will become almost second nature in order to get enough food to the

Damsels are good, tough 'early' fishes . . . but they are territorial

Lionfish are beautiful, but predatory, and will swallow anything that is swallowable

shy species. This will cause all sorts of problems!

Buying healthy stock

It stands to reason that you will enjoy a much better chance of success if the specimens you buy are healthy to begin with. However, no-one can give any guarantees that any particular animal is 100% healthy. Having said that, there are certain ways to be as sure as you can be. These are:

ⓐ Buy from a reputable dealer who is committed to selling healthy coral fishes. It is better to buy from the same dealer from the very beginning, as this will be rewarded with honesty from him/her when you ask questions about the fishes you intend to buy.

ⓑ A healthy fish will be feeding and showing no signs of wasting. Do not buy any fish which is pinched above the eyes or around the stomach. These are doomed and could well cause trouble in the aquarium.

ⓒ A healthy fish will be alert and reacting to movement outside the aquarium. DO NOT TAP ON THE GLASS TO TEST THIS! It will be acting 'normally' (make sure you know what is 'normal' for the species) and will have no marks or abrasions.

ⓓ Finally, try to buy from a dealer who quarantines the fish before sale if you yourself do not keep a quarantine tank.

Introducing specimens

Stress is a major cause of disease in the aquarium and the most stressful time for a fish is when it is moved. It makes sense, therefore, to minimise stress as much as possible at this time. The traditional advice given in books is to float the bag into the aquarium and add aquarium water slowly until both temperature and specific gravity in both are equalised. This method, in my opinion, has a number of inherent flaws, however, such as the bag closing in on itself and causing even more discomfort.

I have been using the following method for a number of years and found it to be far better than the old 'floating bag' technique. First of all, you need to buy one of the small plastic tanks which all aquarium dealers sell. When you buy a fish, ask the dealer for a little more water than is usual and, when you get it home, gently tip the fish into the small tank.

Feed the fishes in the main tank, then slowly turn the aquarium lights off. While all this is happening, start to transfer small amounts of water from the main aquarium to the small tank very gradually. If you have taken my advice about specific gravities (see above), it will take quite a while until specific gravity and temperature are equalised, but you have to be patient.

When the readings are matching, almost exactly, you can then pick the fish up and lower it into the main aquarium. Incidentally, I always use my hands in preference to any net or container — I am far more gentle than any net I have ever met!

Discard the water from the small tank - no use risking the introduction of diseased organisms — and top up the main tank with fresh tapwater; unless you have a very small aquarium this will not affect the specific gravity one iota. Leave the lights off for 24 hours and you will find the fish ready to feed with the rest of your collection when you switch the lights on again in the morning.

AGGRESSION

This is a rather complicated subject. Aggression can be caused by any one of many phenomena, and sometimes a combination. We must first understand what exactly causes aggressive behaviour.

Some possible causes

① Some species are natural predators and will take any fish that is small enough to be considered food. Note that fishes which you may not consider too small, such as a 3in (7.6cm) Angelfish would be meal size for a 18in (45cm) Moray Eel. Other common predators include the Lionfishes — which love to eat Damsels — Groupers and Snappers.

② Certain species have a naturally aggressive streak and should only be stocked with equally robust species (eg. Undulate, Queen and Clown Triggers), or large adult Angels (eg. Emperor and Rock Beauties), or large Surgeons/Tangs (eg. Powder Blue or Sailfin Tangs). Triggers can be particularly aggressive at feeding time, when they will snap at anything that moves.

③ Most large species will not tolerate species of their own kind in the aquarium. Examples of this are the Yellow Longnosed Butterfly, large Angelfishes, Surgeons/Tangs and Triggers.

④ Many fishes are territorial and this can result in fighting and sometimes death of the loser, either directly from the injury, or indirectly by not being allowed to feed. Damselfishes will often defend certain pieces of the tank decor, while Clownfishes will often defend their anemone. Unfortunately, some of the hardier Damselfishes used to stock a new aquarium may be very aggressive and may cause problems later.

⑤ Many species, for a variety of reasons, will consider other fishes as a threat and will react with violent aggression. This can be triggered by colour, size, shape, a closely related species, or by a fish that considers the whole of the tank as its territory. Powder Blue Surgeons are particularly bad in this respect, and large Angels and Triggerfishes can also become a problem as they mature.

Overcoming aggressive behaviour

If a new addition is being bullied unmercifully by other members of the aquarium community, the only answer is to remove it and return it to the retailer or a separate tank. If the problem is a single fish, then the answer is to separate the AGGRESSOR if possible. Either catch the bully and remove it to a new tank, or partition it (the fish) off with a clear perspex perforated divider. If every effort to reduce aggression fails to work, the only answer may be to part with either the bully or the new specimen.

A less dramatic measure that often works remarkably well is to black-out the tank totally for 48 hours. When the covers are taken off (this must be done slowly, and in stages) it is often found that peace and tranquillity has returned to the tank, especially if the rockwork is rearranged at the same time.

FEEDING

Overfeeding is a mortal sin, but, unfortunately, it is also one of the most common errors in fishkeeping. Overfeeding will, at best, considerably shorten the working life of an aquarium and, at worst, contribute to a total aquarium wipe-out. Overfeeding puts an increased load onto the filter bed as uneaten food decays, leading to a build-up in nitrites and other toxic substances in the water, as well as causing a drop in pH.

As a general rule, coral fishes should feed little and often — three times a day if possible, with as much as can be consumed within a minute or so. A policy recommended to beginners is to feed about half the amount you think is needed. This is not true of predators, as they tend to take large feeds every other day or so.

Although coral fishes need to be fed sparingly, the food they do receive must be of first-class quality, varied and disease-free. With the range of foods around today, a first-class diet should be available to any fish the beginner may keep. Commercial foods include numerous flake formulae, freeze-dried, floating pellets, frozen and live food.

This wide variety makes it possible to cater for the needs of most species, eg. whole shrimps are needed for Puffers who need the shell content in their diet, vegetables for Tangs/Surgeons and Mysis and Brine Shrimp for those fish with small mouths such as Mandarins etc. The likes of Lancefish is available for carnivores such as Lionfishes.

The frozen foods available from your dealer are mostly gamma-ray irradiated to remove any disease pathogens. Trying to save money by buying from the local fishmonger is NOT worth the risk.

Vary the diet to allow for one flake feed in the morning and one more specialised feed, depending on the tank inmates, in the evening. Good-quality flake food will supply the vitamins and minerals that all fish require, although even flake may be supplemented by prior soaking in a vitamin supplement. An occasional live feed is also relished by most species — live Brine Shrimp is the most readily available.

Finally, bear in mind that, although we know quite a lot about fish nutrition, it is, in reality, very little. Therefore, the only sure way to provide everything needed to keep our fishes healthy is to provide as much variety as possible.

Ornate Wrasse. As well as being superbly marked and prettily coloured, this wrasse will burrow occasionally and help to keep the aquarium gravel from impacting.

THE MIXED AQUARIUM

Max Gibbs of the Goldfish Bowl in Oxford, outlines his personal Golden Rules for invert/fish aquaria.
Photographs by the author

Catalina Goby. This tiny fish is packed with vibrant colour from nose to tail and makes a delightful addition to the peaceful reef aquarium.

The wonders of the undersea world are becoming more and more accessible to fishkeepers. Advances in techniques linked with those of design and construction of the necessary equipment, the availability of large all-glass aquariums, and hard-learned know-how concerning the handling of reef life by collectors, exporters, importers, retailers, through to the hobbyist, in combination, have achieved this situation.

A large aquarium of highly coloured and fantastically shaped marine fish will turn any head, but the ultimate 'pearl in the oyster' has to be the fascinating living picture created by the reef aquarium with sedentary invertebrate life creating the backdrop, and mobile invertebrates providing the surprise appearances and ensuring the ever-changing nature of the scene. Compatible, brightly coloured fish, complete the compelling interest.

When planning the installation of the reef aquarium it is essential, for peace of mind and long-term success, to equip it with items necessary to create the best captive environment available for the creatures to be housed in it. Some of this equipment will be quite elaborate and the capital cost relatively high in terms of setting up an aquarium. However, to compromise is to invite problems sooner or later, or at the very least, to impose potentially irksome limitations on the choice of occupants.

GOLDEN RULE No 1

Choose the largest tank you can afford and manage.

This must be the initial goal, as the water capacity is a most important consideration. The coral reef is, at most times, a stable environment as far as the water chemistry is concerned. Any changes caused by above-water disturbances due to monsoon downpours, air temperature fluctuations, and the like are gradually felt, allowing reef life to adapt to such temporary upsets.

Similarly, in the reef aquarium with a large water capacity, any upsets to the water chemistry are likely to be more gradual and noticed in time to control with less dire consequences than would be the cause with a small body of water.

GOLDEN RULE No 2

Follow good advice and instructions to the letter.

Wherever possible, locate a good shop from which to obtain your advice and buy your requirements, noting that both fish and invertebrate life is maintained in good condition . . . preferably taking the time and trouble to visit often and be satisfied that the stock is not just being turned over quickly before it can deteriorate, at apparently bargain prices.

Alternatively, an experienced and progressive hobbyist keeping successful reef tanks is an invaluable contact. Failing the availability of a personal adviser, a good book must be resorted to.

Having found your 'mentor', seek good advice and *stick to it*. (I might almost include a 'GOLDEN RULE 2a' here: Do not try combining advice from a number of 'experts' as methods will vary and can be totally confusing when trying to devise some mongrel scheme!)

GOLDEN RULE No 3

Buy the best equipment you can afford, even if that delays the purchase of your reef aquarium while saving up.

Maintenance of good water chemistry is of paramount importance, and the filtration system must be reliable and efficient. My personal preference is for a good-quality power filter and sub-sand filter beds with power heads fitted onto the uplifts. Some plastics are not suited for use in the invertebrate aquarium and the quality of this material is often reflected in the price of recommended equipment.

I favour an ultra-violet steriliser incorporated into the power filtering system; this unit must be correctly rated to the capacity of the aquarium. A necessary maintenance expense is the renewal of the tube(s) every six

months, but the electrical running cost is miniscule.

A protein skimmer is a further accessory I would recommend, and incorporated with this, when air operated, an ozoniser. Ozone was considered to be highly desirable some years ago, but until recently it went through a period of being out of fashion. Now it has rightly reasserted itself as a valuable commodity, albeit to be used with care.

With the operation of these items, properly balanced, it is possible to achieve incredibly clean, bright water with a polished appearance . . . just as you might expect to find over an idyllic coral reef.

GOLDEN RULE No 4

Give the matter of lighting the aquarium special consideration.

On the assumption that you wish to exercise complete discretion over what you may successfully maintain of those creatures and plants available to you from time to time, you might proceed along the following lines. The intensity and spectrum of the light penetrating through the depth of the aquarium water is of prime importance to the health and progress of many of the invertebrates you might keep.

The most effective, but expensive, available lighting is metal halide. Even so, this needs to be supplemented with a fluorescent actinic blue tube for the benefit of those invertebrates which culture single-celled algae within their tissue.

If metal halide is too expensive, then aquarium-type fluorescent tubes of the new 'high intensity' genre will have to suffice. Tubes running the full length of the aquarium and needing to penetrate some 15 to 18in (38 to 45cm) of water would need to be in banks of, say, three across about a 15in (38cm +) wide tank top. The one actinic blue tube will be additional to this bank, and should also run the full length of the aquarium. (The single subject of aquarium lighting could occupy this entire article.)

GOLDEN RULE No 5

Choose your heating equipment with care.

The fully stocked invertebrate aquarium will be the culmination of, maybe, years of collecting and caring, adding up to an appreciable investment in both financial outlay and time spent, not to mention the pride taken in one's prized achievement. Reliable heating is, therefore, a prime requirement.

Apart from purchasing the best available equipment, you might well consider the possibility of fitting an effective alarm system to give instant warning of excessive heat fluctuations, either up or down!

Keeping spare heating equipment to cover emergencies is a must.

GOLDEN RULE No 6

Take your time and get it right!

When setting up the reef aquarium, be meticulous. There is no room for short cuts and slap-dash approaches.

① Having cut and fitted the sub-sand filter plates with their power-headed uplifts, the base medium is bedded on top. I prefer to use a washed coarse coral gravel evenly layered over the bottom to a minimum depth of 3in (7.5-8cm).

② The power filter (or filters for very large tanks) is charged with ceramic pipes at the bottom, a seawater carbon bag next, topped off with a thin layer of polymer wool. There are many options available with which to charge power filters, enhancing their efficiency.

③ The return flow from the filter passes through the ultra-violet steriliser.

④ The heating equipment is set in place. This will most often be a heater/thermostat combined unit, although I have a personal preference for separate units.

⑤ The protein skimmer must be installed securely at the correct height to enable it to function properly, and the air supply will be passing through the ozoniser before it enters the skimmer. (Bear in mind the need for accessibility to the various accessories and pipework within the aquarium for maintenance purposes.)

⑥ The next step is to introduce the base material on which to build the 'reef'. Tufa 'rock' is ideal for this. Being relatively inexpensive, calcareous, and highly porous, it provides a receptive foundation for the expensive 'living rock' which will cover it.*

⑦ Next fill the tank with seawater. Make up the synthetic seawater salt mix according to the instructions and aim for a density of between 1.018 and 1.022. I would recommend the lower density. Initially, leave the water level lower than the finished installation, as there will be some considerable displacement when the 'living rock' is introduced.

⑧ Run the heating and filtering systems for a few days to monitor and adjust performances as necessary. (The protein skimmer will not work until the tank is full of water.)

⑨ When the usual water chemistry tests are showing satisfactory readings, some invertebrate life can be progressively introduced.

Top left, Dancing Shrimp. This pretty crustacean does well in groups and is quite peaceful. It is a busy scavenger, moving about the entire tank removing particles of uneaten food.

Top centre, Knobbed Starfish are frequently available, beautifully coloured and marked. This species is a tempting buy for the reef tank, but it is likely to prey on the polyps of sessile invertebrates and cause damage.

Top right, the short spines of the Blue-spotted Sea Urchin are less likely to cause damage to other invertebrates, such as anemones, than its more commonly seen long-spined cousins. However, these inverts must be handled with care as their spines carry some venom.

Centre left, 'Yellow polyps'. These are actually colonial anemones and make a good carpet effect for foreground situations in the reef aquarium.

Centre right, Green Brain Coral. This species is one of the hardier stone corals which will usually flourish in good conditions. The hard corals are generally best avoided, however.

Left, 'Mushrooms-on-rock' are disc anemones which are very useful when first furnishing the reef aquarium as they are quite tolerant of some volatility in the water chemistry. There are various colours and forms available.

** 'Living rock' is a term coined for calcareous rock pieces taken from the sea complete with their encrustations of living plants and other organisms, most important of which are the unseen nitrifying bacteria hosted on, and within, their structure.*

This rock is arranged on the tufa base in such a way as to leave crevices and ledges suitable to receive the various sessile species of invertebrates.

As the rock is transported in a damp condition and placed in sea water after trans-shipment, the surviving Nitrosomonas *and* Nitrobacter *which profusely colonised it in the tropical sea will soon revitalise and provide a superb starter culture quickly to increase and spread throughout the marine aquarium. This process speeds up the maturing of the aquarium markedly.*

GOLDEN RULE No 7

Check the water chemistry regularly, especially in the early maturing days.

The most important element to monitor initially is *nitrite*. Organic material breaking down will produce ammonia which, in turn, is processed by the activity of the *Nitrosomonas* to become nitrite. Once *Nitrobacter* becomes sufficiently active, this nitrite will be converted to *nitrate*.

Depending on the condition of the bacteria hosted in the 'living rock', the nitrite tests will sooner or later indicate when a safe level has been attained. Recommended maximum levels for both ammonia and nitrite are just 0.1mg per litre.

Beyond the initial stages, and especially when living creatures are being introduced into the aquarium, testing for ammonia is essential. Being highly toxic and the precursor to nitrite, it is essential that the nitrifying bacteria are seen to be doing their conversion work in the cycle.

Regular part water changes will be necessary as a matter of routine maintenance and would once have kept the nitrate level within tolerable limits. But today, many parts of the country are experiencing high levels of nitrate in the tapwater. A number of nitrate-removing accessories are becoming available to aquarists and they are undoubtedly valuable in assisting the control of nitrate levels to below the upper limit of 20mg per litre. Nitrate testing has an important place in water chemistry monitoring.

As the nitrification cycle is largely influenced by temperature and pH, it is necessary to monitor and control these two factors. An ideal temperature for *Nitrobacter* is too high for the invertebrate and fish life, but a comfortable 24 or 25°C (75-77°F) should be aimed for. The pH should be no less than 8.1 and as close to 8.3 as possible. Good management of the aquarium will usually result in an acceptable, but narrow, range.

GOLDEN RULE No 8

Be patient and judicious when stocking the aquarium.

During the maturing time it will be possible to introduce some invertebrate life which is known to be resistant to modest volatility in the water chemistry, but, as always, SLOWLY DOES IT!

Colonial anemones, usually sold as 'Mushrooms on rock', and others as 'polyps', do well in maturing systems and might be added just a week or two after setting up with 'living rock', but subject always to reasonable readings being obtained from the tests.

Reef tanks being built up without the benefit of 'living rock' will need a much longer settling down period, greater care and restraint.

"Too much too soon" will overload the immature system, whichever method is being used. The cost of stocking the aquarium with invertebrates will be expensive and will serve as a brake to all but the wealthy hobbyist. This has to be a good thing. The commodity is a precious one and it deserves care and respect from its keeper.

Once placement of the sessile invertebrate life has been started, the hobbyist will soon be itching to add some of the mobile invertebrate specimens and fish to enliven the developing scene. Providing the tests are showing consistently satisfactory readings, further additions may be made, but never forget the necessity of allowing the growing nitrifying bacteria colonies to keep pace, ie, able to control the ammonia and nitrite produced.

Remember this **GOLDEN RULE No 8...** it is the most important of them all.

GOLDEN RULE No 9

Research the suitability of both invertebrate and fish life being considered for the aquarium.

Compatibility is extremely important in such a complex and delicately balanced community, especially as the removal of unsuitable occupants is usually difficult in the reef aquarium with its labyrinth of hiding places. There are obvious no-go fish which are too large and boisterous for even the largest reef aquarium. Triggerfish and Parrotfish will crunch the hard corals to eat the polyps within. Large species of wrasse will bury in the substrate and undermine the structure of the reef. Strongly territorial species will commandeer too much precious space. Some starfish will eat the polyps of corals and other sessile invertebrates.

While most of the soft corals popularly available are worth considering, many of the hard corals are not. *Caulerpa* (a seaweed) might take over the reef and stifle the sessile invertebrate colonies. The restrictions are many, but there is a wide selection of suitable species to choose from. The tables which accompany this article will give a guide as to what might be chosen.

'Sample Community'

The following is an example of a community for an average reef tank: 'Mushroom on rock' pieces in varying colours placed so that the colonies do not touch. Yellow 'polyps', leather soft corals, bushy *Sinularia* soft corals, pipe corals (usually offered incorrectly as 'Xenia'), feather-duster tube worms, the less restless species of anemone, painted shrimps, dancing shrimps, sea apples (*Pseudocolochirus axiologus*), colourful short-spined sea urchins (*Astropyga* sp), green brain coral (*Trachyphyllia geoffroyi*). Mandarin fish (*Pterosynchiropus splendidus*), Firefish (*Nemateleotris magnifica*), Regal Tangs (*Paracanthurus hepatus*), Green Damsels (*Chromis viridis*), Wreck Fish (*Pseudanthias squamipinnis*), Royal Gramma (*Gramma loreto*), Ornate Wrasse (*Macropharyngodon ornatus*), Catalina Goby (*Lythrypnus dalli*), Coral Beauty (*Centropyge bispinosus*).

FEEDING

Ascertain the feeding requirements of various invertebrate species at the time of purchase. The filter feeders, such as soft corals, tube worms, clams and sea apples are easily catered for with proprietary liquid foods. This same food will largely feed the smaller colonial anemones too.

Large anemones will often be partially fed by symbiotic Clownfish, but will need additional feeds of defrosted fish or prawn placed into the tentacles.

Shrimps, urchins, starfish and small hermit crabs will scavenge for much of what they want, but bear in mind their needs and ensure that there is sufficient food being put into the aquarium.

However, DO NOT overfeed. The balance has to be right!

MAINTENANCE

After a while, the seawater tends to become 'tired' and needs to be part exchanged. This part-water changing is very important and may be 25% per month, or 10% per week, depending on circumstances. Vitamin supplements should be added to the water regularly.

Any excess detritus missed by the filtering system should be siphoned off regularly, and the surface of the coral gravel should be loosened from time to time, especially when there are no fish in the community doing this chore (eg, wrasses).

It has already been mentioned that the UV tubes need to be replaced every six months, but do not overlook the need to change the filter carbon cartridge too when necessary.

INVERTEBRATES — FOR KEEPING WITH COMPATIBLE FISH

Recommended	Think about it!	Unsuitable
'Mushroom on rock'	*Porites* with tubeworms	Almost all Nudibranchs
'Polyps' — various colonial	Crinoid starfish	Elephant Ear (*Rhodactis*)
Anemones (*Zoanthus* sp)	*Cladiella* soft Coral	Knobbed stars
Lether soft coral	*Euplexaura* Gorgonian	Most Gorgonian corals
Bushy soft coral (*Sinularia*)	Pipe Coral (Stoloniifera)	Most hard corals,
Favia hard corals	Coloured soft corals:	eg: *Goniopora*
Feather duster tube worms	*Dendronephthya* sp	Harlequin shrimps
Short-spined urchins	Tooth corals:	Large hermit crabs
Blue Starfish (*Linkia*)	*Euphyllia* sp	*Cerianthus*
Sea Apples (*eg P. axiologus*)	Banded Coral Shrimp	Reef lobsters
Cleaner Shrimps	Sea Pens	Flamingo Tongue
Dancing Shrimps	Clam Shellfish	
Atlantic anemones	Larger anemones	
Brittle Starfish	Long-spined urchins	
Porcelain Crabs	Flame Scallops	
Tiger Cowries		

FISH FOR THE INVERTEBRATE REEF AQUARIUM

Recommended	Think about it!	Unsuitable
Mandarin fish and other	Seahorses and Pipefish	Large wrasse
Callionymidae species	(no stinging inverts, or	(Burying will undermine
Percula Clownfish	incompatible fish	the "reef")
Pink Skunk Clownfish	companions)	Parrotfish, Butterflyfish,
Yellow-tailed Blue Damsels	Yellow-tailed Clowns	and Triggerfish — all of
(*Chrysiptera parasema*)	(*A. clarkii*)	which eat polyps and are
Green Damsels	Maroon Clowns	otherwise destructive.
Ornate Wrasse or other	(*P. biaculeatus*)	Most damsels — grow too
Macropharyngodon sp	Larger gobies	large, aggressive, and
Fairy Wrasse	Dwarf Lionfish — not	territorial.
Carpenter's Wrasse	suitable to mix with	Large Angelfish
False Gramma or other	shrimps or small fish	Groupers
Pseudochromidae	Regal Tangs or other	Jawfish
Royal Grammas	surgeonfish — being	Most Scorpion fish
Neon Gobies	herbivores, they might eat	Tomato Clowns
Catalina Gobies	marine plants, and many	
Firefish	species grow too large.	
Red-spot Cardinals		
Most Pygmy Angelfish		
(*Centropyge*)		
Basslets (*Pseudanthias*)		

A mixed system containing Common Starfish *(Asterias rubens)*, Red Beadlet Anemone *(Actinia equina)*, White Plumose Anemone *(Metridium senile)* and – hiding its characteristic posture – a Blenny *(Lipophrys pholis)*.

Table 2
SALINITY AND SPECIFIC GRAVITY COMPARISONS

Brackish water	2.9%	1.021
	3.0%	1.022
	3.1%	1.022
	3.2%	1.023
	3.3%	1.024
'Average' marine	**3.4%**	**1.025**
	3.5%	1.026
	3.6%	1.027
'Concentrated' marine	3.7%	1.028

Readings must be taken at correct temperature to which the hydrometer is calibrated. Modern aquarium hydrometers are often calibrated at 24°C (75°F). An adjustment is necessary if readings are taken at different temperatures.

c) a reduction of other essential salts for various reasons (e.g. fall in calcium levels as this element is incorporated in the growth processes of molluscs and crustaceans).

Water changes of around 25% every month are suggested to rectify the above, although greater changes may be necessary in specialist invertebrate aquaria.

Oxygen is consumed by the tank inhabitants, including the filter bed bacteria, and this is renewed from the atmosphere. This intake can be increased through agitation of the surface by means of a venturi device attached to a powerhead. At lower temperatures, water can hold more oxygen than at higher ones. In seawater at 3.4% salinity, the saturation limit is 8.1 mg/l at 15°C (59°F), falling to 6.9 mg/l at 24°C (75°F).

ENVIRONMENTAL VARIABLES

Organisms have only a limited range of conditions in which they can survive. This is known as their *ecological amplitude*. Besides the dissolved oxygen levels maintained through aeration and circulation, and pH levels kept stable by water changes, or supplements, other important variables include salinity and temperature. Therefore:

(7) correct salinity, within tolerance limits, must be maintained, and evaporated water must be replaced by fresh water;

(8) correct temperature for each species must be accurately controlled. (This is often within narrow limits, and will involve a heater and thermostat for tropical species, and a cooling unit for fish and invertebrates from British seas. Fish must not be transferred directly from water of different temperatures.)

When an aquarium is first filled, or after any rocks have been installed, the level should be marked on the glass, and the water regularly 'topped up' to this level. Specific gravity can be measured using a hydrometer, but gradual increases in established aquaria will occur because of dissolved organics.

Salinity in the open seas will vary from 4.0% to 3.0%, with any lowered salinities referred to as brackish water (see **Table 1**). Aquarium hydrometers are calibrated at 24°C (75°F), and calculations are shown in **Table 2**.

A Hairy Crab *(Pilumnus hirtellus)* female in berry – a rare (and somewhat destructive) inhabitant of native aquaria.

Most marine invertebrates are 'osmoconformers' and are therefore unable to regulate their sodium chloride balance of salts from the seas in which they are found. They are likely to die if the salinity variation exceeds 0.3% from their natural amplitude.

Fish are theorised to fare better at lowered salinities, even below 3.2%. One of the reasons is because they will need to expend less energy in osmoregulation, because bony (teleost) fishes have a salt balance lower than seawater, and continually have to obtain water from a denser environment. They do this by drinking seawater and excreting salts, which is reckoned to consume at least 15% of their energy and oxygen requirements. However, about five times as much salt is also taken in and excreted over the gills (I always keep British marine fish at 3.3% to 3.4% salinity).

Fish and invertebrates are unable to tolerate temperatures with a difference of more than 2°C (3.6°F) from the zoogeographical range in which they are found. Sea temperatures vary considerably in different seas, and seasonally in temperate waters, by as much as 8°C (14.4°F) in British seas (see **Table 3**).

Table 1
SALINITY VARIATIONS IN DIFFERENT SEAS

Gulf of Bothnia	> 1.0%
Baltic Sea approaches	> 2.0%
North Sea	3.4%
English Channel (west)	3.5%
Tropical North Atlantic	3.7%
Caribbean Sea	3.6%
Indian Ocean	3.5%
Persian Gulf	3.8%
Philippines	3.3%
Great Barrier Reef	3.5%
California	3.4%
Galápagos	3.5%
Hawaii	3.5%

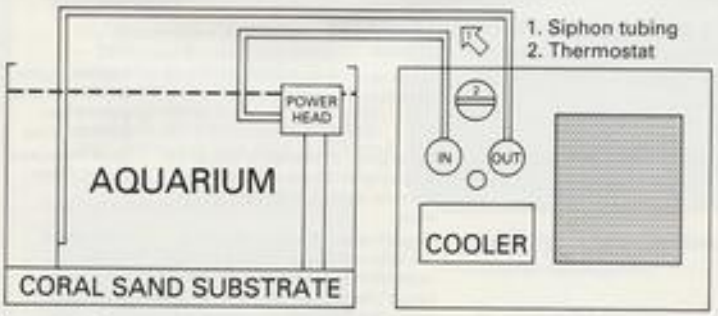
Table 3
SEA TEMPERATURE IN DIFFERENT SEAS
Offshore Surface Temperatures

Arctic Ocean	–2°C– 5°C
North Scotland	5°C–13°C
English Channel	9°C–17°C
North Spain	11°C–20°C
Gibraltar	14°C–21°C
Naples	13°C–24°C
Cyprus	16°C–27°C
Caribbean Sea	23°C–25°C
Tropical Atlantic (Africa)	25°C–30°C
Indian Ocean	24°C–28°C
Persian Gulf	20°C–30°C
Philippines	26°C–28°C
Great Barrier Reef	23°C–26°C
Hawaii	20°C–22°C

Fish transferred to aquarium water 5°C (9°F) higher than that from which they originated are likely to die rapidly of thermal shock. This is a problem normally associated with wild-caught British species.

Hermit Crabs. Left, the well-known 'Common' type, *Pagurus bernhardus* and right, the rare *Diogenes pugilator*.

***Spinachia spinachia*, the ultra-slim Sea Stickleback .**



Diagrammatic representation of a cooling system attached to an aquarium.

STOCKING LEVELS

New aquarists habitually overstock their aquaria. This is because, although hard and fast rules are laid down, the reasons given are often contradictory.

(9) Oxygen is the principal limiting factor in deciding the amount of stock in the aquarium. If a tank is overstocked, the inhabitants will consume the oxygen more quickly than it is renewed. This will result in ailments and eventual suffocation.

(10) For small fish like Clownfish, Butterfly fish, from tropical seas, and small wrasse like the Rock Cook from temperate waters, a figure of 2.5cm (1 inch) for every 2 gallons (9 litres) is the maximum longterm stocking level (see Table 4 for calculation of aquarium capacities). The food consumed by each fish, relative to the size of these common fish, gives an idea of the stock load.

(11) Large fish experience stress if placed in a tank that is too small.

Fish require more oxygen than invertebrates and are likely to be the first to suffer. Large fish, and those with large gills, as well as open-water fish, consume considerably more oxygen than smaller, and more sedentary species.

Filter bed bacteria and other microorganisms can consume over 50% of the oxygen available in aquaria with undergravel filtration. Furthermore, this biomass tends to increase with time. This means that established aquaria that are running successfully for several years may eventually begin to experience problems.

British rockpool fish like the Blenny and Gobies are smaller in bulk, and consequently eat less than free-swimming fish, and can be kept at higher stocking densities.

Table 4
WATER CAPACITY OF STANDARD SIZE AQUARIA

Simple method of calculation

Measure the dimensions in feet and multiply by 6.25 to arrive at figure in British gallons. Allow appropriate deduction for displacement by gravel (10%) and rocks (a further 10-20%).

A more accurate method would be to use the height of water in the aquarium, as the height dimension (and measure in inches).

e.g. 48in × (15in–2in) 13in × 12in = 7488 ÷ 12^3 = 4.33 × 6.25 = 27 gallons (122.7 litres) before displacement (say 25%) = 20.25 gallons ÷ 0.22 = 92 litres.

or: 36in × 13in × 12in = 5616 ÷ 1728 = 3.25 × 6.25 = 20 gallons (90 litres) before displacement (say 15%) = 17 gallons (77 litres)

Note: 1 Imperial Gallon = c 4.5 litres

FEEDING

Ensuring the correct amounts and quality of nutrition can present problems with certain fish and invertebrate species.

(12) Fish and most invertebrates are estimated to consume between 5% and 10% of their weight in wet food in two sessions every day.

(13) Dietary requirements include the essential components of proteins, carbohydrates, vitamins and minerals.

(14) Many fish and invertebrates have special feeding techniques and strategies, which have to be ascertained before you capture or purchase a particular species.

Special problems are numerous. They include specialist fish like the temperate and tropical Pipefish and Sea Horses which eat live food exclusively, bivalve molluscs which filter phytoplankton, some species of tropical Butterflyfish that will only eat coral polyps, other molluscs and herbivorous fish which consume algae, filter-feeders and sea anemones that extract zooplankton, and hard corals that require symbiotic algae to provide the glycerol component of their diet.

Marine fishkeepers can rarely rely on feeding flake food and hoping for the best. Research is essential when deciding compatibility in the community aquarium. In the marine jungle, it is best to assume that any bigger animal will eat a smaller one if it is equipped to do so. For example, crabs are vulnerable to attack by larger crabs and to fish with sharp teeth at the soft-back stage of their moult.

However, there is also a much less obvious problem with compatibility, which is to

ensure that the shyer creatures get sufficient food, and that it is not pinched by the aggressive fish and crabs. Many small rockpool fish like Blennies require shelter in rocks or seashells where they will feel secure and from where they will emerge at feeding time. Anemones may need to be fed individually and, for most species, a crustacean diet will provide all their needs. Boiled, or frozen, mussel should be complemented by prawns, crabs, etc.

In temperate set-ups, all uneaten food should be removed as soon as possible, just as in tropical systems. If not, it will be consumed by aerobic bacteria and small organisms, increasing the biomass, and exuding ammonia.

As my specialist subject is native marines, I tend to concentrate on this unique branch of the hobby. Two major differences occur between native and tropical marines, the major one being that temperate fish and invertebrates are normally captured from the shore and selection has to be made on their suitability. The other difference is that a cooling system is usually required for a temperate aquarium.

The accompanying diagram shows how such a cooler can be incorporated within a native marine set-up, while the annotated lists show the main requirements of a range of coolwater fish and invertebrates which could be considered for native aquaria.

SELECTED BRITISH SHORE FISH

Family	Species	Common Name	Temperature	Character	Food
1. Blenniidae	*Lipophyrys pholis (= Blennius)*	BLENNY (or Shanny)	9°C to 21°C	Small (16cm) green rockpool fish with sharp comb-like teeth for crunching barnacles and crabs.	Crustaceans, algae.
2. Cottidae	*Taurulus bubalis*	BULLHEAD (or Sea Scorpion, Clobberhead)	9°C to 19°C	Small (18cm) brown rockpool fish with large expandable mouth for swallowing prey as big as itself.	Prawns, small fish.
3. Gobiidae	*Pomatoschistus microps*	COMMON GOBY	9°C to 24°C	Very small (64mm) sandy coloured and abundant shore fish with short lifespan.	Small crustaceans.
4. Pholidae	*Pholis gunnellus*	BUTTERFISH	9°C to 19°C	Small orange snake-like (25cm) fish that hides under rocks on the shore.	Small crustaceans, worms.
5. Gasterosteidae	*Spinachia spinachia*	SEA STICKLEBACK	9°C to 20°C	Small brown pencil-thin (15cm) fish with a voracious appetite and found in pools.	Live zooplankton, exclusively.
6. Syngnathidae	*Hippocampus ramulosus*	EUROPEAN SEAHORSE	15°C to 28°C	Rare, peaceful and unusual fish, attaining a length of 15cm.	Live zooplankton, larvae, exclusively.
7. Gadidae	*Ciliata mustela*	5-BEARDED ROCKLING	9°C to 22°C	Small (25cm) bronze-coloured shore fish, that is more active at night.	Worms, shrimps, small fish.
8. Labridae	*Crenilabrus melops*	CORKWING WRASSE	12°C to 24°C	Aggressive and pretty shallow water fish that grows too large (25cm) for home aquaria.	Prawns, crabs, other crustaceans, mussels.
9. Scophthalmidae	*Zeugopterus punctatus*	TOPKNOT	11°C to 22°C	Small (25cm) uncommon flatfish that lives among rocks and in shore pools.	Crustaceans.
10. Gobiesocidae	*Apletodon microcephalus*	SMALL-HEADED CLINGFISH	12°C to 24°C	Charming and tiny (40mm) shallow water fish that hides in shells.	Very small crustaceans.

SELECTED BRITISH SHORE INVERTEBRATES

Phylum	Species	Common Name	Temperature	Character	Food
1. Porifera	*Halichondria panicea*	BREADCRUMB SPONGE	10°C to 24°C	Sessile green sponge attached to the top of rocks on shore.	Plankton, organic particles, bacteria, glycerol from symbiotic algae.
2. Cnidaria	*Actinia equina*	BEADLET ANEMONE	5°C to 28°C	Red or green, or 'strawberry' type of this medium-sized (25mm) and pretty sea anemone, which is widespread on the shore.	Small crustaceans, organic matter.
3. Cnidaria	*Urticina felina (= Tealia)*	DAHLIA ANEMONE	5°C to 24°C	Largest intertidal anemone which may reach 65mm between the tides, and even larger offshore. Macrophagous ('large-particle') feeder. Variously coloured, often orange and cream.	Crabs, whole mussel.
4. Annelida	*Pomatoceros triqueter*	KEELWORM	12°C to 24°C	Small (25mm) worm that lives in white limy tubes and sports blue or red attractive gills which can be seen best with a magnifying glass	Organic particles, plankton.
5. Mollusca	*Mytelus edulis*	MUSSEL	10°C to 24°C	Blue bivalve mollusc that is permanently fastened by white byssus threads, and attains a maximum of 10cm.	Diatoms.
6. Mollusca	*Sepia officinalis*	CUTTLEFISH	11°C to 24°C	Large (30cm) intelligent cephalopod, with active predatory habits.	Shrimps and crabs.
7. Arthropoda	*Pagurus bernhardus*	COMMON HERMIT CRAB	9°C to 22°C	Amusing crustacean that will inhabit whelk shells when adult.	Organic matter and detritus, zooplankton.
8. Arthropoda	*Carcinus maenas*	SHORE CRAB	8°C to 24°C	Aggressive and omnivorous and ubiquitous predator and scavenger, medium-sized, to 4cm.	Worms, organic matter, molluscs, crustaceans.
9. Bryozoa	*Membranipora membranacea*	COMMON SEA MAT	10°C to 24°C	Colonial animal that appears as a lacy mat on fronds of seaweed.	Minute organic fragments.
10. Enchinodermata	*Asteria rubens*	COMMON STARFISH	9°C to 20°C	Orange sea-star that can be so abundant as to reach epidemic proportions. Five arms.	Mussels in shells, eggs, organic matter, other molluscs.

Recent trends in marine keeping

Dick Mills tackles the challenging task of tracking down some of the latest developments.

I've found out while writing in these columns that the best way to get information about any subject is categorically to deny that it actually exists in the first place; the moment pen has left the paper, contributions to prove the contrary then pour in! At least, I hope that's what's going to happen in this instance for, despite exhortations from the editor, and one or two examples, I haven't been too successful in unearthing recent real advances in marine fishkeeping. So, the challenge has been thrown down — prove me wrong.

I think the reason for all this non-appearance of recent advances is due to two things: one is the recession which makes it difficult for any spare cash to go on 'luxuries' such as hobbies, and secondly, the fact that marine-keeping is still a fairly new thing without the equipment exposure enjoyed by the long-established freshwater scene.

Again, it may be that much of the equipment used by marinists is being developed by relatively small numbers of firms who concentrate on production, rather than advertising, managing to become known by recommendation by those already in the saltwater circles. Again (and this is reflecting the recession effect), much of the specialised equipment, excellent though it is, is at the top end of the price range and turnover is relatively small.

LIGHTING

Looking on the bright side first (Oh yes, an occasional pun always comes in really useful), most marine aquarists know that light is very important, especially where coral and invertebrate culture is planned. Coral often has algae growing within it, as do some molluscs, and really strong light is needed to encourage this.

While the introduction of powerful fluorescent tubes such as **Interpet's** Triton have improved matters, even the best tubes won't deliver the goods if much of their light is wasted; the new Light Enhancers (clip on tube reflectors) will ensure that all the light goes where it is needed — *downwards* into the water.

FOOD

One of the most frustrating things about keeping marines is the inability to acclimatise certain fishes to aquarium life in general, and to accept food in particular.

Of course, it's always the more exotic species which show up this problem, so it is a real advance to find a food which may well overcome this. Angel Formula is but one of seven varieties in the Formula range of specialised foods from **Ocean Nutrition**; this contains natural sponge material, part of the Angelfish's diet in the wild, and should do much to enable hobbyists to keep fishes from this family more successfully in future. (**Note:** There may be some confusion over the brand name; it is not connected with the makers of Instant Ocean salt mixes; they are Aquarium Systems).

OCEAN NUTRITION

Light enhancers are recent introductions into the aquarium accessory market and are designed to maximise the amount of light that can be directed down into an aquarium — a real plus for marine set-ups.

OCEAN NUTRITION

Advances are also being made on the nutritional front, one of the latest introductions being this 'Angel Formula' which should help in the captive care of these sometimes difficult fish and their close relatives, the butterflies.

ARTIFICIAL CORAL

One of the biggest trends in marine-keeping is the awareness by hobbyists of the dangers caused to the natural environment by both overfishing and inconsiderate collecting methods. A major area of concern is for damage to corals, where large areas have been decimated for the sake of providing decorative pieces for the coffee table.

Reef-Forms from **Aquarium Systems** are the best answer; each piece of artificial coral is modelled on the real thing, down to the last crevice and colour hue. Being light in weight too, they are much less likely to topple, are easier to handle and are a lot less fragile — all of which makes, not only for a longer aquarium life, but also for prolonging the natural life of those real corals left in the sea. (See also **Dave Garratt's** article elsewhere in this **Supplement**).

WATER QUALITY/FILTRATION

Water quality in general, and filtration in particular, has always been critical in marine aquaria, and the original mandatory biological (undergravel) filtration systems are gradually being supplemented or even replaced by other formats. Among these are the combined wet/dry systems, where a complete cleaning of the water is possible, especially where ammonia-based compounds are concerned.

Much of this development is due to new filter media, and the open-pored sintered glass of Siporax springs readily to mind. By far the most 'increased' product is the trickle filter, where aerobic bacteria make full use of *atmospheric* air in their hardly-damp surroundings and consequently provide a much more efficient cleaning service.

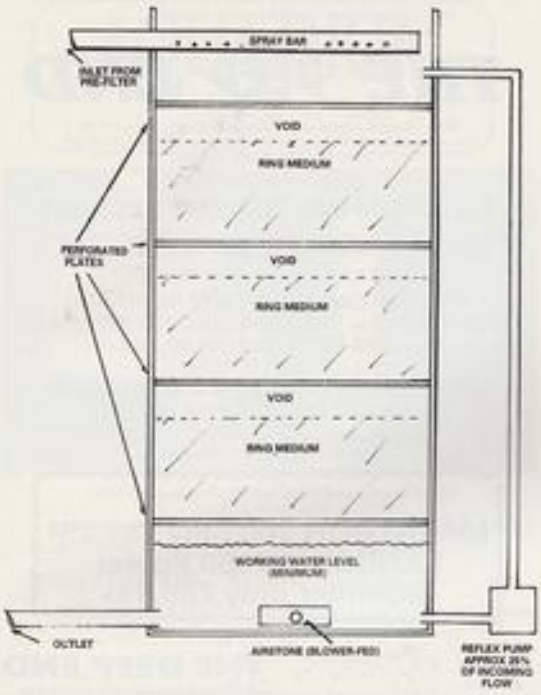
Following the tickle filter with an anaerobic bacteria system (completely submerged and with little oxygen) will allow nitrates to be converted back to free nitrogen once more. Several wet/dry systems are available on the market by independent suppliers.

Right at the forefront of testing and dosing apparatus are **Sander** who, although they may be mostly familiar for their Ozonisers and Protein Skimmers, also make Redox, pH and other important parameter measuring kits. Similarly, **Tunze** pioneered 'hi-tech' filtration not only in its performance, but also in its operational mode — a real tank-top water-management system; this type of 'out of tank' location for water treatment surely inspired the now-common forms of weir-fed filtration systems, except these went 'under-tank' rather than above.

LIVESTOCK

Freshwater aquarists have long enjoyed the results of years of patient work by commercial breeders who now produce over 90% of all the freshwater ornamentals available in the hobby.

On the marine side, things are considerably slower, largely owing to the greater difficulty



JOHN DAWES

JOHN DAWES

JOHN DAWES

Top left, trickle filters — whether of the 'conventional' type, or, as in this case, of 'tower' design — allied to the growth in the range of media available, are resulting major improvements in water quality control.

Top right, a cylindrical aquarium display of captive-bred Clownfish at Florida's Epcot Centre.

Bottom left, away from fish, some marine invertebrates, such as the Queen Conch *(Strombus gigas)*, are also being subjected to maricultural investigation in the US.

Bottom right, currently being reared for biomedical research in the States, the techniques developed for these young Clearnose Skates *(Raja eglanteria)* could, in time, have an impact on the tropical marine aquatic industry.

getting marine species to breed in the first place, and in subsequently getting the fry to flourish.

Despite the inherent challenges, commercial breeding of marines is destined to continue and expand. At the moment, the range of commercially bred 'aquarium' species is quite restricted, consisting predominantly of some eight species of Clownfish and the Neon Goby, plus a few isolated reports concerning Damsels. Angels are also currently being investigated and, it is hoped, other species will soon be added to the list.

Leading the way in this still new field is **Aqualife Research**, based in Walker's Cay, the northernmost island of the Bahamas. We await further developments with bated breath . . .

CLOSING COMMENTS

While a great deal of research and development is, no doubt, going on in many parts of the world, details are much more difficult to come by than on the freshwater side. No matter; whatever the development . . . and wherever it may be taking place, let's applaud it. I just wish that some of those involved wouldn't hide their lights under bushels . . .

OUT AND ABOUT

SCOTTISH ENTHUSIASM SPELLS SUCCESS

By Stephen J Smith

Photographs by the author

If enthusiasm were the key to guaranteed success, then **Brian Patterson** is assured of a very bright future with his young-but-growing company **AquariuManagement.**

As with many Scots, the aquatic scene in Scotland is a subject very close to his heart. "The region is crying out for a good quality aquatic outlet, especially in coldwater species," he reflected.

So, putting his money where his mouth is, he embarked upon providing his special flavour of service to his Glasgow home-town, setting up and maintaining aquariums in shops, offices, and restaurants throughout the area, working at the business virtually round the clock, seven days a week, for the past four years.

Brian has recently been awarded the sole Scottish distributorship of Golden Phoenix Fisheries and thus is able to supply some of the highest-quality imported coldwater stock. "I would dearly love to expand into retailing, as there is a ready-made and untapped market in the region," Brian explained, frustrated only by the fact that he currently has neither the premises nor the capital to make the most of his own potential.

Brian Patterson's enthusiasm plays a major part in his success with his Glasgow-based business, AquariuManagement, providing and maintaining aquarium systems and coldwater livestock throughout the region. Here, he 'sizes up' one of his prize 'Koi' acquisitions.

Beautifully-maintained tanks are the stock-in-trade of AquariuManagement, and Brian Patterson's own quarantine and holding facilities are no exception.

In the meantime, there is no doubt that he is able to capitalise upon his greatest asset, his enthusiasm.

AquariuManagement, 16b Bruce Road, Glasgow G41 5EJ. Tel: 041-429 0363.

FINE PRESENCE AT SCOTTISH GOLDFISH SHOW

A magnificent array of over 200 entries graced this year's Open Show of the Scottish Goldfish Group, held in Edinburgh at the tail-end of August.

The show, sponsored by **Golden Phoenix Fisheries** and **AquariuManagement,** took place at Davidson Mains Church Hall in Edinburgh and attracted entries from throughout Scotland, as well as parts of England.

Coldwater Jotter Stephen Smith was on hand to present the prizes, including Best in Show, to winner **Colin Didcock,** who achieved the title with a very fine Moor.

STEPHEN SMITH

Best in show winner Colin Didcock, from Edinburgh, proudly displays his trophy, with his prizewinning Moor.

In keeping with the developing tradition of specialist Goldfish shows, an auction of Goldfish was held while the judges were 'behind closed doors'; a most popular stall by AquariuManagement also provided advice and accessories throughout the show.

Making the presentations, Stephen Smith remarked: "Praise must go to everyone involved in organising the event, which is a fine testimony to the Goldfish scene in Scotland. With such stalwart support, the hobby is assured of a strong future."

Coldwater jottings

By Stephen J. Smith

THE GOLDFISH WHICH THOUGHT IT WAS A KOI

How many times have I written that it is always your favourite fish which 'gets got'. And isn't it always the case? Sad to report, this was very much so with one of the best-loved Goldfish I have ever encountered, and which joined that big pond in the sky at the end of the summer.

'Big Bertha' was the Goldfish which thought she was a Koi. Aged no less than 13 years, and with a length of approximately 14 inches (35.6cm) from tip to tail, and weighing approximately 2½lbs (c1.1 kilos), Big Bertha, a London Shubunkin, was very much at home

Here in the peak of health during the summer, "Big Bertha" — the Goldfish which thought she was a Koi, was 13 years old, over 14 inches long, and achieved a weight of two and a half pounds before she joined that big pond in the sky.

alongside the Sanke, Ogon, other Koi and mixed Goldfish in the deepest pool of this coldwater chronicler.

Visitors, without exception, took a liking to "that big blue fish with the black dots" and were always impressed by her age, size, and demeanour. Luckily, she leaves several offspring, including a couple of hundred great-grandchildren spawned this year. Hopefully, at least one will surpass her longevity.

(Do you have, or know of, an extra-special coldwater fish, or even one which is older than average? Please let us know, and send a photo if you can, to ***Stephen J. Smith, Coldwater Jottings, c/o Aquarist and Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.)***

HI-TECH REFERENCE

The bookshelves of the fishkeeper are destined to be complemented by video cassettes as the age of hi-tech at last begins to catch up with the aquatic scene.

Two videos, *Goldfish* and *Garden Ponds* from **George Blasiola's** series *Successful Fishkeeping* must surely be of interest to the coldwater aquarist. Now, if you are a long-standing fishkeeper, don't expect to see or hear anything new: these presentations are obviously intended for the aquarist who is just embarking upon the pleasurable pursuit of fishkeeping; and what you will see and hear is very obviously of USA origin and intended for the USA market.

Having set those parameters, these videos provide a most useful introduction to the hobby, presented in a simple, easy-to-follow manner, while there is plenty of information for even the most dedicated enthusiast.

A notice on the cover of *Garden Ponds* exclaims that this is NOT a "How-to-dig-a-hole" video! How true: what follows is a comprehensive review of garden ponds, types of construction, water management, and pondfish care. The best advice any pondkeeper can receive is in the very last sentence of the video, which explains that running a pond is "a project which cannot be rushed".

Titled *Goldfish* on the cover, and *The Goldfish Aquarium* in the title frames, the second video provides an introductory insight into Goldfish keeping, with a review of environment, diet and maintenance, complemented by an intriguing look at some of the more popular (American) Goldfish varieties.

Now, as an enthusiast myself, I found the quality of some of the fish illustrated to be somewhat dubious (especially when a Shubunkin is used to illustrate the Veiltail). However, if I had little or no knowledge of the hobby, I would find the review most informative.

And this is true of both of these videos. Every aquatic society — whether specialist coldwater or general interest — should really have a copy of these titles in their libraries.

And, whether you are embarking on the hobby or are more involved, you will surely find them to be a most useful addition to your bookshelves.

Goldfish and *Garden Ponds* are part of the *Successful Fishkeeping* series produced by **Petvision** and are available, priced £17.99 each, from *A&P* at the Tufton Street address.

SCOTTISH GOLDFISH

"Why not form a regional society?" was my answer to a query during a recent conversation with correspondent **Fergie Brown,** from Glasgow. Fergie is concerned that the immense interest in Goldfish in Scotland is not fully supported, with apparently very few societies catering for such a specialised interest, and all too few retail outlets providing acceptable-quality fish.

So I was delighted to receive news from Fergie that he has developed our conversation with a vengeance, and has formed the **West of Scotland Goldfish Society**. "Interest in the Goldfish is tremendous throughout Scotland," remarked Fergie, "so membership is by no means limited to Glasgow and the surrounding districts".

Further details about West of Scotland Goldfish Society are available from **Fergie Brown, 6 Invershiel Road, Summerton, Glasgow G23 5JG.**

'CHRISTMAS' GOLDFISH GUIDE

One of the favourite books on the subject of Goldfish keeping has traditionally been the *Goldfish Guide* by Dr Yoshiichi Matsui, first produced in Japanese and later translated and published by **TFH Publications, Inc.**

Such has been the popularity and development of the coldwater hobby, and of this book in particular, that it has recently been released in its *third* edition . . . just in time for Christmas.

One of the main failings of many Goldfish references has been the lack of good illustrations of Goldfish varieties. This book, now edited jointly by **Dr Herbert Axelrod** and **Dr Yoshiichi Matsui,** heralds a new generation of Goldfish literature in that new and exciting colour photographs of traditional and new varieties of Fancy Goldfish are incorporated in abundance.

On the minus side, some rather irritating drawings tend to spoil the presentation of a fine volume; and there are some rather dubious captions (ie: "Calico Comet Shubunkins(!) are now the common Goldfish type of Scotland", accompanies a photograph of a *Bristol Shubunkin* — Ouch!

As with many books from the USA, the "ouch" factor is only too prevalent (if only the researchers of these volumes would talk to some of the specialists within the hobby . . . I'm sure they would be only too pleased to assist).

Irritations aside, however, this is a fine volume, presented in a larger format than its predecessors and in hardback, and well worth its £14.45 cover price, even if you already have one of the predecessors and in hardback, and well worth its £14.45 cover price, even if you already have one of the previous editions. A great Christmas present.

Goldfish Guide (Third Edition) by Dr Yoshiichi Matsui and Dr Herbert Axelrod. Published by **TFH Publications, Inc.** Price £14.45. ISBN 0-86622-605-2.

GREETINGS

Finally, to all readers, correspondents, and aquarists throughout the globe, I wish you all a very happy Christmas.

FISH *'KEEPING'* (OR CONSTRUCTING A POND COVER)

Alan Townsend presents a step-by-step guide to constructing a pond cover, both for winter and heron protection.

Photographs by the author

Have you ever had an attack of the herons (very nasty), or perhaps witnessed the neighbour's cat showing a keen interest in pond life? Well, during last February, with snow on the ground and ice on the pond, we had a visit from the local heron.

Standard mortice and tenon joints will give the structure the strength it needs.

It fished through a six-inch diameter hole in the ice (created by an underwater bubble column) and enjoyed the very first fish we purchased, a Comet named (quite appropriately) Haley. This occurred during broad daylight, the harsh winter conditions having obviously forced herons to become more daring. I have noticed, since last winter, that perhaps herons are becoming more approachable, as on various angling venues, herons stride down the water margins in a proximity to anglers that appears unusually close.

Normally, I would stretch a net over the pond surface to protect the fish, but any heavy rain or snow would weigh it down and into the water; if the water then froze, it would be trapped in the ice. So, on this occasion, with a heavy covering of ice, the net was not in place.

ANTI-PREDATOR OPTIONS

Giving some thought to the problems of protecting one's stock from predators during both winter and summer, the options available soon become apparent.

1 Dummy heron

Pros: can look pretty (depending on point of view); easily installed.

Cons: not guaranteed to keep other herons away (could attract them if we believe the one about the amorous heron mentioned in *A&P* recently); won't work on cats.

2 String stretched around the edge of pond about 18-24in (45-60cm) high on sticks with strips of bin liner to flap in wind

Pros: cheap and easily installed; heron put off in case it cannot spread its wings or legs become entwined.

Cons: will not deter cats; can be unsightly; can make access to pond difficult.

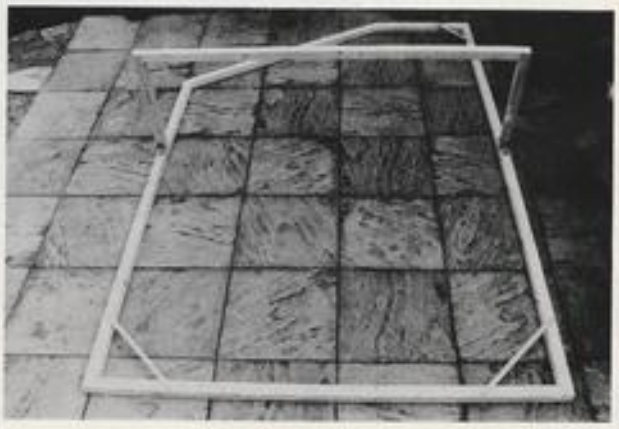
3 Netting stretched over water surface

Pros: cheap and reasonably quick to install and remove.

Cons: can look unsightly (especially, in my opinion, if green in colour; black netting is not so obvious); from a distance it will impair view of fish as you see the net from an angle (not looking directly from above); needs supporting by a central wooden slat to stop it sinking into the water if it rains heavily; during the plant-growing season, plants will be damaged if covered by net; difficulties may be encountered in trying to pin around plants; if the pond is a raised construction (like mine), tensioning of the net can take a few minutes using bricks to hold it down; obviously, putting the net either on or off for total protection during the day can be time-consuming; herons have been known to try to fish through the netting.

4 Wooden folding framework covered with black netting

Pros: reasonably cheap to construct; total protection (herons *and* cats); easily stowed when not in use; quick to install or remove; does not unreasonably impair view of fish at both close quarters or distance; framework



The framework completed (see step 8).

can be utilised for further winter protection with the addition of snow covers with netting still in place; does not damage plants excessively, especially if taller plants are positioned centrally to hinges.

Cons: design and construct yourself; may not be feasible for large ponds.

5 Heron/cat scarer devices (one or two on the market)

Pros: total protection; may also warn off human intruders; electric units are unobtrusive.

Cons: not usually cheap; will either work off trip wires (see 2), or infra-red passive sensors requiring power source; when activated, a variety of movements and noises are set in action (are your neighbours close by?); larger ponds may require more than one unit.

MY SOLUTION

So, these were the options, and having tried netting stretched over the pond, I decided to take it one step further and put it on a framework. The instructions provided here are only guidelines; other pondkeepers may have to modify them to suit their own requirements.

I decided to work in 2x2in (5x5cm) timber, purchased ready-planed to finished dimensions of 1¾x1¾in (c 4.5x4.5cm) approximately. Obviously, careful measurements made at this stage (transferred to a sketched plan) will result in some timbers being purchased cut to the finished length.

Step by step guide

(1) The first stage was to make the central spar, having decided at what height it should be from the pond coping stones (this was 24in — 60cm — with the water level being some 3-4in — 7.5-10cm — lower). The joints used were standard mortice and tenon which were cut as accurately as possible to give a nice tight finish (see photo).

(2) They were then secured in place with waterproof glue, pinned and finally screwed.

(3) Both side frames had now to be made and, with the spar over the pond, the cut lengths for the straight side could be positioned up to it to check calculations were correct.

(4) The joints were once again cut and fastened in place and strengthening spars were added to each corner using thin slats of wood, glued and pinned in place.

(5) Leaving the framework in place again, measurements were taken and the remaining long side was cut.

(6) Then the short side and, finally, the two end pieces to suit contours of the pond were also prepared.

The completed cover in situ.

As a first step in removing the cover, the left hinged 'flap' is lifted.

Once the central upright is folded over to the right, the left 'flap' can also be folded over.

Lifting the left of the folded cover (see previous picture) will result in the whole assembly ending upright but upside-down.

It's then simply a question of lifting the whole assembly off for stowing elsewhere (total time taken to remove the cover: about 20 seconds).

(7) The joints on the end diagonal piece required joints with angles of approximately 45 degrees, this being achieved by laying the diagonal piece of wood on top of the other two and marking in pencil the angle of joint required and then cutting the mortice and tenon to suit.

(8) With all the jointed parts assembled, the three sub-assemblies were then brought together on a flat surface and the hinges were screwed into place (note, the upright central spar must stand on the level surface and not onto the other assemblies).

(9) When all the parts were finally assembled, a power file was used to round off all square edges (this would help handling and also reduce the risk of the netting snagging when folded).

(10) Any joints that were not perfect were then filled with plastic wood and sanded smooth.

(11) A protective finish, using a water-based non-poisonous treatment (I used Wilco Fencecare costing £3.99 for a 4-litre tub) was applied, giving three coats and allowing each to dry thoroughly before reapplication.

(12) Once dry, the netting could be loosely draped over the framework, ensuring complete coverage.

(13) When this was established, a carpet staple gun was used to staple the netting, initially to the centre spar top surface, the netting being doubled over at this point to take any stress. Stapling then commenced at one end and continued round the sides, the net being tensioned before the staple was released. Again, the netting was folded over to ensure a thickness of material before stapling.

(14) Surplus netting was cut off before final stapling to tidy up, and the middle spar upright netting joints were cut, folded and stapled in place.

(15) The other side was completed in the same fashion, again tensioning the netting all the time before fixing with staples. One final tip here is not to try to hold the staple gun too close to the wood as it can fire the staple in so hard as to cut right through the netting.

(16) Finally, two flat case straps were attached to the underside of the central spar for lifting purposes. This type of handle slides totally flat when not in use and, when the cover is in places are difficult to see.

Removing the cover

As can be seen from the photographs, demonstrated by my wife, Patricia, removing the cover has been found, by trial and error, to be best achieved by raising the left assembly upright to the centre, then folding the centre over to the right, followed by the now-upright left hand assembly.

With the cover laid flat on the right side it is then raised by lifting the bottom of the centre upright until it is vertical and, in effect, upside-down. The frame can then be lifted from the pond for stowage elsewhere.

Final tip

I feel the cover achieves most of the targets set for it and, with careful use, plant damage will be minimal, especially if any tall plants 2-3ft (60-90cm) are set centrally in the pond (nearer to the upright). Time taken for either removing or replacing the cover is approximately 20 seconds; thus, we can protect our fish, even if we have to nip out for only 10 minutes.

Some readers may wish to use less substantial wood sizes, but this has also to be considered if the frame will eventually be expected to support winter covers, plus the expected snow.

PROJECT 16
Part 4

Thore Kjellberg concludes his four-part series with an account of the maturation process he adopted for his unique marine set-up and a discussion of some of the unforeseen problems he encountered along the way.

Photographs by the author

And so, to life in the aquarium. First of all, though, I would like to state my views on how to keep animals and plants in an aquarium. I don't want you to think that I solve every problem with equipment. Biology, after all — the science of life — is more important than technology — the science of machinery. A fish can survive without a skimmer, but a skimmer won't work without a fish.

But . . . an aquarium, even one containing 1600 litres of water, is a small restricted prison compared with the deep sea. Therefore, we need to maintain high water quality using technology. The compromise is that the animals eat the algae and the equipment removes dirt from the water.

STARTING UP

Over the past 10 years I have tried many methods of getting the tank started (ie systems maturing), and discussed the subject with other aquarists. The methods tried or suggested have ranged from 24-hour illumination to start with, to zero illumination and no animals for the first 6 months. None of these methods is a good idea, as they don't follow the rules of nature. It is not wise, in my opinion, to try to force maturation.

First steps

Once the final piece of equipment and decor was in place, I could finally get to work on setting up the aquarium. I filled and emptied it three times (using warm water) to flush out dirt, silicone, polyester, and old algae. Then I added the artificial salt mix. I always use this type of salt; I have used mature sea water from 35 metres depth at a research station, but I had problems with algal blooms. Besides, I am lazy, and a lot of work is involved in transporting 75 cans of water back home!

To add a further challenge, I used a salt mix I hadn't tried before, an American salt from Instant Ocean. This is said to be a very good salt with the correct balance of trace elements and a stable pH value. The mix is also dry, so no chemical reaction can start before mixing with water. After adjustment by adding tapwater, the specific gravity was 1.024 at 25°C (77°F). Now all the four Fischer 3500 pumps were used at once to help the salt mix dissolve more quickly.

Week 1

The specific gravity was correct and stable. From now on, the maturation proceeded steadily.

Weeks 2, 3, 4

I added a sensitive fish, a Yellow Goby, at an early stage, in order to have some indication in case an increase in ammonium/nitrite should occur. I was checking on whether bacterial action was taking place. I avoid using robust fishes, such as Sergeant Majors, at this stage, as they can often stand a high level of nitrite, and there may be unexpected problems in adding further fishes.

Metabolic wastes from the Goby would help decrease the time required for bacterial maturation (if we could put fishes in nappies, then we wouldn't need equipment to keep our tanks clean!). Ammonium is mainly a by-product of respiration, and also of excretion, but in lower concentrations.

The completed tank, fully set up and running.

Colony anemones have done well despite my 'September' disaster.

Week 5

The lighting hadn't yet been turned on, though there had been some exposure to daylight.

The first metal halogen lamp was now brought into use, very gradually. The first day it was turned on for only 5 minutes. The period was then increased by 100% each day — 10, 20, 40, 80 — until 10 hours per day was achieved.

Week 6

The second lamp was now brought into action in the same way as the first. Both lamps had an integral cover of quartz glass to protect living creatures from Ultra Violet radiation. No cover glass was used on the aquarium, to permit evaporation so that I could add fresh water mixed with calcium oxide. This was done using a Tunze Osmolator (0.8 litre). A cover glass needs cleaning frequently, as algae and carbonates readily accumulate on it.

The reason why I started the aquarium off slowly is that strong light, even light from the sun, can cause an increase in the bio-load by biochemical action. By this I mean that light can start algae metabolising before an adequate bacterial population has developed, and an unnecessary nitrite level is the result. Although this is hardly measurable, it produces slight toxicity which may prevent the chlorophyll in the algae from shielding their tissues from the UV radiation. The result is brown slimy algae on all surfaces which the light reaches. If there is a small amount of silicon dioxide present you will have a wipe-out.

Despite the slow start, I soon had a small amount of brown thread algae on the overhangs. I removed these with a little help from a filter and a washing-up brush. Amazingly, these horrid algae didn't come back. I think success at this stage depends on slow maturation combined with good tapwater and a high-grade salt mixture. So far so good . . .

Week 7

The ammonia and nitrite levels were zero, indicating that the bacterial levels had stabilised. I did not want to overload the bacteria, and so it was time to start the big Sander skimmer.

The powerful 420 watt motor was brought into play in the same way as the lights, ie 5, 10, 20, 40 minutes per day until constant use 24 hours per day was achieved. To achieve a perfect balance between bacterial and chemical processes in the water, there must be no nitrite. I checked it three or four times per week. Once the level was zero, the protein skimmer could be started.

Week 8

The water quality was perfect, so I was able to increase the bio-loading a little. I did this by adding corals, anenomes, soft corals, and some brown disc anenomes. Remember that brown disc anenomes stand strong light better than red or blue ones.

Weeks 9, 10 and 11

The bacterial action had now started to produce a yellow tinge to the water. So it was time for the next step — ozone.

The 250mg ozoniser started up with almost no noise. Of course, I started the ozoniser off in the same gradual fashion as the lighting and skimmer, except that I increased the ozone by 20mg per day instead of doubling it, as the ozoniser was connected to the automatic redox control unit. So, it took a week extra to reach the desired value of 300mV.

Weeks 12 and 13

The redox was steady at 300mV; as it always drops in new aquaria, I thought the water quality could cope with a large quantity of fish, inverts and higher algae (I avoid *Caulerpa* as it grows too fast and gets out of control!)

The life in the aquarium seemed OK. There were green encrusted algae all over the interior and the animals were growing.

Week 16

Early in spring there was an occurrence which could have led to a major catastrophe.

I noticed that the colony of anenomes was slowly getting smaller. On closer inspection, they were found to be infested with hundreds of 10mm long white parasites. I moved them to my quarantine tank and cleaned the parasites off by picking them off by hand and by putting the anenomes in an extremely strong water current. This process was repeated five times. I then returned them to their former home, and they recovered rapidly.

Next time I will quarantine my colony anemones before I put them in the main tank!

Week 20

Skimming and ozonising made the water very oxygen-rich. There were a lot of air bubbles on the underside of the stones forming the overhangs.

I think this was good for two reasons. Firstly, when there is no water circulation apart from that from the skimmer, lots of bubbles rise to the surface, and the fishes all gather at the surface looking for food in the belief that it's feeding time. To see eight fat Yellow Tangs schooling is a picture that money can't buy.

Another advantage is crystal clear clean

Some of my present crop of corals — all healthy and thriving.

water, so clean that the filter floss did not need cleaning even after three weeks. But the skimmer was dirty after only two weeks.

I am convinced that a combination of strong skimming and a constant redox of 300mV maintained by ozone makes the control of thread algae easier. The skimming decreases the level of nutrients, and the ozone oxidises algae spores into oxygen and nitrate. Thus, the algae that thrive in clean water can grow, the animals eat them, and the cycle is completed.

Naturally, the technical equipment can't completely prevent thread algae. I now have some clumps of thread algae — these are decorative, as long as they are in small groups and are deep green. I have noticed that none of the animals eat old thread algae; perhaps it doesn't taste good.

I was very pleased with my fantastic set-up. It took three months to get the water right, but it now seemed OK.

Nothing exciting happened during the warm summer that followed the setting up. The equipment worked well and the animals flourished. Sometimes the water temperature went up to 30°C (86°F) but the animals seemed unconcerned.

SEPTEMBER DISASTER

All good things come to an end . . .

When the evenings draw in you want to stay at home and watch your aquarium. It was at this stage that a surprising event occurred that caused many losses.

Algal explosion

Lots of brown algae started to grow all over the lit areas of the interior; first slowly, and then faster. After two weeks, the diatoms had reached their full strength and were growing on the inverts. Spots of slimy red algae were also growing between the disc anenomes. The inverts began slowly to fade away. I tried treatment with:

- demineralised water
- charcoal
- ozone direct into the water
- stronger circulation
- no ozone
- no skimming for three weeks
- increase of redox to 400mV
- blue light only.

None of this helped to get rid of the algae. I was therefore obliged to remove them mechanically to avoid the animals dying off quickly.

After a while, I decided to try drastic action, even if this risked killing the inverts. All the light, even daylight, was cut off. The ozoniser and skimmer were switched off for four days. On the fifth day I started up the ozoniser and skimmer at maximum rate. The redox was increased rapidly from 200 to 450mV over half an hour. On the seventh day, the water was so brown that I couldn't see into the tank. On the eighth day, Christmas came early — no brown spots of algae, the interior was green again.

I finished the job by sucking up the rest of the green and brown algae from the bottom. This was easily done. There was a wonderful aroma from the foam cup when I cleaned it out!

The aquarium was back to normal.

Possible causes

What could have caused the problem? I don't know. I expect it was too much 'silicon acid' in my tapwater. As I feared, switching off all the light was a dangerous way to tackle the matter. Many of my animals died — giant clams, Bali polyps, disc anenomes, and several shrimps. A Loriculus and a Ctenochetus Tang also died because they couldn't find any green algae; they were covered with a layer of brown algae.

I kept the redox at 450mV for a week, then lowered it to 425 and then 400. And there it

stayed. I switched off the skimmer and ozoniser for three weeks and it didn't drop any lower.

I tried feeding more, and tried using ascorbic acid. No joy. After a short time it was back to 400. Now the water started to become yellowish, so I increased the redox to 450. I shouldn't have *done* that. Seven Yellow Tangs and five *Anthias* died . . . and, amazingly, I couldn't find their bodies anywhere. No inverts died. The redox was now around 455mV and I couldn't force it lower.

Many aquarists have had problems with the redox being too low, but I had never heard of it being too high!

I subsequently started up a big 37-litre nitrate filter, to find out if this could lower the redox (the flow rate is 50 litres/hour). This filter has now been in action for four months and there is no sign of a lower redox (before the nitrate filter was ready, the redox lowered spontaneously to 350mV).

Mini snails

During the period when the lights were off, many hundreds of small snails, 3mm long, had appeared, derived from an original population which I got from friends. I like these snails very much. They are easy to take care of and they like algae and shadow. They feed at night, and I have seen them in large numbers at a single spot. They don't eat deep enough to expose the white limestone of my decor, but they leave light green areas which are very decorative. The advantage of these over sea urchins is that brown algae don't grow on the grazed area.

To complement them I am going to use some *Neritina* snails from East Africa.

PRESENT SITUATION

The surviving fish seem to be doing well. I feed them four times a week on *Mysis*, *Artemia*, krill, and many other kinds of food. I feed the inverts once a month, starting by turning off all the water circulation, and then adding foods such as fish eggs and Sera Micron. I add the food using a long piece of plastic pipe. The colony anenomes and blue sponges are thriving.

I use trace elements, colloids, bio-element, strontium and potassium iodide occasionally, perhaps twice a year. I don't know whether the animals need them or not — they seem to thrive without them.

Everything is working well now . . .

Maintenance is the simplest possible:

— foam cup cleaned every two weeks (three minutes)
— add tapwater/limewater (see below) to osmolator once a month (five minutes)
— cleaning front glass (five minutes twice a month).

Limewater

Instead of cold water I now use hot water from the tap when I make my limewater. I add only four pieces of calcium oxide, and then wait five days before I use the mixture. Then I mix my 50 litres of limewater with 200 litres of tapwater in a container. This mixture, with a KH of 20 and redox of 210mV, is pumped into the main aquarium via the Tunze osmolator. This device adds 0.8 litre of water per hour. This is not quite enough — I intend to buy a 2.0 litre capacity model later.

I believe that an osmolator, after the skimmer, is the best technical device for making life easier for the aquarist.

Water quality

After a year of running I have changed 180 litres of artificial salt water. Below are the parameters that indicate the quality of the water:

— pH 8.2 — nitrate 10 ppm — nitrite 0.2 ppm — ammonium 0.0 ppm — redox 350mV — KH 14 — specific gravity 1.023 — temperature 25°C (77°F) — salinity 35%.

As I come to the end of this series, a year has passed since I started my set-up. I have no regrets about anything — not the big skimmer, nor the Divinycell, nor the fish and invertebrates.

Editor's Note

Part 1 of Project 16 was published in the April '91 issue of *A&P*, Parts 2 and 3 were published in July and August, respectively.

Reflections By David Sands

OH DEAR, WHAT CAN WE DO . . . IT'S NEARLY 19–92

The day is almost here! 1992 has been heralded as 'Euro Year' and all businesses are supposed to be organised and ready to meet the challenges.

I cannot help wondering if fishkeeping isn't already there. After all, hobbyists have always had something in common with counterparts in all corners of the world. I have been in written contact with fish people in (the then East and West) Germany, Russia, Italy, Holland, Belgium, Spain, Brazil, Colombia, Peru, Australia, USA and Canada. To them I wish a very happy Christmas and a happy 1992.

There have been many myths surrounding German and American fishkeepers. They always get the best fish, keep them in the best conditions and produce the best literature. Of course, that is not true. There are many fine aquarists here in the UK breeding rare and unusual species, and our tropical fish imports can be as exciting as those received anywhere else.

Another myth is that South American fish catchers throw the best fish back into the water. It is true that large individual fishes that would be difficult to store and pack for shipment might be ignored. Usually, a European-based or European-linked operation in South America will export some new and exciting fishes, but this occurs because catchers go further afield. It was Germany's Arthur Werner, whose export base in Belem, Brazil, led to the fantastic collection of 'spiny' Plecs (*Acanthicus* and *Pseudacanthicus*) being imported into Britain over the past few years. Heiko Bleher's various expeditions have also triggered off the import and availability of some new and interesting fishes.

SEA LIFE — SEE LIFE

I would like to congratulate the various Sea Life Centres around the UK for some superb displays. Blackpool exhibits show dogfish and ray breeding in a great educational way.

In the meantime, Brighton Sea Life has taken on the old aquarium and given it a great new lease of life. Eileen, once of Blackpool Sea Life, who is currently 'living it up' in the town of 'dirty weekends' (I'm showing my age!) has made an effort to understand the fishes in her care. The marvellous displays are a real treat for fishkeepers and can help any newcomer to the hobby to think about aquascaping in a natural way.

It's easy to praise the billion-dollar Sea World-like centres in the USA, but here in the UK we can do a lot on a much smaller budget.

In these troubled times, it might also be an idea to support London Zoo Aquarium, Chester Zoo Aquarium and the modest set-ups like the one I visited earlier this year at Bolton Civic Centre.

If these displays promote fishkeeping, then our hobby will grow . . .

A RED TAIL

I recently conducted a quick survey of about 60 sets of details provided by Red-tail Catfish keepers over the past year and was *horrified* to note some of the statistics.

The ratio between fish length and aquarium gallonage was sometimes *so low* that I wanted to write immediately and ask if the keeper had upgraded the size of system.

The greatest fear I have is that all those people who purchased the juvenile Red Tails on a whim (these juvenile RTC's are the product of hormonal breeding in the Far East or South America), thinking they would upgrade in the distant future, will find themselves struggling to keep them alive. I have heard of 15-inch (38cm) RTC's being kept in 36 × 15 × 12in (90 × 38 × 30cm) aquaria . . . it doesn't bear thinking about!

The increase in back page adverts selling 18-inch (45cm) RTCs is very worrying. I can see the day arriving when someone will have to run a Red Tail Rescue Service (there is probably someone somewhere already working on it). What on earth do you do with a two-foot (60cm) Red-tailed Catfish that no one wants? This question needs to be answered. Has anyone got any ideas?

I do feel slightly responsible for the boom in keeping RTC's, although I could not have predicted the influx of *'cute little baby reds'*. Impulse buying is a dreadful thing.

Some keepers are extremely responsible, of course. They provide the best filtration, the biggest aquarium possible and the best care and attention.

Don't misunderstand me. I realise the financial and space limitations that most home owners encounter, and that's my point really. Fishkeepers need to be aware that a two-to-three foot Red-tailed Catfish requires a tank/pond ten-foot by four-foot by four-foot (3 × 1.2 × 1.2m). What house can accommodate such an object?

In the current climate of responsible attitudes towards animals and nature, I believe a code of practice might be in order. This should happen before an outside body does it for the hobby. Any thoughts on this matter would be gratefully received via the editor.

POSITIVE POISSONS

Fishkeeping should have a rosy future. There is much more equipment, water testing, fish treatment research and development going on now than ever before. I look forward to the time when *all* equipment available is dependable and reliable and is suited to day-to-day normal usage. It's surprising how much equipment is not 'user friendly'.

Have you ever tried to uncouple a power filter inside an aquarium base cabinet late one evening? In my house there is always lots of swearing at this stage. I feel that the equipment situation suffers a little from the 'planners who decide where to hide roundabouts, motorway signs and such-like syndrome' in that I wonder if they ever have to test working equipment in a real environment. Luckily, things are changing and Hi-tech, 'user friendly' developments are on the way.

DAVID SANDS

User friendly hi-tech equipment like this *should* become the norm one day.

In the meantime, please enjoy your hobby. Don't forget that you should find time to sit and watch your fish in a relaxed manner. It's no use if the only time you ever see your fish is when you are undertaking water changes or feeding. Most fishkeepers took up the past-time in order to enjoy a relaxing hobby. It is very easy to forget that simple fact! Happy fishkeeping.

Books & video

The Waterlilies

A Monograph of the genus Nymphaea

By: Henry S. Conard
Introduced by: Philip Swindells
Published by: **Lark Publications**
ISBN: 0 948697 17 2
Price: £95 (US$200)

Like all other waterlily enthusiasts the world over, I've been aware of the existence of this 'Bible of Waterlilies' for years. Again, like so many of my fellow 'liliephiles', though, I had never seen this revered publication at close quarters.

Now I have . . . and what a tremendously exciting experience it's proving to be. I knew in advance, of course, that I was in for a rare treat, but there's a world of difference between *knowing* and *experiencing*.

Let me quote the opening paragraph of Philip Swindell's introduction:

"Since the publication of The Waterlilies *in 1905 Henry S. Conard has become regarded as the 'Father of Waterlilies'. Students and researchers, amateur gardeners and commercial growers, each have turned to Conard for the final word on almost anything taxonomic concerning the genus* Nymphaea. *Although research has continued, a new species have been discovered, and much hybridising has taken place since 1905, Conard's monograph still provides the foundation upon which all serious studies of the genus are based. It is an invaluable work, for not only does it embrace Conard's original research and views, but also collates those of De Candolle, Planchon and Caspary, thereby bringing together an enormous wealth of botanical knowledge."*

As all pondkeepers and water gardeners know, Philip Swindells — an occasional contributor to *AGP* — is a leading authority when it comes to waterlilies having, himself, written the standard modern-day English-language book on these regal plants. So, when Philip says that it was a privilege and an honour for him to be invited to write the Introduction to this 1991 Facsimile Reprint of *The Waterlilies*, you know that we are dealing with something very special.

The Waterlilies is an exact reprint of the original 1905 edition. All the original text and illustrations are there, the only modification being the order and location of the plates made, in the words of the publishers, *"to facilitate the colour printing by grouping them at the front of the book"*.

There are 30 plates in total, 12 of which are in colour, the remainder in black and white. These plates depict (a few, in minute detail) some of the most beautiful species, hybrids and varieties. A further 823 figures, scattered throughout the text, illustrate other types, along with flowers, leaves, seeds, reproductive structures (anthers, stigmas, ovaries), vascular bundles, rhizomes, tubers and virtually every other important part of a waterlily.

The text is written, as one would expect, in 'learned' style, representing what was, at the time, the most thorough thesis ever written on the genus *Nymphaea*, an honour which this monumental work still enjoys today. There are, in total, 279 large pages of text; these are in addition to the 30 plates, Introduction, Preface, and lists of contents, plates and figures.

The index, on its own, takes up to 14½ pages, while the Bibliography, at 20½ pages, is, in its own right, a major contribution, listing important earlier works dating from as far back as William Turner's 1548 *The Names of Herbes*.

The main chapters (most subdivided) are: History, Structure, Development, Physiology, Taxonomy, Distribution, Hybrids and Garden Varieties, and Culture and Uses.

If you are looking for a very special gift for a very special person, then go for *The Waterlilies* and you'll have a friend for life! If you want *the* book of the year, then this is probably it. At the very least, you should pester your local public library to obtain a copy. The interest in waterlilies is so great these days (and is growing so fast) that no library could consider itself complete without, at least, one copy.

John Dawes

BOOK NEWS FROM STEVEN SIMPSON NATURAL HISTORY BOOKS

The Whales of Hawaii

By: Kenneth C. Balcomb III, illustrated by Larry Foster
Published by: **The Marine Mammal Fund**
ISBN: 0 9617803-0-4
Price: £4.95

The Marine Mammal Fund, based in San Francisco, California, is a non-profit organisation devoted to public education and research on marine mammals and ocean issues. Their new book is a fine photographic guide to the twenty or so species of whales and dolphins, and the one seal, to be found in Hawaiian waters at some time during the year.

The marine mammal fauna of Hawaii is one of the most spectacular in the world, with recent, confirmed sightings of five species of baleen whales, six species of large-toothed whales, and a bewildering eleven varieties of dolphins. The one seal could be said to be the most Hawaiian of Hawaii's marine mammals. It is the endemic and sadly endangered Hawaiian Monk Seal, *Monachus schauinslandi*, which can be seen on the islands of the leeward Hawaiian Archipelago (from Nihoa to Kure) and ranges out to sea for hundreds of miles from its favourite haunts.

While not a field guide, this handy volume of 100 pages gives species accounts for each and is illustrated throughout with colour photographs and carefully researched illustrations to aid identification and to give the visitor or interested reader an insight into the lives of the varied fauna. The quality of illustration is high considering the difficulties involved in photographing some of the shyer species. One of my favourite photos is that of a group of the gregarious Spotted Dolphin, *Stenella attenuata*, standing on their tails and looking curiously at the camera!

The book concludes with a short appendix of accounts of four species of whales and dolphins, including the Blue Whale, *Balaenoptera musculus*, not yet observed in Hawaiian waters but included because their known range does not entirely discount their occasional presence. The reading list suggests a number of useful volumes for reference, notably the incomparable field guide *The Sierra Club Handbook of Whales and Dolphins* by Leatherwood and Reeves.

For further details, contact **Steven Simpson, Natural History Books, PO Box 853, Brighton BN1 5DY. Tel: 0273 727 328; Fax: 0273 203 754.**

Three useful German books

The following three books are published in German by **A Ziemsen Verlag, Lucas-Cranach-Strasse 21, Lutherstadt, Wittenberg, Germany.** Each makes an exhaustive study of its subject, and will be of great value to the specialist, assuming the foreign language is not an insurmountable problem.

The publishing house is located in what was, until recently, the German Democratic Republic (East Germany), and this is reflected in the rather utilitarian presentation — soft cover, only a few colour photos, and a somewhat confusing tendency (at least to the Western reader) to pass from one major section to the next with only a few blank lines and a small title to mark the transition! The content, however, is excellent.

Because of the language barrier it seems unlikely that the books will be readily available in the UK, and it is suggested that anyone wishing to purchase any of these books should write to the publishers direct.

① Der Goldfisch

By: Rudolf Piechocki
Price: DM 9.40
ISBN: 3-7403-0244-5

The book opens with a short history of the Goldfish, followed by sections dealing with the various fancy types developed in China and Japan and with its status worldwide. It then turns to the more practical side, with a chapter on maintenance, which includes not only the usual advice on pond/aquarium maintenance and breeding, but also details of physiology and the identification and treatment of disease.

Two further chapters deal with the genetics of the Goldfish (and its application to the numerous cultivated forms) and with the role of the species as an experimental animal, and finally, a 'Goldfish-Keeper's Calendar' detailing the work necessary in the pond throughout the year. There is also an extensive bibliography, mainly of scientific papers.

The illustrations cannot be described as lavish, but they are adequate for their purpose; they include a few colour plates, rather more black and white photos, and a number of excellent line drawings.

② Der Guppy

By: Hans-Gunter Petzold
Price: DM 15.30
ISBN: 3-7403-0164-3

The author was working on this, the third edition of his book, at the time of his death in 1981, and, in consequence, publication was delayed for some years pending completion of the revision by another expert in the field, Dr Joachim Kormann, Curator of Fishes at the Berlin Zoo.

The opening chapters cover the history of the Guppy and its systematics, its physiology and coloration, and its natrural range and habitat. These are followed by far more detailed sections on maintenance and breeding, and an in-depth study of the genetics of the species, which should be of considerable value to anyone contemplating creating a new variety from scratch. This section also covers the various forms and colours and the international standards for finnage.

The book concludes with a short section on the role of the Guppy as an experimental animal, and a comprehensive bibliography.

Unfortunately, the photographs are only black and white, and it is to be hoped that the disappearance of the Iron Curtain will remedy this in time, as colour really is required to do illustrative justice to the subject.

③ Eingeburgerte Fischarten (Introduced Fish Species)

By: Andreas Arnold
Price: DM 17.20
ISBN: 3-7403-0236-4

This is a detailed study of some 10 species of fishes which have been introduced (deliberately or accidentally) into European freshwaters. It covers the biology and requirements of the fishes, their feral distribution and habitat, and their effects (if known) on native fauna and flora.

This is a book for the biologist rather than the aquarist, but nonetheless, of interest for the information on biology and ecology.

Mary Bailey

Creating an Aquarium

Written by: John Dawes
Produced by: **Renaissance Vision** in association with **Pisces Aquaculture (Tewin) Ltd** and **John Dawes**
Price: £14.99
Distributed by: Renaissance Vision,
9 Capitol House,
Heigham Street,
Norwich NR2 4TE
Tel. and Fax: 0603 767272

In my opinion, television and its associated media will never really replace the written document as an essential source of reference in any specialist field, and fishkeeping is no exception. The aquatic hobby is, however, based very much upon visual appeal and, therefore, television and video provide a perfect opportunity to complement most effectively existing works of written appreciation of the hobby.

Unfortunately, full advantage of this opportunity has not really been taken by authors/producers and, of those video productions which have passed through my offices, all too few have been impressive enough to rank alongside some of the first-rate written works which adorn my own bookshelves.

That is, until now.

At last we have a video produced by someone who knows what he is talking about, knows how he wants to say it, and knows his limitations well enough to find a first-class producer to ensure that the quality of the presentation is as good as the content.

In other words, this is a darned good video.

Creating an Aquarium makes compulsive viewing for anyone with even the faintest interest in the aquatic hobby, and should be made compulsory for anyone considering venturing into any any area of fishkeeping.

Presented in John Dawes' characteristic meticulous style, the viewer is introduced to all aspects to provide a comprehensive and concise guide to making the right start in this pleasurable pursuit.

Detailed presentation of setting up tropical freshwater, coldwater freshwater and marine aquarium systems is complemented by sensible advice on just about every aspect of starting up — from buying your aquarium and accessories, to choosing your fish.

Some breathtaking photography on undersea locations and of established aquaria provide a stunning complement to the 'instructional' sequences. Look out particularly for footage of the Hong Kong Butterfly Pleco — a stunning tropical fish — as well as one or two exhilerating Fancy Goldfish.

A minor criticism would be that too little time is given for the viewer to absorb the on-screen graphics: perhaps these, reproduced in a leaflet, together with an indication of 'content', would form a most useful insertion within the package.

However, at only £14.99, you really do get your money's worth, with almost an hour of the most useful and practical advice any fishkeeper could wish for. Follow this advice and you really shouldn't go wrong.

Indeed, all that is missing from this video is John Dawes wearing a goldfish bowl (Sea Trek style) over his head!

Stephen Smith

Koi Calendar

By David Twigg

GIFT HINTS

Christmas is almost with us and this is a relatively quiet period as far as Koi keeping is concerned. As mentioned before, we should not neglect our fish during this time, but neither should we neglect our spouses!

What would your other half like for Christmas? Does he/she have everything that a Koi keeper could wish for, or can you think of something which would be most gladly received?

I will try and give a few ideas here.

Books

The Dr Kurokis's books entitled *The latest Manual to Nishikigoi* and *Modern Nishikigoi* are still favourites and contain a wealth of useful information, as well as a collection of colour photographs representative of the varieties of Koi. Both books are published by **Shuji Fujita, Shin-Nippon-Kyoiku-Tosho Co Ltd** and Modern Nishikigoi has ISBN number 4-88024-102-4 C2076.

Another well illustrated book is *Koi Varieties* by **Dr Herbert Axelrod**. Not only does this book have more than 250 colour photos of 'All-Japan' Show winners, but it also has chapters on the origins of Koi. Published by **T.F.H. Publications, Inc.**

For a very comprehensive coverage of Koi keeping, you should consider *The Interpet Encyclopedia of Koi*. This book, published by **Salamander,** and a favourite of **John Cuvelier,** covers just about every topic in Koi keeping that you care to name. Considering building a new pond? If so, this book will provide plenty of ideas and good advice.

For the Koi keeper who wishes to find out more about fish disease and the methods of diagnosis and treatment of same, then the *Textbook of Fish Health*, published by **T.F.H.,** is a must. This book was written by Dr George Post, a fish pathologist, as a reference and textbook suitable for undergraduate fish health students. There are 32 pages of coloured photographs (182 in all) included which show, not only slides of bacterial cultures, gill filaments and the like, but also photos of dissection techniques and parasites etc. ISBN 0-86622-491-2.

Videos

Moving from books to video tapes, a few months ago I reviewed a video made by the Northern Section of the BKKS called *Koi Care Part 1. Part 2* has now been released, runs for 23 minutes and covers anaesthesia, topical treatments, short bath treatments and pond treatments.

Again, this video is clearly presented by Koi keeping vet **Tim Grantham** and would make an excellent addition to the Koi library. At £7.25 for Part 1 and £8.25 for Part 2, these videos can only be regarded as excellent value for money. Contact Mike Donlan on 061-643 9107.

Bronze Koi

Now for the present for the Koi keeper who has everything . . . well, almost everything! A bronze Koi over 24in long. These are obtainable from **Brit-Koi (Hounslow) Ltd** and **Japanese Water Gardens** at a price just under £100. Contact Brit-Koi on 081-847 4730 or JWG on 0602 397926.

RECENT EVENTS

The last show of the year for me was the Mid-Somerset Section BKKS Show at the Bath and West Showground on the weekend 7/8 September. I had attended the wedding of a relative in Wellington on the Saturday and, having stayed with "la tante de ma femme" overnight, found it convenient to call in on the 'Countryside Cavalcade' on my way home on Sunday.

This was a very well presented event by the Mid-Somerset Section, with a good collection of healthy Koi on show.

Alan Purnell, the Mid-Somerset show secretary, had had his team of willing workers setting up the vats etc, over the previous few days on the balcony of the Showerings Pavillion, overlooking a Craft Fair.

The Membership stand was kept busy answering a constant string of questions from the public, many of whom were not Koi keepers at this time, but I have no doubt many will have been converted by what they saw and heard. Copies of the last two **Koi Supplements** published by the *Aquarist & Pondkeeper* were being given away to the really seriously interested visitors.

An excellent selection of dealers attended from the surrounding area, together with Quality Koi who travelled all the way from Yorkshire to 'show their wares'.

The judges made their decisions on Saturday and the prize presentations were made on Sunday. Each of the thirteen varieties had been split into two size groups, and there were other 'Special Awards' including the Best Fish in Show

DAVID TWIGG

DAVID TWIGG

Above, Mid-Somerset Section Dealers' Champion — a Sanke from Taunton Koi.

Left, Maria Groves receives her award for Best in Show at the Mid-Somerset BKKS Section Show.

Below, a study in 'Koicentration' at the last port of call on the Northants trip to the Northern BKKS Section.

DAVID TWIGG

Herpetology matters

By Julian Sims

CHRISTMAS PRESENT IDEAS

What do you buy for the herpetologist in the family at Christmas time? One practical and very welcome solution would be to pay the **annual subscription** to a herpetological society — either in Britain or North America (refer to details given in the July and August 1991 editions of **Herpetology Matters**):

ASRA, c/o Cotswold Wildlife Park, Burford, Oxon OX8 4JW.
BHS, c/o Zoological Society of London, Regent's Park, London NW1 4RY.

Alternatively, a **book** might well be the practical answer to this problem, while proving to be a useful and much appreciated present. Two mail order specialists supplying books on all aspects of natural history, including herpetology, are as follows:

Natural History Book Service Ltd., 2 Wills Road, Totnes, Devon TQ9 9XN. Tel: 0803 865913.
Steven Simpson, Natural History Books, PO Box 853, Brighton BN1 5DY. Tel: 0273 727328.

Both suppliers will, on request, provide a copy of their latest **free** catalogues, which list the extensive range of books currently available.

Items of **vivarium equipment** also make very good presents. There are three main categories which might be considered:

① Lighting equipment

Natural sunlight is very beneficial to the vast majority of reptiles (and many species of amphibian). Unfortunately, the useful ultra-violet (UV) rays in sunlight, which help to make vitamin D in the skin, are filtered out by the glass in windows and the glass of the vivarium. Thus, an alternative source of illumination and ultra-violet might be provided for reptiles during the day. One such source is from a True-Lite fluorescent tube. These are imported from the USA by:

General Acoustics Ltd., Salter Road, Cayton Low Road Industrial Estate, Scarborough, North Yorkshire YO11 3UZ.

As each fluorescent tube is quite expensive, one would make a very nice present.

② Heating equipment

Suspended ceramic infra-red heaters

Although certain types of fluorescent tube provide UV rays similar to those available from sunlight, such tubes provide very little heat. Sunlight has a warming effect, and many types of reptile bask in it to increase their body temperature.

A suspended ceramic infra-red source can be used as a substitute for sunlight to create basking 'hot spots' in a vivarium. These ceramic units make very useful presents, much appreciated by reptiles and herpetologists alike.

Submersible heaters

Artificial heating in freshwater turtle tanks can be provided by using underwater heaters inside the aquarium.

The best ones to buy for turtle enthusiasts are those with aluminium tubes, for example, **UNO Regal Heaters** manufactured by **C. Ellson & Co. Ltd., of Nantwich, Cheshire.** These impact resistant heaters are particularly useful for freshwater turtles, which, being active reptiles, can knock the heaters about as they swim around.

Heating mats

An alternative source of heating for tanks used to accommodate freshwater reptiles and amphibians can be provided by a heating mat placed *underneath* the aquarium. **Ultratherm Heaters** are manufactured in **Kinghorn, Fife** and carry a 10 year guarantee — a long-lasting present indeed.

Thermostatic controllers

Due to the activity of freshwater turtles, it is a good idea to keep tank 'furniture' to a minimum. Therefore, an external thermostat to control the heating is a practical solution. A **UNO Slik-Stat**, manufactured by **C. Ellson & Co. Ltd.** could therefore be a possible present.

Alternatively, instead of using a traditional type of thermostat with a bi-metallic strip to regulate the temperature in a vivarium for snakes or lizards, a solid state electronic thermostat with a remote sensor could be used. Such a piece of equipment is the **Vivarium Temperature Controller (or VTC)** which was reviewed in the January 1990 edition of **HM.** Further details about this product can be obtained from:

Bio-Pet, 55 Boundary Road, London E17 8NQ.

Solid state electronic thermostats have the advantage that they are very much more sensitive than bi-metallic thermostats. However, they are also very much more expensive — quite an impressive gift.

③ Filtration equipment

The time taken for suspended material to build up in water inhabited by reptiles such as freshwater turtles will depend on (a) the size of the pond or aquarium, and (b) the size and number of the inhabitants.

A **power filter** would make a useful present to remove this suspended material. A number of different manufactures supply filters especially designed for ponds and large aquaria. Further details about these powerful units can be obtained from the manufacturers themselves or from retail outlets which regularly advertise in *A&P*.

For example, some of the larger **Eheim** external filters are also fitted with a heating element and very sensitive thermostat — another practical way of removing these essential items from the inside of a freshwater turtle tank. Details about Eheim products, including their underwater modular pond filter, can be obtained from:

John Allan Aquariums Ltd., Eastern Way Industrial Estate, Bury St Edmunds, Suffolk IP32 7AB. Tel: 0284 755051.

Powerheads can be attached to your own design of filter chamber — refer to **Product Round-up** in the January 1990 edition of *A&P*. Further details about **Sacem** powerheads can be obtained from:

Interpet, Interpet House, Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 0306 881033.

Details about **Cyprio** products, together with a range of leaflets giving information about the *Principles of Pond Filtration* and *Pond Vac Systems*, can be obtained from:

Cyprio Ltd., The Peterborough Koi Centre, 133 Eastgate, Deeping St James, Peterborough PE6 8RB. Tel: 0778 344502.

NO LIVESTOCK PLEASE!

Tempting as it might be to give reptiles and amphibians as presents, livestock **do not** make sensible gifts. There are a number of reasons why they should not be given to potential herpetologists. For example, appealing impulse purchases are often difficult to keep — careful consideration should be undertaken before any animal is acquired.

In particular, preparation of adequate housing and a supply of suitable food must be organised. If livestock are unthinkingly given as presents, the opportunity to make this thorough preparation might not occur — especially through a holiday period when shops are closed.

I hope that readers will find these suggestions of help in the selection of a suitable present for a herpetologist friend, relative, husband or wife.

I wish you all a very Happy Christmas and successful New Year.

OUT AND ABOUT

THREATENED WORLD OF FISH

By David Sands

Attendance sponsored by the Aquarian Advisory Service / Pedigree Petfoods

The in-vogue theme title of the 7th International Ichthyology Congress held in Den Haag, Holland, at the end of August — *The Threatened World of Fish* — must have caught the imagination of many of the 446 delegates from 51 countries, with strong support from the USA, Canada, Germany, Italy, Spain, UK and, not surprisingly, the Netherlands.

The extreme political changes in the Soviet Union, developing at the time of the congress, must have also concerned a few delegates. The 16-strong delegation from the USSR must have been attempting to read newspapers between lectures. Among the delegate lists could be seen representatives from troubled countries such as Estonia, Lithuania, Slovenia and Yugoslavia.

'UNKNOWN' FISH

The opening, or plenary lecture, on the first day was presented by **Dr P H Greenwood,** formerly of the fish section of what is now known as the Natural History Museum (some marketing spark must have missed the fact that this name change clashes with every other natural history museum in the western world!).

Dr Greenwood's lecture title *Are The Major Fish Faunas Well Known?* was loaded. With a wry grin, he answered with an abrupt NO! Then he expanded the point by stating that of the 27,000 + fish species "scientifically accounted for" not enough was known about most of them. "The answer is . . . we have long way to go . . ." he said despondently.

Dr Greenwood expressed concern that biochemical studies might be 'taking over' from other conventional systematic fields. "You can't check a fish's DNA on the river bank . . . . to identify which species it might be . . ." Greenwood announced astutely.

Dr Greenwood made the common complaint that not enough money has been made available for the "all-important" ecological studies of fishes. "The way to finance such research," he argued, "is through diplomacy!" "To be used on those who control the purse strings," he concluded. This is an art that has yet to be learned by many scientists — maybe we should have a special course on the art of persuasion."

Dr Greenwood went on to cite the disastrous introduction of the Nile Perch, a voracious fish predator, into Lake Victoria. Greenwood admitted that in 1974 he considered the huge species flocks of Haplochromids would be strong and resilient enough to cope with just about anything. "We know now," he continued rather gloomily, ". . . that those species flocks were extremely vulnerable."

Some ten years ago, by real coincidence, a colleague of Greenwood in the Fish Section (who was in attendance at this Congress) working at the British Museum of Natural History (as it was known then) castigated me in writing for *daring* to publish my thoughts "that scientists did not know enough about fishes, not at least when compared with other avenues of natural history such as ornithology or entomology."

I wonder how this 'ex colleague', still working at the Natural History Museum, feels about Greenwood's emphatic answer to the question posed in the opening lecture?

Greenwood's challenge to fish scientists to encourage more Government investment (certainly drying up for museums of late), could have its origins in his own bitter experience. The severe cutbacks imposed on one of the world's most famous natural history establishments affected Greenwood personally.

Speaking for myself, I would immediately hire someone like David Attenborough who could certainly charm the relevant ministers out of their respective trees . . .

The Congress week brought together various theme symposiums covering the full range of sciences including taxonomy, conservation, anatomy, polar biology, ecology, neurobiology, cichlids, cytogenetics, larvae, ecomorpholgy, behaviour, fisheries, ecotones, osmoregulation and life history.

POSTER DISPLAYS

The two poster displays under the *'Ecotones'* and *'Behaviour'* titles caught my eye. The first from **Dr Witte** of the University of Constance, Germany, and the other from **Dr Benoni Seghers** and **Zoe Billinghurst,** of the University of Oxford.

Dr Witte's poster — titled *Semiaquatic Ecotopes in Peat Swamp Forest, a threatened habitat with a special aquatic community* — showed familiar and not so familiar *Betta* species (Siamese Fighting Fishes) and their Southeast Asian lowland swamplands habitat.

In the leafy, shallow waters, these beautiful air-breathing fishes and juveniles of opportunist species have adapted. Exploitation by man (of course) is threatening this special environment, though.

Dr Ben Seghers' work on the mating tactics in Guppies involves working with wild-caught Guppies from Trinidad. Only over-bred multi-variant, highly coloured, long-finned, farm-raised specimens are available in the ornamental

DAVID SANDS

DAVID SANDS

Above, Dr Witte presented a fascinating study of wild fighting fish. Below, Dr Ben Seghers' poster displays showed Guppy males to be potential 'opportunistic maters'.

trade, but pictures of Segher's wild-caught fish showed them to have plenty of colour.

Seghers, a Canadian exile at Oxford, proved in research that female Guppies, distracted by predators, could find themselves the recipients of sneaky "gonopodial thrusting" by opportunist males . . .

The same behaviour also came into play when female Guppies were distracted by the presence of food.

There is so much mankind can learn from fishes . . .

One over-view did come into mind during the course of the week: while fish continue to have a much less 'cuddly profile' — when compared to the likes of the Speckled Panda and Siberian Tigers — the 'world of fishes' will continue to be threatened without as much as a murmur.

TAXONOMY HIGHLIGHT

In the Taxonomy Symposium **Dr Tyson Roberts,** an American Ichthyologist working and based in Thailand, illustrated his extensive research in the Mekong and surrounding river systems with transparencies of many new, undescribed fishes.

Robert's inventory of the *Freshwater Fishes of Thailand* will probably double the 550 species detailed in Smith's excellent revision of 1945, *even* discounting the 80 species of marine and brackish fishes which would not have been included.

If Dr Roberts' Thailand example was replicated in Africa and South America and produced similar findings, Dr Greenwood's statement that "The major fish faunas are not known" would prove to be a real understatement.

PREDATOR PREY BEHAVIOUR

During the behaviour lectures, an Oxford PhD student carefully unfolded prey 'inspecting' predator theories. Her work related to housing together a single Pike and four to fifty Minnows (although Home Office regulations meant that the predator was restricted in a tank within the laboratory aquarium).

She apologised on more than one occasion for this quirky, English problem which (I am informed) is meant to prevent 'detergent-in-the-eyes-of-rabbits' type research. An American fish ethologist, Julia K. Parrish, (based at the Fisheries Research Institute at Seattle) immediately followed with a 'Do-predators-shape-fish-schools?' question which unintentionally made the Oxford work seem rather one dimensional.

The Seattle scientist's research involved underwater field observations in the ocean watching "half a million strong shoals" of silver fish in clear, shallow water, being attacked by benthic and pelagic predators, the latter group being Tuna which attacked shoals and rammed individual fish in what she enthusiastically described as "Rambo" fashion.

So much to know with so little time to find out, is how I felt about the whole thing.

RIVER DAMAGE

In the final plenary 'Fisheries' lecture, **Dr R L Welcomme,** from Italy, expressed alarm at the damage done to the rivers of the world.

"Diverting rivers, building hydro-electric schemes, changing the shape of rivers and estuaries" is obviously threatening "the world of fishes", according to Dr Welcomme. He suggested that the world should be worried about over-exploitation and possible extinction of fishes.

He listed how fisheries could put pressure on fish stocks by accidental capture (a species could be susceptible to capture at the same time as the target fish), interception during migration, commercial pressures in the shape of subsidies, acidic drops leading to depletion of stocks, pollution and euthrophication.

Dr Welcomme did manage to slip into his lecture that 70% of all fish are eaten by other fish . . . He cited terrible examples of fish introductions, including the Nile Perch, Catfish, Zander, Pike and Sea Lamprey, the last of which has more or less severely depleted (as parasites), the fish stocks of the Great Lakes.

Dr Welcomme pleaded that urgent action to combat the situation of the poor state of world-wide fish stocks and aquatic environments, must come from a national and international level.

PRODUCT ROUND-UP

BY DICK MILLS

Crystal clear

The following should hold your interest, no matter where your aquarium loyalties lie; just read on and it will soon become **'CRYSTAL CLEAR'**.

Bob Tomlinson didn't use filters, preferring to maintain well-balanced aquaria instead and believing that filter media were (at that time) quite inefficient. However, he switched from using Spaghnum Moss Peat (as an acidifying biological filter in Tetra and Discus breeding tanks) when he started experimenting with a synthetic non-woven material — FILTER MAT — in the middle 1960s. The Crystal Clear method of treating this material claims to be much safer than others, as the resin is heat-bonded on to the material instead of being sprayed on; this is necessary as the resin is usually water-based and will contaminate the water if not bonded more permanently. This breakthrough provided just the stimulus Bob needed to develop further Crystal Clear products.

Activated carbon was next to be examined by Bob and his latest collaborator, Marine Biologist **Jack Swain**. The result was Coal-based XJ100 ACTIVATED CARBON, having an adsorption rate of between 1,100 and 1,200m/g surface area (the highest on the pet market). Of the seven other carbons marketed by Crystal Clear, XJ100 is the best 'all-rounder', the others having more specialist uses (information on request). XJ100 does not affect pH, and will not leach any chemicals or previously adsorbed materials back into the water; it needs no washing and is suitable for both freshwater and marine use.

Apparently, Bob's early aversion to filter materials hung over during the early production of Filter Mat, even though 'floss' was part of the production process, for it was not added to the range of products until two years had passed. However, this is again due to Bob's insistence upon quality performance — the double-carding effect and long staple length give a strong, long and heavily-crimped fibre which, in turn, gives a good void space with springy texture, ideal for a smooth flow of water but with effective trapping properties for both large and small debris. Thus FILTER FLOSS was born.

Continuing to think originally, it was not long before two previous products were merged to form ACTIVATED FILTER MAT and soon other practical products were on stream: PEAT (for biological use but only for fishes that tolerate acidic conditions), RESIN (for softening water, replacing removed calcium ions with sodium ions; re-chargeable using an ion-exchange column), DIATOM POWDER (for removing particles down to 1 micron in size; needs specially-made filtration equipment), POND FILTER PADS (3in – 7.5cm – thick non-woven, heat-bonded material — claimed to be more efficient and cheaper than foam).

The most innovative of the product range has to be the TURBULATOR diffusers. A Turbulator diffuser can be stripped down, boiled and cleaned, and works with any air-pump at any depth; a life-span of over 2 years is not uncommon, even in marine tanks. The perforated rubber tube is weighted down internally with two pieces of the best 316 stainless steel and has moulded ends for standard 4mm airline. The range includes useful sizes from 2in (5cm) right up to 18in (45cm) and has broken into the Koi market too.

AQUARIUM TONIC SALTS were introduced way back in 1969 (we've just missed their 21st birthday!) but remain among the top mixes of salts on the market, being very effective in the treatment of fungus, for sterilising tanks, and for making up brine shrimp hatching solutions and brackish water.

However, it's not all geared to production of retailable goods, as Bob has also kept up his breeding prowess, turning his attention to that most difficult of fishkeeping areas — marines. Using Crystal Clear closed-circuit filters with existing and prototype filter materials, Clowns, Neon Gobies and Dwarf Angels have all been raised. Crystal Clear is also the brand name of their own fry foods, such as Green Algae, Phytoplankton, Rotifers and Zooplankton, each together with their own raising foods. As an appetite-whetter for future product releases, two-month-old fry have been raised in systems using a new diffuser with no other filtration being used at all!

Full details of all products are available from: **CRYSTAL CLEAR PRODUCTS (Bolton) LTD., Regan Street Works, Halliwell Road, Bolton, Lancashire BL1 8AR (Tel: 0204 42801).**

CRYSTAL CLEAR PRODUCTS (BOLTON) LTD.

Part of Crystal Clear's extensive product range.

Timeguard Trading

At first glance, you wouldn't think that aquariums, aquaculture and swimming pools have much in common, but they have: they all depend on water treatment for their success.

For the fishkeeper's interest, TIME-O-BIO/FW from **TIMEGUARD TRADING** is a special blend of bacteria which will naturally digest faeces and food articles missed by fish, as well as controlling algae. The results are improved water clarity, reduction in disease and control of odour and algal growth through reduction in nitrogen levels. Only 0.5g is needed to treat a 15-gallon (68-litre) aquarium for many months, and further beneficial 'by-products' include the reduction of filtering/maintenance normally required, as well as extending the period between partial water changes.

Time-O-Bio is also suitable and highly-recommended for ponds, both at amateur and commercial levels, where increased survival of spawn, with better growth rate and food conversion ratios, are common. A compound with similar properties is also available for salt-water applications.

Dealer and distribution enquiries are welcomed by: **TIMEGUARD TRADING LTD., Charterland House, 2251 Coventry Road, Sheldon, Birmingham B26 3NX (Tel: 021 742 0622; Fax: 021 742 0625).**

Aquarium Systems Ltd

The commonest complaint from hobbyists "It seemed OK when I bought it" might bring this justifiable reply from the manufacturer: "Did you set it up as instructed?"

However, there may well be a long gap between cause and effect which some manufacturers might not be aware of; not so with **AQUARIUM SYSTEMS**, makers of BIO-FILTA Trickle Filters.

Since the range of filters came on to the market, the company has followed up their progress with a comprehensive questionnaire to all new owners. The results show that it's not always the equipment's fault and, as filter-designer **Leon Taylor** observes, "A high percentage of aquarists do not read or follow instructions — or for that matter read anything!" Disappointments were due to failure to set up correctly, using incorrect media, incorrect data gathering and reluctance to follow simple directions.

A breakdown of BIO-FILTA performance figures from the survey showed that nitrate reduction averaged 59%, with 100% reductions achieved in two instances (they definitely read the manual!). In marine systems, the average previous nitrate ppm levels were 25.76 and, in a sample of 10, present levels were 7.5 ppm. In Reef systems, the previous level of 7.5 ppm had been completely reduced to zero.

As far as additives were concerned, usage was: Trace Elements 60%, Invert Food 40% and pH buffering compounds 30%; in reef tanks, 1 used Trace Elements, 1 used Vitamins and 1 *didn't* use pH buffering compounds.

Aquarium Systems Ltd. BIO-FILTA research results are now out.

Where Protein Skimmers were used, 16.6% took 12 hours to fill, 33.3% took 24 hours to fill and 33.3% took over 24 hours. It is pointed out that efficient skimming tends to reduce nitrates. In four freshwater usages, two owners were happy with results, but another had set up incorrectly, while the fourth hadn't followed the instructions.

Obviously, there has been a lot of research done at pre- and post-sales points. Data gathered are always useful and, although it doesn't apply in this case, it ought to be pointed out that some instruction manuals are worse than others — usually those where translation has occurred (a manual I had for an imported make of scooter some years ago, advocated pulling over to the *right hand side* of the road in the event of a breakdown!)

Details of the BIO-FILTA system, together with very explanatory information sheets on maintaining excellent water quality, can be obtained from: **AQUARIUM SYSTEMS LTD., 22 Westover Road, Bournemouth, Dorset BH1 2BJ (Tel: 0202 295079).**

Interpet

If you personally have given up drinking tapwater because of the high nitrate levels, spare a thought for your freshwater fishes who have no choice in the matter, if you continue to use tapwater in their aquarium.

Until recently, rising nitrate levels (caused by the breakdown of fish wastes, animal and plant matter) have been traditionally held in check by dilution during regular partial water changes; now you can do it another way. NITRASAFE, from **INTERPET**, is a selective resin which removes nitrate, replacing it with a small amount of salt; this salt is beneficial to the aquarium by assisting to maintain the constant balance of fishes' internal body salts, thus reducing the effect of any impact of stress.

Nitrasafe comes in sachet form which is easily slipped into any external canister filter or air-operated box filter; alternatively you can place it anywhere in the tank where it is in the water circulation path. Each sachet will remove over 7,000mg of nitrate and can be recharged with a simple solution of sodium chloride — common salt. For the more technically-minded, Nitrasafe will remove nitrates down to a level of 25mg per litre (NO_3) or 5.7mg per litre (NO_3-N). Nitrate removal is rapid, up to the sachet's capacity in a matter of hours. Nitrasafe costs £9.52, providing both efficient and economic ways of keeping nitrate down to a safe level.

Interpet's attractively packaged range of Easy Tests.

When first introduced, the EASY SAFE range of Test Kits made a breakthrough on two fronts — they were simple to use and remained accurate throughout their shelf life. Dosing is easy — you don't have to count drops — and the results come fast. However, testing is only one part of solving water chemistry problems. Fortunately, the comprehensive instructions not only show you 'how to do it' but also how to interpret the results once you've got them. Since their introduction two and a half years ago, EASY TESTS have become firm favourites with hobbyists; look out for their re-packaged displays in 1992.

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

A-Tech Water Management Systems

According to those that know these things, oceans are the most stable of environments, both in water quality and temperature.

Thanks to the latest 'hi-tech' thermostat from **A-TECH**, you can now keep the temperature of your aquarium within almost the same exact limits, such is the accuracy of their AQUASTAT. First of the AQUA range of products to be launched over the next three months (others will include a digital timer and a mains distribution box), the 'stat's immediate appeal is that it's splash- and salt-proof, reliable and safe to use.

Offering a High Temperature Alarm and a Minimum/Maximum Memory (the large,

easy-to-see LCD readout can be switched to either Centigrade or Fahrenheit as required), the Aquastat will turn on the heat when the temperature drops by as little as 0.1 of a degree.

Safety has been uppermost in the design too, from a simple thing such as ensuring the mounting holes (for wall fixing) are totally isolated from the 'works', to the fact that the voltage travelling down the cable to the sensing probe is only 1.5 volts, which, itself, is optically isolated from the 240v heater circuit. Hooded control buttons prevent water getting in, and the method of removing the lid is the easiest I've come across: push down with a screwdriver and a quarter-turn anti-clockwise on each of the four fixings and it's done.

The standard Aquastat can handle up to 600 watt of heaters in whatever format you need, including heating mats and vivarium infra-red lamps. A 3000 watt expansion box, the AQUABOOST, is available.

Details from: **A-TECH WATER MANAGEMENT SYSTEMS LTD., P.O. Box 18, Aylesbury, Buckinghamshire HP18 0UG (Tel: 0296 770034; Fax: 0296 770038).**

A-TECH WATER MANAGEMENT SYSTEMS LTD

A-Tech's Aquastat — 'expandable' up to 3000 watts.

PRODUCT NEWS

Ruto

A new name, both supplying aquariums and associated equipment, will hit the market in a very short space of time. Announced at this year's BAF (see report next month), the frozen food company **RUTO** will be the main agent for **JUWEL AQUARIUMS** from Europe.

The aquariums can be fitted with tailor-made double-stage filters (we will be featuring these products more fully in the next issue).

For the time being, full details of Juwel Aquariums and equipment can be had from **RUTO, 278 Wigan Lane, Wigan, Lancashire WN1 2RN (Tel: 0942 821114; Fax: 0942 836396)** who will also be pleased to send you full information about their own frozen foods too.

Tetra

Also announced at BAF, by **TETRA,** was the formation of the TETRA CLUB. The Eastleigh-based company has come up with a mouth-watering package for hobbyists — you can join as a Tropical, Pond or 'Kids Club' member, and there are extra benefits too, including free admission to the various Tetra Talking Fish Seminars, discounts to Wildlife Parks, Zoos, etc and a regular Newsletter.

As we were pushed for time (and space!) for this issue, more details will appear in the next issue, but see also **News** in this issue. Details from: **TETRA CLUB, Lambert Court, Chestnut Avenue, Eastleigh, Hampshire SO5 3ZQ**

Lahaina Aquarium Systems Ltd

A 60-minute Video presentation by **Chick Holland** of **LAHAINA AQUARIUM SYSTEMS LTD: Valuable Information for both Novice and Enthusiast,** has been launched.

In this Video Chick explains his proven method for maintaining high water quality within a marine aquarium — a system reportedly regarded by many as the world's most advanced aquarium system.

Available in PAL–VHS or Beta and NTSC in VHS, from: **LAHAINA AQUARIUM SYSTEMS LTD., Lahaina, Kellas, Elgin, Morayshire IV30 3TW. Tel: 0343 89 209; Fax: 0343 89 296.**

Letters

Society for Disabled Aquarists

While undertaking research for my latest book, *The Tropical Fishkeeper's Handbook*, I've been collecting addresses etc. of specialist, breed-specific and general aquatic organisations for my book's various appendices. One rather startling omission has come to light. I could be wrong — although I have checked rather thoroughly, as I do all my facts — but there doesn't appear to be any organisation which caters specifically for disabled or housebound aquarists.

Now, in these days of 'integration', I'm not looking for something which will positively discriminate for disabled aquarists, or any preferential treatment. However, we do have problems and obstacles to overcome which an able-bodied aquarist would never even think of. For example, how do you plant an aquarium while encased within a polythene spinal jacket which permits no bending? Nipping down to a local aquatic dealer is not an option available to all of us. Disabled aquarists usually find some solution to whatever problem they are faced with, but how many other aquarists in a similar situation would benefit from this knowledge if it could be shared?

Further, fishkeeping is a pursuit which is fairly static, taking place mostly within the home environment. Could there be a more ideal interest for such people? They — just as I do — would benefit enormously from the therapeutic, educational and social aspects of the hobby.

Providing no such organisation already exists, I think that it's high time one was created. The sort of thing I have in mind is basically an information interchange, where ideas and theories could be discussed (by post) and disseminated among members. Reviews of aquatic equipment which has special relevance to disabled aquarists could be printed in a newsletter or put onto audio cassette tape for the visually impaired aquarist. Ideally, a list of volunteers — for shopping, humping, or even just someone to 'talk fish' with — would be compiled; and who would be willing to offer advice over the phone, or visit personally to assist with a particular task? But best of all, and my main reason for suggesting such an organisation in the first place, is the numbers of disabled/housebound people who would be introduced into the hobby for the first time, and find themselves involved with something which will enrich their lives as much as it has (does) mine.

If enough people are interested they can write to me to discuss the idea further. Personally, I have no time to run such an organisation; but as I possess an extensive range of computer and graphic equipment etc., I am more than willing to assist in an administrational capacity. Maybe we could could even get some form of sponsorship from the aquatic trade?

Kevin M. Fox,
Sheffield.

Editor's Note

We will be pleased to put interested readers in contact with Kevin. Please mark your envelope: F.A.O. Kevin Fox, and address it to me.

John Dawes

British Cichlid Association Announcement

The British Cichlid Association is concerned that some aquarists may be unclear as to the distinction between the BCA and the recently formed British Cichlasoma Study Group, or indeed, that these are two entirely separate organisations.

The BCA was formed some 20 years ago, its aims being to further the maintenance and study of ALL types of cichlids. It endeavours to cater for all levels of expertise, from beginner to specialist, and continues to welcome applications for membership from cichlasomine enthusiasts.

The BCSG was formed in 1990 to study cichlasomines only. It is not connected with the BCA in any way, and in consequence, the BCA regrets it is unable to deal with any enquiries relating to the BCSG or its affairs.

We hope this clarifies any confusion that may have arisen among *A & P* readers.

British Cichlid Association Committee.

'Cichlid Fishes' correction

Readers of *A&P* and indeed members of the British Cichlid Association may appreciate knowing that the price of the new book *Cichlid Fishes, Behaviour, Ecology and Evolution* is £45 net, not £49 as reviewed in *A&P* in September. This book is readily available from specialist booksellers, in many cases, post-free.

Steven J. Simpson,
Steven Simpson Natural History Books,
Brighton.

Axolotl Supplies

With regard to the article written in your October issue by Jason Endfield, I write to express astonishment that Mr Endfield should have done so little research on Axolotls before writing his article.

We acquired the entire stock of a hobby breeder, Douglas Paul, in April of this year, and have since placed the enterprise on a commercial footing.

Mr Paul's stock comprised over 1,000 adults and adolescent Axolotls, and contained black, white, harlequin and a few gold specimens.

We began advertising in May. We were also asked to provide a display feature at the Petcare Exhibition, held in Bristol on Sunday 8 September.

We believe we are the largest suppliers of Axolotls in the UK, and the success of the enterprise since we started has been such that we have had weekly orders throughout the past six months. We have now sold out of our entire saleable stock, are down to our breeding adults, and we will not have any further supplies for sale until June 1992.

We will be delighted to welcome Mr Endfield at any time, when he can see for himself what we have to offer.

W. J. Woolrych,
Axolotls Unlimited,
Bristol.

Jason Endfield Comments

Alas, it seems that Mrs Woolrych isn't one of my regular readers! I admit ashamedly that, occasionally, my research lets me down, though I don't claim to be an 'expert' in our field, and my writings, I hope, reflect the trials and tribulations of everyday 'aquatamy' (you see, an expert would never use that word!).

However, I am grateful to Mrs Woolrych for responding to my printed murmurings and wish her success in her work with Axolotls.

I actually fully imagined that Axolotls were somewhere, and my question was light-hearted and a bit rhetorical, as in "Where have all the flowers gone?" (I'm sure there are plenty of flower growers out there too . . .)

I do, however, stand by my original point which is that many of today's aquarists neglect the less exotic creatures in favour of more demanding species, and so, dealers must cater more and more to this trend — hence fewer Axolotls in the shops.

Jason Endfield.

Correspondence for our Letters page should be addressed to The Editor, *Aquarist & Pondkeeper*, 9 Tufton Street, Ashford, Kent TN23 1QN.

LAURENCE ROWNS

Axolotls are available in several varieties. This is an albino.