

MAY 1982 70p

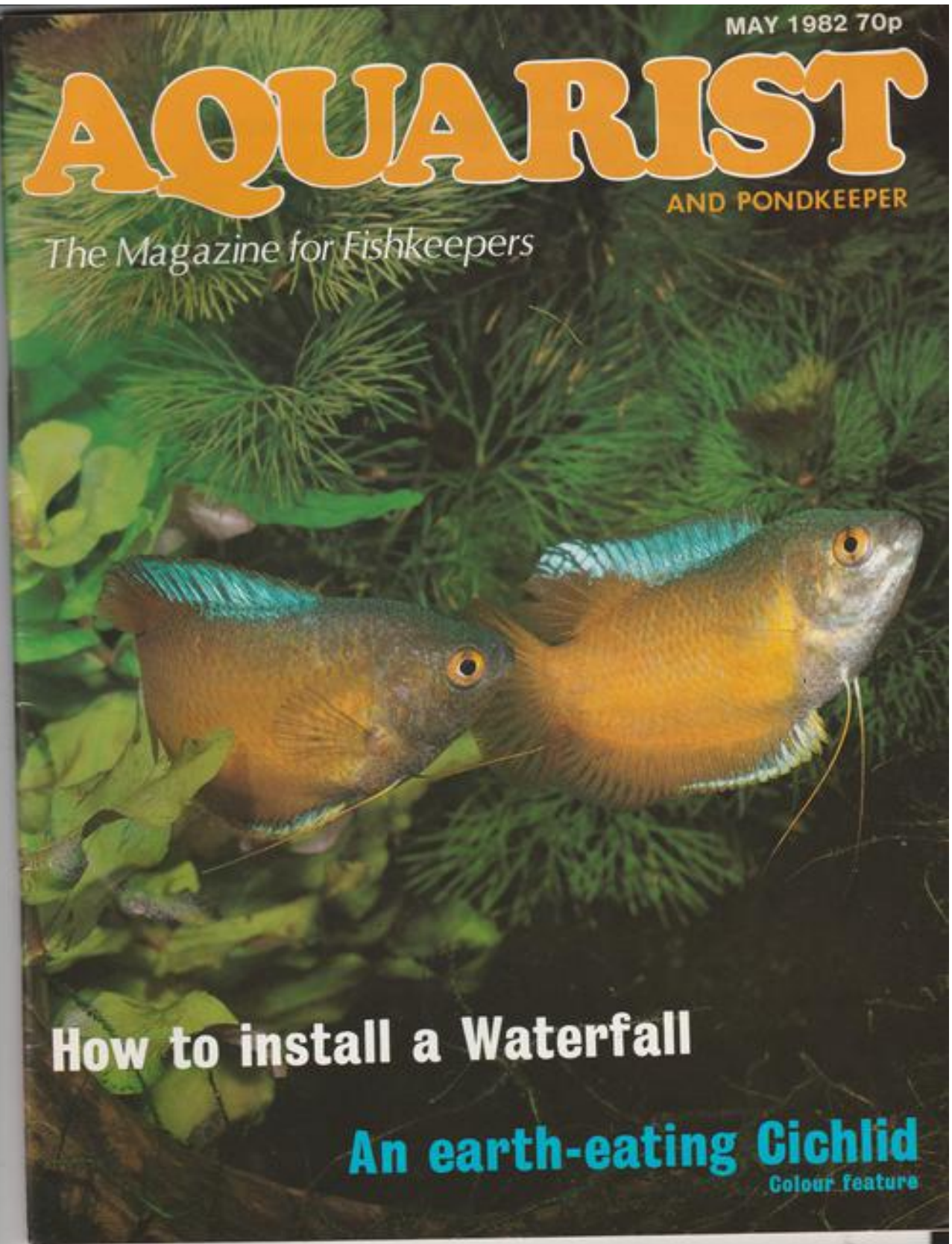
# AQUARIST

AND PONDKEEPER

*The Magazine for Fishkeepers*

**How to install a Waterfall**

**An earth-eating Cichlid**  
Colour Feature





# THE AQUARIST AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

Published Monthly 70p

Printed by Buckley Press,  
The Butts, Half Acre,  
Brentford, Middlesex.  
Telephone: 01-568 8441

#### Subscriptions:

Renewable 31st December  
annually. (Surface mail)  
June - December £7.00.  
Airmail quoted on request.

MSS. or prints unaccompanied  
by a stamped addressed  
envelope cannot be returned  
and no responsibility is accepted  
for contributions submitted.

Founded 1924  
as "The Amateur Aquarist"

Vol. XLVII No. 2, 1982

Editor: Laurence E. Perkins

Advertisement Manager:  
J. E. Young

Cover Plate:  
*Colisa lalia*  
(Red/Orange mutant)  
Photo by  
A. van den Nieuwenhuizen  
(See Spotlight article)

## CONTENTS

	<i>Page</i>
The Making of a Water Garden, part 2—The waterfall	24
What is Your Opinion?	27
From a Naturalist's Notebook	32
<i>Spiranthes cernua</i> —an Orchid for the Aquarium	34
Coldwater Jottings	38
The Pond after the Saga	39
An Earth Eating Cichlid— <i>Geophagus hondae</i>	41
Book Review	46
Spotlight—The Dwarf Gourami	47
Colourful Celebes Beauty— <i>Glossolepis incissus</i>	50
Native Shore Crabs	54
Commentary	57
Coldwater Queries	59
Tropical Queries	61
Marine Queries	62
Press Release	64
Plant Queries	66
News from Societies	67

The Editor accepts no responsibility for views expressed by contributors.



THE theory of making a waterfall with a liner material such as Butyl rubber is simple enough. The liner is laid down in a trough or cutting, joined to the pond at the bottom, and then overlaid with rocks or stones until the liner is completely concealed. That is the theory, in practice the work needs to be carefully planned and carried out. There is something of a knack in arranging the stone so that it looks natural and so that the water travels in the way you want it to. If there is too great a spread, the water will be hardly noticeable; and if the water goes over the edge of the liner at any point, or even splashes over, you will find your pond emptying very quickly.

If you read my first article you may remember that I made two ponds one above the other on separate terraces. My aim then was to join the two ponds by means of a stone waterfall. By placing a submersible electric pump in the lower pond and the outlet pipe in the higher one, it would be possible to feed the waterfall by a simple circulation of water.



Waterfall during construction

## The making of a water garden part 2 The Waterfall

by Gordon T. Ledbetter

As regards the design of a stone waterfall, one might say that there are basically three types. There is the type of waterfall in which water descends through the air, without coming into contact with any rocks, and lands in the pond underneath. Then there is the cascade type of waterfall in which the water gurgles and foams over and around a whole series of rocks and stones without becoming airborne. And there is the waterfall in which the water descends to the pond via a series of smaller pools. Many waterfalls are, of course, a combination of these types. As the vertical distance between my two ponds is about 5 metres (15ft) I was never tempted to have a single airborne descent direct from one pond to the other. Building a stone waterfall—in effect a stone wall—5 metres high

would certainly have been possible. But one could not readily guarantee the stability of such a wall. Think of the pressure of water that could build up behind the liner after heavy winter rain. Remember the wall could not be sloped. If it was, then you would not have a free descent of water and the effect would not be the same. So I decided to step the descent with two pools.

If you have never made a stone waterfall it is difficult to appreciate just how great a difference is the size between the original excavation and the finished waterfall. Supposing for example that you want the spread of the water as it tumbles down to be about 150mm (6 inches in width) on average. Let us assume also that the waterfall will be composed of stones or rocks of about 300mm thick,



Close-up of flange (sleeve) by which a pipe can pass through Butyl Rubber

Now as the stone is not going to be laid to produce a smooth surface as would be the case with a carefully constructed wall, but more informally some rocks protruding more than others, the effective size of the stone will be greater. Let us say their effective size is 450mm (18 inches). As both sides of the waterfall will be lined with stone, the thickness of a single stone must be doubled, ie 900mm (3ft). Add to that the spread of the water, 150mm, and you get a figure of 1050mm (3ft 6 inches). That has to be the width of the excavation. The depth must be comparable. I have seen people horrified when the waterfall has first been dug out: 'We don't want anything like that!' But what once seemed utterly out of proportion, very quickly merges into the surrounding landscape once it has been completed.

My JCB driver was rather perplexed at first, but he soon gouged out a broad 'U' shaped trough from the top pond to the lower one with two 'steps' on the way. The pools were then dug out of the steps to a depth of about 300 to 450mm (12 to 18 inches). The trough, incidentally, measured about 1500mm across (5ft). I regretted afterwards that I did not make the waterfall wend its way downwards. The trough was dug a little bit too straight. I did try and rectify that later by hand, but that was only

partially successful. A curving twisted descent is an attractive feature in its own right.

Having dug out the 'U' trough, the base and sides had then to be very carefully prepared. The pressure of stone and mortar is considerable, so all sharp stones had to be removed from the trough. It is also advisable to lay a protective layer of sand, hessian or what is sometimes available from Butyl suppliers, polyester matting, which is what I used. The Butyl sheeting was then laid in place. Ideally, the Butyl sheet in the top pond should protrude over the top of the waterfall and overlap the waterfall sheet. At the other end, where the waterfall meets the lower pond, the waterfall sheet should overlap the pond sheet. In this way it is not necessary to make any joints at all. But if you want to make sealed joints here is how to do it. Your Butyl rubber supplier can provide you with a roll of sticky rubber. This can be simply pressed to the two surfaces to be joined and that ends the matter. (Repairs can be carried out in the same way.) The surfaces must, of course, be scrupulously clean and dry. If the surfaces have become muddy, which is often the case, then clean them with a little petrol on a cloth. Then remove all traces of petrol with a blow lamp. (If the slightest petrol remains you will not get a perfect seal.) The sticky rubber can also be slightly warmed with the blow lamp.



If you overheat the rubber it will carbonise (easily recognised by the fact that the surface changes colour and becomes pimply) and will refuse to stick.

If you observe a waterfall made by Nature you will notice that the placement of the rocks is rarely chaotic. There is usually an underlying form to the placement and this is what should be aimed at in making a miniature waterfall in a rockery or bank. If the stone you are using has a grain, make sure that the grain is always running on the same plane. If there is no obvious grain, then use the shape of the stone instead. The stone should be held together with mortar (cement and sand mixed in the ratio 1:3). Use only a little water so that the mix is firm. And use the mortar sparingly. Keep it off the exposed surfaces of the stone and make the joints as inconspicuous as possible. I left numerous nooks, crannies and hollows in the rock face. These can be filled with soil later and used to grow ferns. Where I wanted the water to descend through the air, I selected a particularly flat and smooth faced stone and cemented it in place between two larger boulder type rocks. The water is then forced over the flat stone which must, of course, protrude some distance out and over the rock face beneath it. This flat stone or 'lip' should also be tilted forwards slightly so that the water runs off it and does not trickle backwards underneath the stone. You will find that the flow of water is critically determined by the exact position and angle of the stones. So it is worth experimenting to obtain the optimum effect. If you want to obtain a 'sheet' of descending water, then the best material to use for the lip is probably slate. Once all the rocks and stones were in place I trimmed back the Butyl rubber and worked soil around the sides of the waterfall so that the rock work merged into the surrounding banks.

Close-up of first part of waterfall with ferns in place



All that was then left to do was to install a pump. Electric cable was run down from the house through conduit. A small chamber made of concrete blocks was placed near the waterfall where the flex from the pump could be connected to the cable. A two inch outlet pipe was buried alongside the waterfall to emerge in the top pond. (It is possible to bring the pipe through the wall of the pond using what is known as a sleeve and/or rubber strip. A waterproof joint can be obtained in this way. But it is more usual to bring the pipe in over the edge of the pond and conceal with a rock or plant.) To prevent any danger of the top pond being emptied via the outlet pipe, when the pump was not in operation, I installed a non-return valve. The pump I placed close to the waterfall so as to minimise disturbance in the water, and I placed it on blocks to avoid it becoming clogged from mud or debris on the base. The outlet pipe I also made sure was close to the top of the waterfall. (On other occasions I have placed a pump and outlet point at opposite ends of a pond. Muddy water can be filtered through the underwater plants in this way. But the resulting turbulence can disturb the water-lilies if the pump is anyway powerful.) Using a Uni 400W I anticipated an output of something in the region of 320 litres per minute (4,200 gallons per hour).

Living in a rural community means news travels fast. In no time my earthworks (with a huge pile of rock obstructing the driveway) was the talk of the village. Locals eyed me curiously. In the local pub wagers were laid that the waterfall would not work. It was relayed to me that a septugenarian had declared knowingly that the top pond would flood as the lower pond ran dry. But work it did; and the mesmeric sight and sound of water gushing forth and tumbling and gushing down the stone, and turning white during its descent, and rippling and splashing into the pond beneath made it all worthwhile.

Next month: Making the bog garden.

# WHAT IS YOUR OPINION?



by B. Whiteside, B.A., A.C.P.

WELCOME TO THE 15th anniversary edition of *What Is Your Opinion?*—an idea that came to me 15 years ago and which I asked the Editor if I could try for a few months. More than a half million words later it still seems to be as popular as ever. Like many good ideas, the idea behind *W.Y.O?* was a simple one. I really enjoy writing and receiving letters—and I am most grateful to the very many people who have written to me during the past 15 years. Thank you, friends. I enjoy my monthly chat with you in these pages—even though I seldom get time to send individual answers to readers' queries. Were I to send personal replies I would not have time to write the monthly column and shoot the photographs used to illustrate the text. I should like to thank those who wrote especially to mark the 15th birthday of the feature: I appreciate your support and hope it will continue for the next 15 years—if my two typing fingers last that long.

I was interested to learn that one of Northern Ireland's leading societies will be holding an open show on 27th February. Bangor Aquarists Breeders Society Open Show will be held in Bangor Leisure Centre, Castle Park Avenue, Bangor, County Down, Northern Ireland. Judges officiating at the show will be from the following panel if available on the day: Messrs. D. Bryans, M. Carlisle, C. Carr, D. Frater, J. McCready, R. McIlwaine, P. Naismith, I. Pollock, A. Robbins, A. Sherlock, R. Thompson, T. Campbell (probationer), S. Lusty (probationer) and R. Morgan (probationer). I hope the show will be a big success for B.A.B.S. and for the gentlemen judges—even though it will be over by the time this appears in print. It's encouraging to know that our hobby continues to thrive in Northern Ireland—the land that produced the last winners of *University Challenge!*

I must thank the British Koi-Keepers' Society for sending me the latest edition of their Magazine. They never fail to send me a copy. My magazine file this month also contains the latest issue of the Midland Koi Association's Newsletter; and the Newsletter of the Coventry Pool and Aquarium Society.

Mr. Dave Winder is the Hon. Secretary of East Dulwich Aquarist Society and he resides at 32 Eddystone Road, Brockley, London SE4 2DE. He writes: "I am happy to be able to enclose the latest copy of our Magazine for you, and would like to thank you for your kind comments. I am also sure that you will be pleased to know that since you published a few of my letters, three new members have joined as a direct result. It is encouraging to note that they have turned out to be 'good' members, with a genuine interest in both fishes and club life. Perhaps this is a reflection on the sort of people who read your column.

"The East Dulwich A.S. is happy to be able to say that we have reached our 25th birthday—not a bad achievement for such a small club. I definitely attribute our good fortune to the fact that we consist of a small number of very enthusiastic aquarists who, although very much individuals in our own right, form a very solid, determined group, not breaking into opposing factions as so many clubs sadly do.

"To celebrate our birthday I can confirm, as mentioned in our Magazine, that we will be holding our first Open Show for ten years. It will be held on Saturday, 19th June, at The United Reformed Church, Highcombe Avenue, Charlton."

Congratulations, E.D.A.S.—and Dave. You've beaten *W.Y.O?* by a decade. I hope readers will support your Open Show and that it will be successful.

No. 5 Keals Croft, Lynton, Devon EX35 6HF, is the home address of Mr. Ray Holmes, who has obviously been a very careful reader of this feature. He writes: "Congratulations! This month we celebrate the fifteenth anniversary of the first publication of *What Is Your Opinion?* Tradition decrees that the fifteenth anniversary is 'crystal', so it would be appropriate if I were to mark the occasion by presenting you with a certain well-known make of aquarium filter, allowing for the modified spelling. Please forgive the omission. If *W.Y.O?* still flourishes ten years hence, I promise you something suitable: a pair of silver tetras, perhaps.

"Though credit for the original idea is obviously due to you, I think you will agree that your many contributors deserve a pat on the back. Since this feature's inception, I have been enlightened, amused, bewildered and even outraged by their efforts, which must have covered every conceivable aspect of our hobby. It would seem impossible to present a monthly collection of letters over so long a period without their content becoming repetative, but you have achieved that. Though the subjects being





*Apistogramma borelli* - male left, female right

discussed recur regularly, each reference manages to reveal a new finding or a different opinion.

"Without reading 180 previous issues, I am left with the impression that the fish most frequently mentioned has been the kribensis. This must be closely followed by the goldfish, if only because so many writers mention that the first fish they ever owned was won at a fair-ground. Top of the plant pops that comes immediately to mind must have been Java moss. Having grown it since long before it first became the subject of a long-running saga, I still regard Java moss as an overrated pastime (sic). I must, however, commend your missionary work, and suggest that the taxonomists who regularly confuse us by changing our old, familiar names may consider doing so just once more. *Bonus whitenedii* would be easier to remember than *Vesicularia dubyana*, anyway!

"Over the years we regularly noted Tojo's hibernation dates until the announcement of his demise. I did because I keep a number of tortoises. Tojo was always first asleep and last awake; but I ascribe that to the milder climate here rather than to any implied lethargy in the nature of the Irish. We regretted your reduction to the status of one-fingered typist, the result of your serious accident with a piece of quarter plate. Then we supported you, in spirit at least, during the heroic battle with your (tobacco) addiction, until you emerged victorious. None of this was relevant to fishkeeping, but getting to know the person behind the pen does render a feature more enjoyable.

"I can think of no unfavourable comment to make about *W.Y.O?* unless. . .

"One criticism is of readers who do not contribute anything. There must be many, because if circulation was even, say, ten times the number of readers who write to you, I believe the magazine would have ceased to be published long ago. I frequently look forward to future editions in anticipation of the replies to a matter raised or opinion expressed. The response is, all too often, nil. If other readers share

this opinion, perhaps we could remedy the situation by undertaking to write, say, twice a year.

"Another cause for complaint—and this started out as a letter of congratulations?—is probably a result of readers' apathy. A number of excellent suggestions have been made regarding changes or innovations in the magazine. The opinion of their quality is unbiassed, since none of the ideas was mine. I should add that I do not support requests to omit certain items, since I enjoy all the content, both editorial and advertising. You almost invariably agree that the idea is a good one, and promise to raise the matter with your editor. Then? Nothing! Are we to assume that the editor has dismissed the suggestion on every occasion? If so, may we be told? I suspect he would like to see evidence of more support before introducing changes, which brings us back to where we started: readers' apathy.

"Keep up the good work. I wonder how many times you have written that on a pupil's report. To the next fifteen years I raise my glass of bubbly—and it hasn't got an airstone in it!"

Thank you for your kind comments, Mr Holmes. It's always encouraging to learn that one's work and efforts are appreciated because one is frequently taken for granted. I am separated from other contributors, etc. . . by the Irish Sea and tend to be almost completely isolated.

I am writing this in February and am amazed at the rate at which my light bulbs above my aquaria are blowing. Stocks of reduced-price Woolworth's bulbs vanished locally and I searched around and found that the local branch of Dunn's sold double packs of Philips, 40-watt, pearl bulbs at 49p, i.e. 24p each bulb. To date, one blew after 48 days; another after 49 days. I can but hope that others will last longer.

No. 23 Hastings Road, Pound Hill, Crawley, West Sussex, is the address that heads a letter I received from Mr. Colin R. Storey, who said: "Here are a few points for your page,—Ask your Editor to include more vivaria information—a series on buildings, plants, stocking, maintaining—like the recent one on tropicals.

"Plants: In a mature tank, i.e. gravel full of detritus, I have found plants root adequately but not with 100% success. In a new tank, with raw gravel, success is much lower. My solution is to plant most species in 2½ in. pots sunk in fine gravel. The pots are filled to within 1 in. with 1:1 mixture of garden soil and peat. This is capped by a ½ in. of very wet soil gently padded around the plant to retain the lighter rooting mixture. Finish off with a ½ in. of gravel. This gives nearly 100% success with *Echinodorus*, *Vallisneria*, *Aponogeton*, *Acornet*, *Nymphaea*, *Marsilea* and *Eleocharis*. Spreading plants send runners into the gravel. (The method) is almost foolproof in my tanks when starting from scratch.

"The advantages are: (i) rapid rooting in virgin tanks; (ii) an easy method of moving plants between



aquaria—N.B. disease quarantine where necessary; (iii) plants healthy in gravel-free fry tanks—providing shade, shelter and, I suspect, better infusoria, etc.; (iv) possibility for resting seasonal species in cooler tanks—maybe life-prolonging; I have yet to try it; (v) containment of roots of larger rampant species.

"Don't forget to pot on as for house plants if you wish to freshen the medium or increase plant size.

"Lighting: tungsten filament is good at 30 watts/two square feet, but irritating in that filaments crumble and bulbs seem forever to be expiring. Recently I switched to fluorescent tubes over my three, main tanks—15 watts/two square feet, warm white. This certainly maintains plants tungsten-grown; but is maybe slower in starting off some species; and *Nymphaea* prefer filament lamps.

"Fish: Since my early years of mixed communities—two of everything peaceful—I have recently been restricting fish to one to three species per tank, e.g. angels and festivums; honey and leer gouramies; and barbs and danios. It's expensive if you buy, say, 20-30 honey gouramies; but if home-bred and ruthlessly culled a single spawning yields twice this number and en masse the species is even lovelier. A tip: if buying a large tank—say, over 3ft.—don't spend pounds on fish. Buy a 2ft. one as well and a few pairs of breeders. Fill the larger with the parents and offspring of, say, five species of compatible types. Apart from an excuse to get two aquaria, the cost of the second is recouped in money saved on fish and maybe you can even sell a few. The latter aspect is governed by your local shop.

"I cannot think of much else. I vote *Colisa chuna*, the honey gourami (photograph 1), my favourite for its tameness, colour, movement, peacefulness and pleasure received. Much easier to keep in groups than *C. lalia*, the dwarf gourami, which seems inordinately aggressive, and the females prone to ovary trouble if kept in pairs but not spawned.

"Final points: Lighting suggestions are for tanks in well-lit (natural) rooms; double the wattage in darker rooms. Yogurt cartons are as good as plant pots if properly buried in the gravel."

Photograph 2 shows a selection of tropical aquarium plants. Please drop me a line if you have successfully grown any of the species shown. I should particularly like to hear for how long you have managed to keep alive and growing specific species.

As for elderly fish, my oldest are, without question, some large angels that I cannot really remember getting. They appear to be so old that they have lost interest in spawning. They share their 24in. tank with five, young angels and, fortunately, none of the fish fight. By far the most active and beautiful fish I have at present are my pair of clown loaches. They were purchased several years ago—I cannot recall when or the cost but no doubt I recorded it in this feature. Photograph 3 shows one of them. They were an excellent investment and have remained healthy, alert, hungry, active, peaceful and beautiful since I got

them. They also have a 'character' of their own that marks them as individuals.

Yesterday I visited a newly-opened pet shop in the town where I live. The stock ranged from a monkey, through several tanks of fish, to birds and rabbits. Two small pepper *Corydoras* catfish cost me 67p each; and a pair of quite young, but well-shaped and coloured dwarf gouramies cost me £1.70. How do these prices compare with those in your area? I should be pleased to hear from you.

Another Philips 40 watt light bulb has hit the dust. It lasted for only 56 days. I'll leave you to draw your own conclusions.

I'm pleased to be able to include a letter in this month's feature from a lady reader. Her name is Mrs. L. Wale and her address is 36 Devon Drive, Birmingham, Chesterfield, Derbyshire. She wrote: "I was very interested to read in your column of your interest in Malayan sand snails—*Melanoides tuberculata*. About 18 months ago I bought some plants from an aquarium shop in Sheffield and a week later noticed some very tiny snails in my tank. I had no snails prior to buying the plants. Not many days later they had grown to what I imagined to be adult size. As there were only about six I didn't mind and left them alone as they are attractive. Within a couple of months I was appalled to find, one night when I put on the tank light, that the entire four walls of glass were absolutely covered in small snails. Well, I spent an hour or more removing them as I don't find so many snails attractive. I thought I had ousted every one of them; but no! Every two or three months I have as many as before. I have been taking them out as I now regard them as a pest.

"Then in October 1981 I read your article just weeks after I had cleared some out; so when I went to the Festival at Belle Vue I thought I had none or I would have passed on some via *The Aquarist* stand. Now, as I write, there appear to be hundreds of

Cardinals, neons and other small fish





them happily reproducing in my tank. I was considering buying a second tank to put my fish in and buying something to clear my tank of them. I am not a serious aquarist but just someone who loves to see a few fish living happily in pleasant surroundings. Now I'm saying to you: you are, or anyone else is, welcome to the snails rather than my killing them. The only trouble is that you said they would need to be put in a snuff tin, or something similar, to send them through the post in an envelope; but do they need anything else—such as gravel, plants or water? A snuff tin would not be big enough for the number of snails. Also, would you really want a batch of them every few weeks? I wouldn't mind them if they wouldn't reproduce so often. If you are interested could you please reply personally as I can't always be sure of a copy of the magazine as I have just cancelled it at my newsagents. I know it's a good magazine but I think it is cut pricing (*sic*) itself considering the amount of actual reading compared with the number of advertisements. If any of your readers want the snails will they send reply-paid packages. I don't want to profit from the snails but I also don't want to be at a loss buying stamps.

"Please reply as soon as possible if you are interested before the snails take over completely. I am sure they are Malayan sand snails as I have compared them with the picture in a book I have. They are cone-shaped and sort of spotty-striped ones. My telephone number is 0246-35983."

The snails certainly sound as if they are Malayan sand snails. They should not do any harm in the tank. I don't think I would recommend using a snail killer because the snails live in the gravel (hence their name) during daylight and will die there if a poison is added. They will decay in the gravel and pollute the tank. If you really want to get rid of them it would probably be safer to throw away the gravel completely.

*Balantiocheilus melanopterus* - the bala or silver shark



A Woolworth's 40 watt pearl light bulb has just blown. Its life span was 99 days. The Woolworth's own brand seem much better suited to aquarium hood life than the Phillips ones I have been using. Perhaps the batch from which I have been buying the latter has not been the best for aquarium use. I should be pleased to hear from readers who have kept similar records.

Dr. J. Neville Carrington, of Interpet, said in a letter that he was amazed to hear that this column had been going for 15 years. Neville writes: "It certainly does not seem so long and I always enjoy reading it. . . . The best of luck for the next 15 years. . . ." Thank you for your kind comments, Neville. I think you have been my most regular contributor from the trade side of the hobby during the life of this feature.

Photograph 3 shows a 'Sarasata' comet-tailed goldfish and makes an appropriate introduction to the following letter written by Mr. Keith Lock, of 17 Oaklands Road, Northfleet, Kent. ". . . Last May I bought some water hyacinth plants—*Echhornia crassipes*—from my local pet shop. On inspection I found that the roots were dotted with eggs. On returning to the shop I discovered they were from some 'Sarasata' comets kept in the same tank. I hatched the eggs in a washing-up bowl and had, I estimate, some 90 fry.

"When old enough I transferred them outside to a 50 gallon loft tank. I fed them on egg yolk, Liquifry and Phillips Fry Food; and later, small *Daphnia*. As they grew I made regular culls and from the original 90 fry I was left with nine fish, two of which are fine specimens. Fired by this success—this is my first attempt—I have now fallen in love with the 'Sarasata' comet and intend, over future seasons, to breed better and better fish.

"During the raising of these fry I found Mr. F. W. Orme's book *Fancy Goldfish Culture* very useful as it has a very good section on breeding.

"Outdoors, I sprayed weedkiller near my small cherry tree—Amanagawa. It is supposed to have straight, upright branches. I now have the only corrugated Amanagawa in the area!"

Photograph 4 shows one of my angelfish spawning. Please send me details of your experiences with the spawning of any of the larger cichlids.

The last of this month's letters is headed 5 Seymour Avenue, Heysham, Lancs., and came from Mr. C. J. Hutchinson. He wrote: "Just a few lines that might put some fellow aquarists' minds at rest as to a possible cause of mystery deaths in otherwise safe tank set ups.

"Whilst carrying out my fortnightly water change, re-plant and vacuuming duties I noticed my in-tank, magnetic, algae remover was looking a little frayed. Upon removing said cleaner from the tank I noticed rust sediment running out from the insides. I promptly dismantled the scraper to find that behind the two magnets there was a mild steel plate which was rusting quite considerably.



"I totally dismantled the scraper, thoroughly cleaned off all the rust and re-assembled using an epoxy resin. The scraper is now kept in a drawer and used only when needed. As I carry out regular water changes there has been no chance for a build up in seepage of rust; but for anyone with one of these scrapers installed permanently in their tank, and who may be having unexplained deaths, this could possibly be the answer.

"I hope this letter may have helped to throw some light on a subject that one never stops learning about."

My thanks to all whose comments appeared in this 15th anniversary edition of *What Is Your Opinion?*; and to the many readers whose letters I was unable to include because of shortage of space. I believe we'll be changing our format to three columns from next month's issue; and I suspect some other exciting changes may also be taking place. Like you, I'll look forward to seeing what form they take.

One letter beside me as I type this runs to 13 sides of A4 sized paper. I hope I'll be able to include some excerpts from it in a future feature. I'm always pleased to hear of readers making contact and friends with other aquarists through this feature. By the way, I understand that my comments in the February issue concerning some of the English in the British Discus Association's *News Journal* resulted in an angry member telephoning a member of *The Aquarist* staff, at Brentford, to complain. I'm sorry if my comments caused offence; but the fact remains that the English was bad. Just as doctors comment on good and bad health, English teachers comment on good and bad English. I am a teacher of English by profession. Those who send me their club and society magazines obviously want some free publicity—and why not!—and a brief review. If they want a professional opinion they must accept criticism as well as praise if both are merited. As well as the criticism I wrote: "... The copy ... contained a lot of useful and interesting information for those interested in discus. ... " I still feel that my comments were balanced and fair.

Also, in the February issue I used the term (*sic*) after Mr. Lawrence Belshaw's use of the spelling "phenoxethol" for the more common "phenoxetol". In defence of Mr. Belshaw, Dr. Neville Carrington, of Interpet, kindly points out that the former is an acceptable synonym for the latter. I'm pleased to stand corrected. Sorry about that, Mr. Belshaw. I am ignorant of many things.

For a future feature please send me your opinions on any of the topics mentioned above; or on any of the following: (a) raising live foods; (b) aquarium plants grown from bulbs; aquatic plants that have flowered in your aquarium; (c) the kribensis (*P. pulcher*); (d) breeding good guppies; (e) keeping non-poisonous snakes; (f) outside filter design; (g) what you do at club meetings; (h) breeding any tetra; (i) your pond fishes; and (j) the reason why *Cryptocoryne* species sometimes lose all their leaves shortly after being moved into a different tank. Recently I bought some attractive plants of *C. thwaitesii*



*Pelvicachromis pulcher* - better known as *Pelmatochromis kribensis*

and *C. minima* and planted them in separate tanks. My main aim was to photograph the two species. Yesterday I looked into one tank—and discovered that the *C. thwaitesii* plants had suddenly lost all of their leaves. Why? I've observed this problem for years yet no one has presented me with a convincing reason supported by evidence. Incidentally, the spelling *C. thwaitesii* is that used by Rataj and Horemán in their book. De Thabrew, in his book, uses the spelling *C. thwaitesii*. As De Thabrew's book was published in 1981 and Rataj and Horemán's in 1977, I should plump for the spelling *C. thwaitesii*. This minor example shows how even experts can disagree; and why one should not accept everything that appears in print.

Another Woolworth's bulb has just blown. It lasted 97 days above a 30 in. tank, sharing a hood with two other 40 watt, pearl bulbs.

Goodbye until next month.

#### IN OUR NEXT ISSUE

**THE SPRAYING TETRA**, Part 1 of a superb picture series by van den Nieuwenhuizen. The same author will also turn our SPOTLIGHT on to THE LARGEST KILLIFISH.

**THE MAKING OF A WATER GARDEN**. Part 3 of this interesting series by Gordon Ledbetter who on this occasion discusses the Bog Garden (Colour Feature).

**THE MAROON CICHLID**. A well illustrated article by Rudolph Zukal.

#### Plus many other fascinating features

Britain's finest read for the fishkeeper who really cares. **STILL ONLY 70p. WATCH OUT FOR FURTHER CHANGES IN THE PRESENTATION OF YOUR FAVOURITE MAGAZINE.**





by  
**Eric Hardy**

WHEN 8 inches of ice finally thawed from a friends's garden pond in the West Derby district of Liverpool after the long Christmas frost, our coldest since 1890, he was surprised to find among his dead fish the decomposed remains of a frog, because he didn't know any frogs were in it. Furthermore its size was out of all proportion to common frogs, measuring 15 cm body length, 29 cm nose to foot, and 7 cm at its broadest. Of course it wasn't a common frog, but the much larger European marsh-frog, wild in southern parts of the U.K., but not on Merseyside. It must have escaped in summer from some aquarist's collection, and with its instinctive nose for water, found its way to my friend's newly made pond and there taken residence, undetected.

Observations on common toads the other year in Wales

showed that size has much to do with breeding success at the spring spawning lakes. Though nearly three-quarters of the females arrive at the breeding water already in amplexus, larger males will displace smaller males already copulating. Small males normally mate with small females, but the larger the male, the greater its success in mating. This applies also to natterjack toads. Outside the mating season they do not associate together in size groups, or in male and female in amplexus before spawning. Females may exercise some selection by delaying spawning until a suitably sized male mates with them.

#### Dragonflies

It has been shown that the wing-stroke frequency of dragonflies, as might be expected, is in relation to temperature and body-size. The almost helicopter-gyrating wings of the green or emerald damselfly had their flight positions revealed by modern electronic high speed flash and photo-electric cell-beam photography. The future of these insects depends largely upon their habitat not drying out from drought or drainage; but the southern *Aeschna* dragonfly quickly colonises small ponds. Because the scarce *Libellula* is attracted to running water in lowland south and east of England, it is vulnerable to pollution. Digging permanent ponds is one way of conserving them.

#### Heron

A friend who kept the golden rudd alive in his garden pond in Cheshire through the coldest weather since 1895 in his area last winter, failed to stop early morning herons raiding the pond. This is a common problem, but he didn't like my suggestion of submerging almost transparent nylon mesh an inch below the surface. The alternative remedy was to buy a metal model heron or stork and stand it on the edge of the pond. Two herons seldom fish so close together as that. Herons will visit remarkably small garden ponds in built-up areas early in mornings when their owners are usually asleep. They are the usual explanation when fish disappear mysteriously. Look for their droppings, large arrowed footprints, and beak-marks in any surviving fish which sometimes escape them.

*Continued on page 58*

## OSCAR

G. Robinson



# *Spiranthes cernua* — an Orchid for the Aquarium

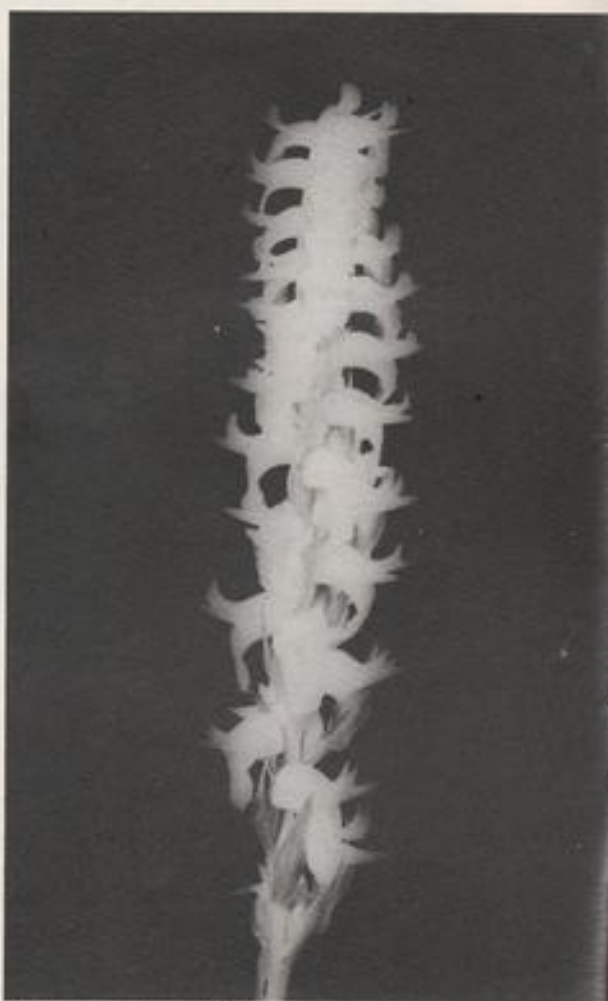
by Karel Rataj

Photos R. Zukal

WHEN ONE HEARS the word orchid one immediately pictures beautiful flowers opening out in the humid twilight of tropical rain forests. Not many people are aware that the family Orchidaceae is represented by many genera and species in the temperate areas throughout the world. Their flowers are, of course, not as attractive as those of the tropical species. Perhaps only the genus *Cypripedium* (lady's shoe) which grows on the sunny, calcareous plains of the temperate zone, bears comparison with its tropical relatives as far as the beauty of the flowers are concerned. Otherwise one is dealing mainly with species which are found in shady groves of trees or in meadows and which love calcareous soil. There grows in the temperate zone, nevertheless, a number of species which thrive in marshy meadows, bogs (peat-soil) and similar areas. For example, *Orchis corionophora*, *O. strictifolia*, *O. majalis* and *O. palustris*. Many species grow directly in the very cold water of forest springs and springs feeding streams and small rivers. For example, *Achroanthes monophyllus* or the genus *Ephigobium*.

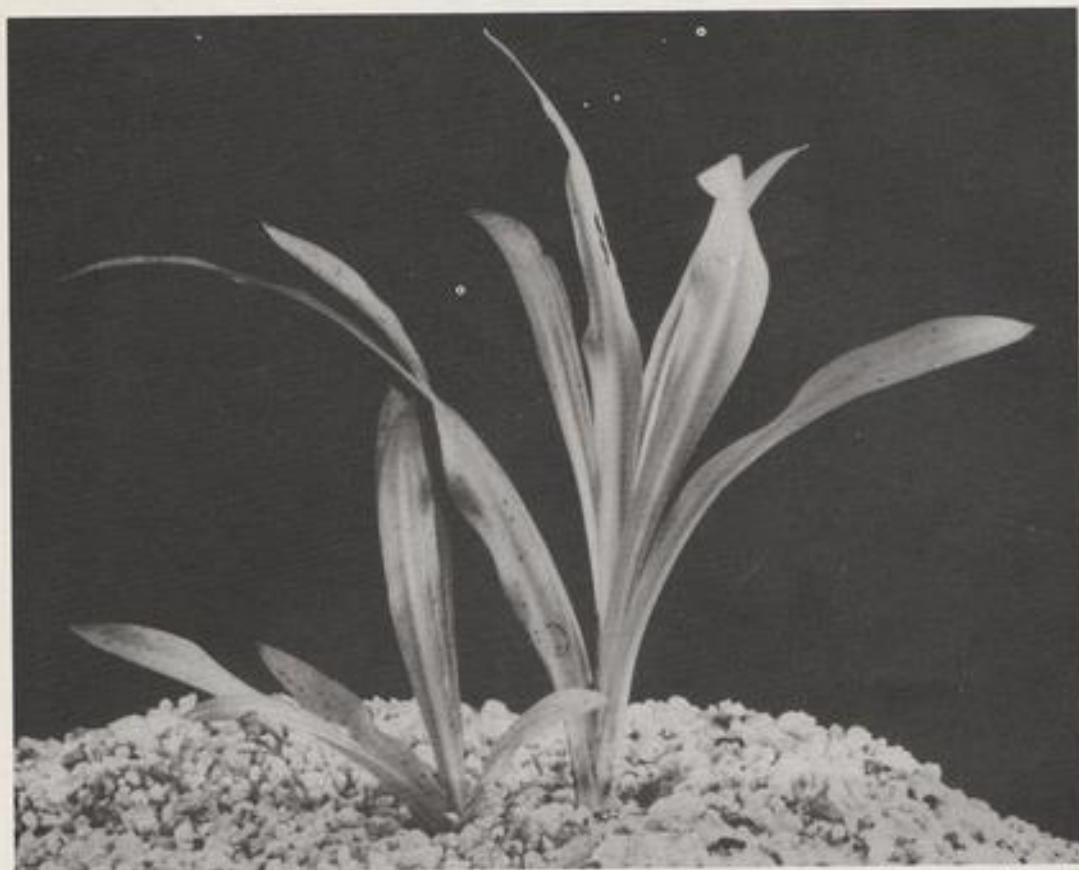
Among marsh plants are also species of the genus *Spiranthes*. European species, such as *Spiranthes spiralis* or *S. aestivalis*, are immersed from time to time as a result of flooding but do not withstand the relatively warm water of home aquaria. In this connection *Spiranthes cernua* Rich, which has the synonym *Ibidium odoratum*, has proved its worth as an aquarium plant. It comes from the eastern parts of North America down to Florida, including southern Canada and the eastern states of the USA. For the aquarium, of course, only plants which are adapted to higher temperatures are suitable. In other words, ones which originate from the southern most areas of the plants range. Plants which turn up in specialist dealers usually come from Florida. As a result *Spiranthes cernua* became a highly popular aquarium plant in America, whereas it is rarely seen in Europe. As a result it is known only to a few aquarists and is not seen at all in aquarist dealers' shops.

The plant forms vertical, about 3 cm long and 0.7 cm wide, rootstocks out of which grow five to eight dark green leaves. These are 10 to 17 cm long and 1 to 2 cm wide.



Fully opened flower of *Spiranthes cernua*





*S. cernua* as a plant grown under water

They are ribbon-like with rectilinear edges or the almost stalk-less laminae become gradually narrower towards the top and bottom and so are at their widest in the middle. The veins on the leaves which run parallel with the leaf edges are relatively inconspicuous. The edges of the leaf blades are almost straight or slightly undulate. The shape remains almost the same in both emergent and submerged plants.


Flowering takes place in the summer months and exclusively in emergent plants, very rarely in plants which are kept in shallow water up to a depth of 10-15 cm. The inflorescence is 20 to 25 cm long and a half to two thirds of this is composed of the stem which is devoid of leaves. On this are formed 10 to 12 cm long clusters of snow white flowers, with bright green, lanceolate bracts about 1 cm in length. The inflorescence is very full and attractive and commonly contains up to forty flowers, which open out almost all at the same time.

*Spiranthes cernua* can be cultivated in well lit aquaria. It needs sufficient daylight, plants kept under water must

receive artificial illumination in winter. It grows well in pure, washed coarse sand which has been enriched with mineral detritus. In view of its size it is suitable for the foreground or the central area of a smallish aquarium. It thrives not only in soft, but also in medium hard to very hard water. As the majority of plants of the family Orchidaceae it tolerates in fact a rather large quantity of calcareous salts. It is grown at temperatures ranging from 15 to 25°C.

*Spiranthes cernua* is also suitable for smaller terraria and palladaria. It reproduces best of all in such arrangements. Plants which are a few months old send out side shoots from the rootstock, on which at a distance of 10 to 20 cm from the mother plant a new plant develops. During the course of a year two to three such shoots are formed, which usually run in different directions. Vegetative reproduction also proceeds very slowly. In the submerged form the process is even slower. Perhaps for this reason this water orchid is such a rarity amongst European aquarists and it seems it will long remain so.

---



**Coldwater  
Jottings** by Frank W. Orme

---

A GOVERNMENT consultation paper, entitled "Review of Inland and Coastal Fisheries in England and Wales," is available from the Fisheries Division 1A, Room 368, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London SW1P 2AE which, although dealing in the main with the fish farming industry, does contain one or two suggestions which could possibly have implications for those with an interest in both tropical and coldwater ornamental fish.

For instance, under the heading Objectives of the review: Fish Diseases, an extract reads "... There is now a greatly increased movement of fish from area to area, due partly to fish farming developments but also to the wider management practice of restocking sporting fisheries. In addition, changing patterns of international trade have added to the danger of British stocks being infected by serious exotic diseases hitherto unknown in this country."

The heading Import Controls, it is stated "Import controls obviously provide a most important safeguard against the introduction of fish disease. ..." However, following the sub-heading Coldwater ornamental fish it is remarked that "Some concern has been expressed about the possibility of serious fish diseases being introduced through the importation of coldwater ornamental fish which could, it is suggested, infect farmed or wild fish. Powers exist under the 1937 Act to introduce health certification as an import licensing requirement. However, the administrative burden involved in giving effect to such an arrangement would be considerable, while the risk of imported coldwater ornamental fish infecting native stocks of wild or farmed fish is probably not great. The Government are

not convinced that health certification should be introduced, although they are prepared to keep the matter under review."

Tropical fish are mentioned under Import Licences which reads, "The vast majority of fish import licences issued relate to tropical ornamental fish. At present, individual annual import licences are issued to each importer. However, from a fish health point of view this is not considered necessary. It is therefore proposed to introduce new simplified arrangements for the importation of defined classes of tropical ornamental fish, either generally or from named countries of origin. The new arrangements would provide for the re-introduction at short notice of the full licensing procedures if this were considered necessary on disease grounds. These arrangements should reduce paperwork for the businesses involved in this trade."

It is also proposed that the cost of an import licence should be increased "... so that the charges can be kept in line with the cost of administering the arrangements."

There are also a number of other proposals, including a revision of the notifiable diseases, and a suggestion that fish farmers should be required to maintain records of live fish movements from or into their farms.

Those who would like to read the full text should apply to the address given earlier. The hobbyist in general, however, can draw comfort from the knowledge that, despite fears in some quarters, there has been no suggestion that the import of ornamental fish should be banned, or severely restricted.

Perhaps this is the opportune moment to remind all fish keepers that they should take great care to protect our own native species. Under no circumstance should any diseased ornamental fish be released into wild waters. Nor should the carcass of such a fish be flushed down a W.C., pan, because from there it may be possible for the body to find its way through the sewerage system, and eventually into natural waters—where the disease could do untold damage.

The responsible, thinking aquarist will be well aware of the possible results of an accidentally introduced disease to our wild stocks, and will do everything possible to avoid such an occurrence through his or her negligence, and, I believe, readers of this magazine are responsible aquarists.

---

#### Discover the Fish

BY PISCES

The first is in MODEL and also in MOULD  
The second is in TROPICAL and also in COLD  
The third is in OPTIC but not in EYE  
The fourth is in HIRE but not in BUY  
The fifth is in FISH but not in TANK  
The sixth is in MOIST but not in DANK  
The seventh is in CATCH but not in NET  
The eighth is in DIAGNOSE but not in VET  
The ninth is in ORDER but not in MAIL  
The tenth is in STOCK but not in SALE  
The last is in GRAVEL and also in SHALE

Answer on page 60



I HAVE ALREADY described the difficult process of acquiring such everyday fish as minnows. Having disrupted the whole routine of the Everglades Aquatic Nurseries that autumn I departed for home with a number of very fine specimens, most of which were destined for the large pond and the remainder for a spare indoor tank. The latter were not so much subjects for long term study as a form of insurance against losses during the coming winter. Whatever care one takes many pond fish fail to survive severe winters, but we do suffer from an additional hazard each autumn, when local herons seem to do the rounds and snap up as many pond fish as they can catch before these drop below the weed to overwinter.

until I could afford the luxury of either running water or well aerated ponds or aquaria. Therefore, when I extensively rebuilt my pools a year or so ago I made provision for a waterfall from a small basin above the large pond, based on a recirculating system driven by an electric pump. I chose an Otter Waterfall Pump supplied by Lotus Water Garden Products—there is a wide range of units available to power both fountains and waterfalls—but this seemed the best buy because it put all its effort into moving the water and kept me away from the temptation of a fountain which would have done my waterlilies no sort of good, and which would have looked quite out of place in my informal setting.

# The **POND**

## After the saga

by Roy Pinks

The minnow is generally regarded as a common and fairly ordinary fish, not much sought after except as live bait, by fishermen, and as a consequence it is now almost out of circulation so far as aquarists are concerned. It is well described by Frank Orme in the September 1981 *AQUARIST*, which article might well whet some appetites for the 1982 season! However, I would add that this is a species of such extensive colour variation as between individual fish that a shoal is a most interesting sight, and sex determination outside the breeding season is very difficult. Such individuality does make it a fish of many parts, greatly enhancing its appeal to the aquarist with the good sense to give it a large indoor tank, for this species alone. In my youth much was made of it by the writers, most of whom had practical experience of it, and one of the axioms was that it should have the purest of water to live in, and many averred that this either had to be heavily aerated or actually in motion if the fish were to give of their best.

So I had rather shied away from minnow keeping in more recent years, having encountered severe losses of orfe and similar oxygen-greedy species even in under-stocked and newly seasoned ponds, notably during "close" weather conditions. I consequently decided to defer the matter

I was most impressed by the solidity and ruggedness of the pump unit—the whole affair was simplicity itself by way of assembly, and annual servicing seems to be no sort of difficulty even for the laymen. You simply lay the pump unit in the main pool, lead a length of hose away from it to the upper basin, and secure the pipe unobtrusively into position, in such a way that it fills this chamber by splashing down into it. The water then tumbles out of an opening, across a ledge of rock, into the main pool below, making a most satisfying gurgle as it does so. The lead from the mains must be carefully protected, and if you are nervous it is best to consult an electrical contractor, though I cannot pretend that he is likely to let you off lightly so far as cost is concerned. A temporary channel for your electrical lead may be provided by taking it through a length of reinforced hosepipe, and if you keep this prominently displayed and firmly anchored, all should be well. But always turn the power off when the pump is not in use and try to avoid any work like digging near the cable when power is running through it. Take out the plug when removing the pump from the pool before winter sets in, then disconnect the pump from the wires and store it after cleaning it well. I made a waterproof terminal box from a plastic sweet jar and a circular electrical junction unit, to remain permanently at the pump end of the mains



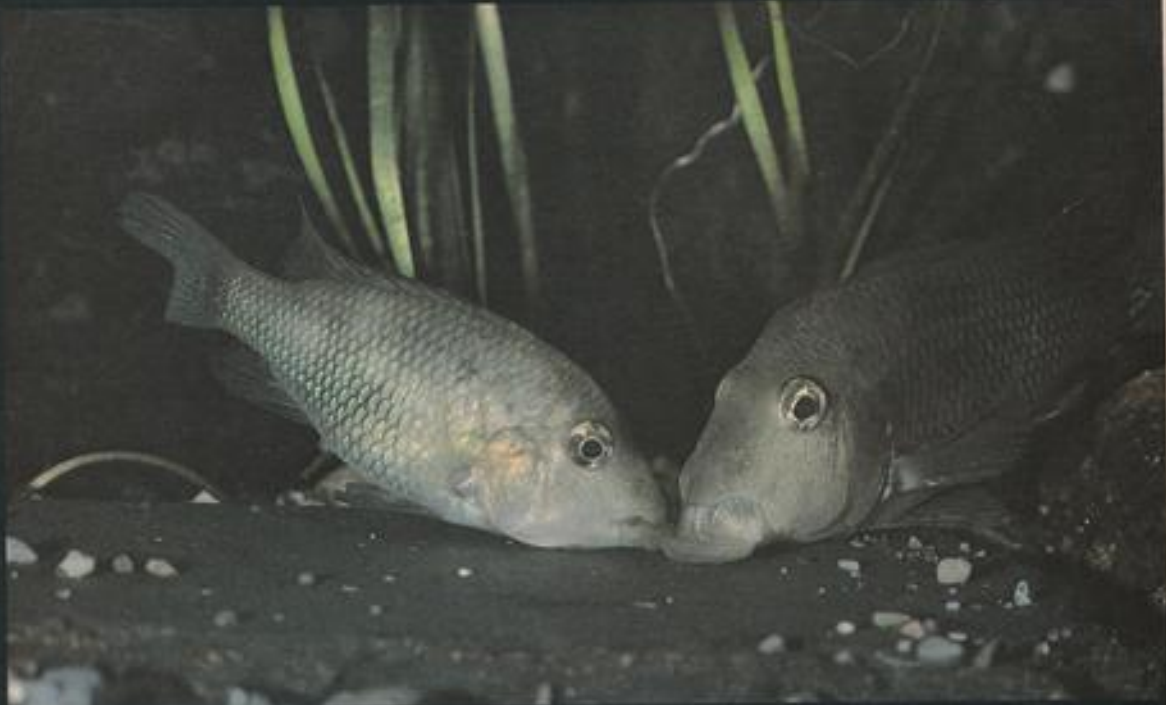
cable. This was because there is a very long run of cabling from the nearest power point, and it just isn't practicable to wind it all up for the winter. Needless to say the cable is kept unplugged until after the pump is reconnected the following season. I went to some trouble, therefore, to ensure that the minnows would take to their new surroundings, and fondly hoped that they would, as per the various scribes, eventually take food from my very fingers and even reproduce their kind. I admit to accepting that once the minnows got established, this would most probably put an end to the breeding of the orfe and the rudd and the goldfish, though this was a problem which could no doubt be taken care of by some form of undetermined stratagem.

I refrained from releasing the minnows straight into the pond, preferring to see how they fared in the upper basin for a week or so. I released them most carefully, and have seldom seen fish disappear so swiftly and so completely. They simply shot below the plants, burrowed into the gravel, and that was that. I never actually saw them swimming from then until I finally rounded them up for transfer,

though I occasionally inspected the basin by torchlight after dark and detected the odd flicker of a tail, but little more. A disappointing start to what was intended as a brave venture!

The quartet I had consigned to the indoor tank were extremely nervous and they took several weeks to settle down—far longer than I would have expected from such reputedly bold fish. They were never, seemingly, completely at ease, and always congregated as a batch in the shelter of large rock, merely scything, trout-like to investigate tit bits and return to base, from which they continued to survey the world suspiciously, keeping up that incessant weaving and hovering motion which suggests to me the stance of the typical river dweller in its battle with the prevailing current. These minnows were fairly obviously not happy with the tank, and I resolved to release them into the pond in the following spring, whether or not their erstwhile companions had survived the winter. Specimens half their size or smaller, even, would have probably proved more suitable for indoors, and I shall try for some of these when an opportunity arises.





Just before spawning the male, right, "vacuum cleans" in front of the female

## An earth eating CICHLID

Breeding  
*Geophagus hondae*

by Jørgen Hanson

The female has just deposited an egg and will move backwards to pick it up in her mouth



The male swims forwards and the female nuzzles his genital area to get the egg fertilised



*Geophagus hondae* comes from Venezuela in South America, where it occurs in the northern tributaries of Rio Limon. Another group of these cichlids lives in Tado, Rio San Juan, Chocó in western Colombia. This group has been described as *Geophagus pellegrini*, but in fact it is *Geophagus hondae*.

In 1910 Eigenmann published an article in which he mentioned a fish by the name of *Geophagus steindachneri*, but this name is not valid because of the lack of an exact description of the fish. In 1912 Regan described the fish as *Geophagus pellegrini*, a name which, as a result of a revision of the genus *Geophagus* made by Gosse in 1975 was changed to *Geophagus hondae*, which might be the final name of the species.

The name *Geophagus* comes from Greek. The first part of the word—*Geo*—means earth, we know the syllable from related words like geology, geography etc. The last part of the word—*phagus*—means eater, and put together "earth-eater". This refers to the way this cichlid genus obtains its nourishment. The fish takes a mouthful of the bottom layer, spits out uneatable items and eats the rest.

The total average length of caught specimens was 71.8 mm, and the biggest caught specimen measured 141 mm.

The first time I saw *Geophagus hondae* was in 1975 in an aquarium exhibition. The fish were very old and they had a lovely pink hump of fat on top of the head.

The second time I saw these exciting cichlids was in Sweden, and I was very happy to bring five with me home.

When I came home the five cichlids were put in an 80 litre tank and over the following days they were fed with various live and dry foods, and I kept a close eye on them. I thought one of them behaved a bit strangely but did not really take any notice before, suddenly, five days later, I discovered that the skin on the lower jaw was hanging down. I quickly caught the fish and put it in an aquarium of its own. And great was my surprise when the next day it spat out some fry. There were five baby fish in all.

Over the following six months there were regular females with eggs in their mouths, but I never succeeded in photographing the spawning. Either the spawning had just finished or I was not home at the right moment. The numbers of fry were relatively small—up to 15 baby fish, but nonetheless, my collection of *Geophagus hondae* grew so that at one moment I had more than 20 mature fish in a 180 litre tank. The tank was furnished with stones in different sizes and planted with *Vallisneria spiralis*. The fish mostly stayed near the bottom of the aquarium, so one should in one's own interest keep an effective filter running, as otherwise particles from the bottom layer will settle down on the leaves of the plants retarding growth. Now and

then small fights might occur amongst the dominating males, but there were never any signs of damage to any fish.

As the fish spawned all the time in the big tank, I at one time decided that now I really wanted to photograph their spawning. Every time a female had eggs in her mouth she was moved to another tank where the fry were let out when the mouthbrooding was finished. Thereafter she was moved to a third aquarium where there were no males. In a week's time I had five females in that tank, and I started to keep a close eye on them. As the days went by they got a little fatter in the belly and suddenly one day one of them had eggs in her mouth. I just left her in the tank because I knew that the eggs could not be fertilized, but now I kept an even closer eye on the remaining females.

In the meantime I decorated a 50 litre tank in such a way that a big bit of slate was placed horizontally near the front glass while the rest of the tank was filled up with large stones creating a lot of hiding places but leaving no other space for spawning than the slate. The water had a pH value of 7 and a DH value of 14. The temperature was 27°C. In one corner there was placed a filter to keep the water clear. When everything was fixed to my satisfaction I placed the most dominating male in this tank.

When one of the females, one evening, had a hint of a little white ovipositor, I decided that it had to be now, and I moved her to the spawning tank. Immediately she was put in the spawning tank the male fussed around her, and two minutes later they had taken over the piece of slate and there commenced a most fascinating play for even the greatest cichlid fan. Both the male and the female took turns in putting their upper lip right down to the piece of slate so one could easily see the thin skin over the lip. The skin was that thin that one could clearly see something behind it vibrating up and down. At the same time both fish swam slowly and closely over the piece of slate with the mouth pressed right down to it as if they were vacuum cleaning.

In the corners of the mouth of the male there were two red dots and every now and then the female swam up to him and touched these spots with her mouth, where after both fish "vacuum cleaned" a little bit more. The female also had these red dots in the corners of the mouth but they were not as clearly visible as those of the male. This sort of "spawning without eggs" lasted for approximately 15 minutes.

When the actual spawning starts, the fish stand head towards head, and the female swims slowly forward and lays a large orange egg. It is oval in shape and has a length of approx. 3 mm and a width of approx. 2 mm. It is a remarkably large size for an egg from a South American



cichlid and especially, when one bears in mind that the ovipositor of the female is no bigger than  $1 \times 1$  mm.

Immediately after the egg has been laid, the female backs and takes the egg into her mouth. With other mouth-brooders the spawning often occurs in quite another way—the fish circle around each other—but the spawning of *Geophagus hondae* is unique in that the fish, among other things, do not circle around each other.

When the female has taken the egg into her mouth, the male swims forward and lies nearly horizontal in the water and the female puts her mouth forward towards his anal area and fertilization occurs. After the fertilization of the egg the male backs and the female again gives him a "tender kiss" on the red spot in the corner of his mouth.

That the female lays her egg, collects it immediately after and in the end gets it fertilized while it is in her mouth, is the most advanced form of mouthbrooding we know amongst the cichlids.

Immediately after the female has got her egg fertilized, she swims forward again and lays another egg. In Aquarium magazines throughout the world one can read that the eggs have a diameter of 1 mm, but it has not, as far as I know, ever been documented with photographs. But let it here be stated that the eggs are quite a bit bigger than 1 mm. It also occurs that 2-3 eggs are laid at the time, although most often it was only one egg.

When fertilization of the egg has happened, it might occur that the male again starts "vacuum cleaning" in front of the female, and she answers him by touching his red spot in the corner of the mouth.

An explanation of this might be that the "vacuum cleaning" of the male is a signal for the female that a male is ready for spawning, and when the female touches the red spot of the male it is most likely to stimulate him to continuous spawning.

When after an hour, the spawning has finished and the female no longer reacts to the "vacuum cleaning" of the male, he chases her away, and for the next 15-16 days she will swim about with her mouth full of eggs and fish larvae. Now and then she takes a little nourishment although there are still fish larvae in her mouth.

If there are two females together with the male, the spawning pair will chase the second female away if it gets too close to the spawning site. When the spawning with the first female is finished, the male is ready to spawn with the next female. He is polygamous.

When the fry are fully developed after approximately 16 days, they will be released from the mother's mouth at the least sign of danger she immediately collects them again.

For up to a month will the mother look after her fry, ensuring the survival and the existence of the species.

If the mother is moved away immediately after she has released the fry for the first time, one can see by putting a dummy into the aquarium that the fry will swim towards it when it is moved diagonally upwards and away from the fry.

On one occasion I had 3 females, all with fry in their mouths, and I tried every possible trick to get pictures of a female while she was collecting her offspring but every time I got near my camera, which was put up in front of the tank, all the females immediately collected their offspring, so that when I was ready to take pictures the fry were safe in their mothers' mouths and they were not released until hours later.

The fry can be together with their mother for weeks without her trying to do any damage to them.

Feeding of the fry is not difficult as they measure approx. 12 mm when the female lets them out, and from the start they eat *Artemia* and fine dry food. One has to bear in mind that the fry do not keep near the surface and they prefer the food near the bottom.

After photographing the spawning of *Geophagus hondae*, I sold most of the fish to the Danish Aquarium in Charlottenlund where they can now be seen in the big cichlid tank.

The special method of spawning of *Geophagus hondae* made me wonder if we have here the last and most advanced stage of mouthbrooding among the American cichlids. Within the *Geophagus* genus we have all the different ways of parental care possibly with the exception only of skin secretion.

(1) *Geophagus brasiliensis* lays its eggs on a stone and when the eggs are hatched the fish larvae are moved to a hollow in the bottom layer. When the fry swim the parents look after them.

(2) *Geophagus sorsinamensis* lays its eggs on a stone and when the eggs hatch the female takes the fish larvae into her mouth and we have mouthbrooding.

(3) *Geophagus jurupari* lays its eggs on a stone and they might cover them with a thin layer of sand. When the eggs hatch the fish larvae are collected and mouthbrooding occurs.

(4) *Geophagus balzanii* lays its eggs on a stone and when all the eggs have been laid, the female will, approx. 36 hours later, collect them and mouthbrooding occurs.

(5) *Geophagus hondae* lays its eggs in small batches of 1-3 eggs and after each batch the female collects the eggs. The eggs are larger than the ones of the other species.

**Aquarium Guide and Work Book.** By Graham Cox. Available from The Reception Area, SANSUI, 476 Bath Road, Longford, West Drayton, Middlesex at 40p.

This book has been written to enable children in school groups or individually to join in various projects designed to heighten their awareness of the wonders of nature and further their education in geography, ecology, underwater life in general, and much else that will give them high satisfaction and pleasure.

Mr. Graham Cox is one of this country's leading dealers in things aquatic, and serious readers of the aquarium press would not dispute that his published writings on tropical marine life are singularly well-written and authoritative.

Mr. Cox's expertise has been gained over decades of study and research (not a little of which has resulted in the advancement of the hobby of aquarium keeping). It all began long ago and far away when he was a teacher of science in what was then called Northern Rhodesia and is now called Zambia.

At the conclusion of his first year's tour of duty he spent his well-earned vacation not back in England but on the sun-baked shores of Mozambique. There he had, and took, every opportunity to swim and dive among the superlatively beautiful and curious denizens of the extensive reef. He was so enchanted by what he observed beneath the surface that he conceived the idea, or dream,

of one day creating a living coral reef somewhere in Britain so that British children could, as it were, walk underwater and see for themselves the wonderful array of colours and fascinating behaviour and modes of life of the inhabitants of a reef.

SANSUI is the embodiment of that dream: a magnificent water garden created in the Japanese way and containing the largest man-made coral reef in the world.

The *Aquarium Guide and Work Book* contains 24 pages (8 in. x 6 in.) of things to work on and do in the classroom and home (and in the water garden itself). There are maps and fishes and invertebrates to colour and draw: all besides soil tests and so on. A great innovation is the provision of a telescope in the Tea-House. This will enable the user to watch aircraft landing and taking off at Heathrow Airport. A page in the book is set apart to make drawings of different countries' aircraft emblems. These can be coloured in later, on an outline map of the world.

Young visitors to SANSUI are requested to bring along one clear glass bottle and lid, one glass or plastic funnel, drawing pencil and rubber and some colouring crayons. Everything else needed to conduct the various projects will be provided by the curator or one or more of his assistants attached to this outstanding water garden and aquarium.

JACK HERMS.

# Book Review



Book Reviews

**Desmids of the English Lake District.** By Edna M. Lind and Alan J. Brook. (Freshwater Biological Assoc, Scientific Pubns. No. 42).

Desmids are microscopic, green freshwater algae abundant in our weedy northern soft-water ponds and ditches, and most numerous in acid peat-bog pools on the moors or the rushy margins of lakes. Here, early in the day, they are seen as a green film over the bottom until sunshine causes them to rise later in the day to nearer the surface. Fewer inhabit the hard, calcareous waters of southern and eastern England.

The contrast to plain cyst-like saccoderms or "false" desmids, the flat placoderms, in two halves joined by a narrow isthmus, range through great varieties of shape which appealed to Victorians when the microscope was largely a toy for winter evenings. They range from *Closterium's* crescent-like curved rods to the triangles of *Staurasteum*, cylindrical *Penium*, filamentous *Hyalotheca*

and transparent, thread-like *Desmidium*. Most show a green core.

Unless one had access to the Wests' classic 5 volume monograph published by the Ray Society over 50 years ago, pond-dippers were handicapped in identifying the specimens under their microscopes, a handicap now remedied by this new field-guide which is essential to all who seek to identify the common kinds. It is not really a Lakeland location guide, but applicable to any study of British desmids anywhere. As it includes none of the rarities found in less than 3 of the Lakeland tarns, it is confined to the most typical species, just over a quarter of Britain's 700 desmids. The rest can be sought in the Wests' work. As usual in this series, the new number is well illustrated with line drawings and has a good identification key. One might add to the reference list the series of illustrated papers written by G. T. Harris of the Quekett Club in the pre-war Watson's *Microscope Record*, though I don't suppose many have access to this. ERIC HARDY.



Further Notes on Dwarf Gourami colour mutants by Arend van den Nieuwenhuizen with photographs by the author.

When I gained my first experience with *Colisa lalia* in the year 1951-1952, I had no idea that I should make acquaintance with the fish twenty-eight years later once more, but in a quite different fashion. After I had made several trips to tropical areas, my friend Odijk and myself decided to undertake a car trip through West Malaysia, travelling from north to south, and to this end we flew separately to Singapore. He with KLM, myself a day earlier with Singapore Airlines. In fact, this was agreeable to me as I wanted to use the day before my friend was to arrive in taking a few test shots with my camera. After arriving late in the evening at my hotel, I wanted to be up and about early on the following morning. But, at home, it is usually my wife who wakes me. In Singapore, however, I did not have my 'alarm' with me. Since I am stone deaf without my hearing aid and one could break down the door without my noticing it, when I am not wearing it, it is pointless to ask the receptionist to wake me with a phone call. As a result I did not awake until half-past eleven instead of half-past six and a quarter of an hour later I was standing on the street without any breakfast as if shot from a cannon, for I still had a lot of things to do. But cold water was poured, literally, on my plans for about two o'clock the heavens opened and I returned unwillingly to the hotel where my friend was just cheerfully wandering in with a few bottles of beer under his arm. We looked at the sky and decided it was only a passing shower. The shower lasted without interruption for two days. We thought over what we should do—change our itinerary and go to Thailand or carry on to Penang and see what it was like there. We did the latter and there followed three beautiful weeks of travel which were drier than dry... and then arrived back to Singapore for a visit to the exporter, Y. W. Ong. On the last day of our visit our very friendly host intended to drive us to Johore. Since

# SPOTLIGHT

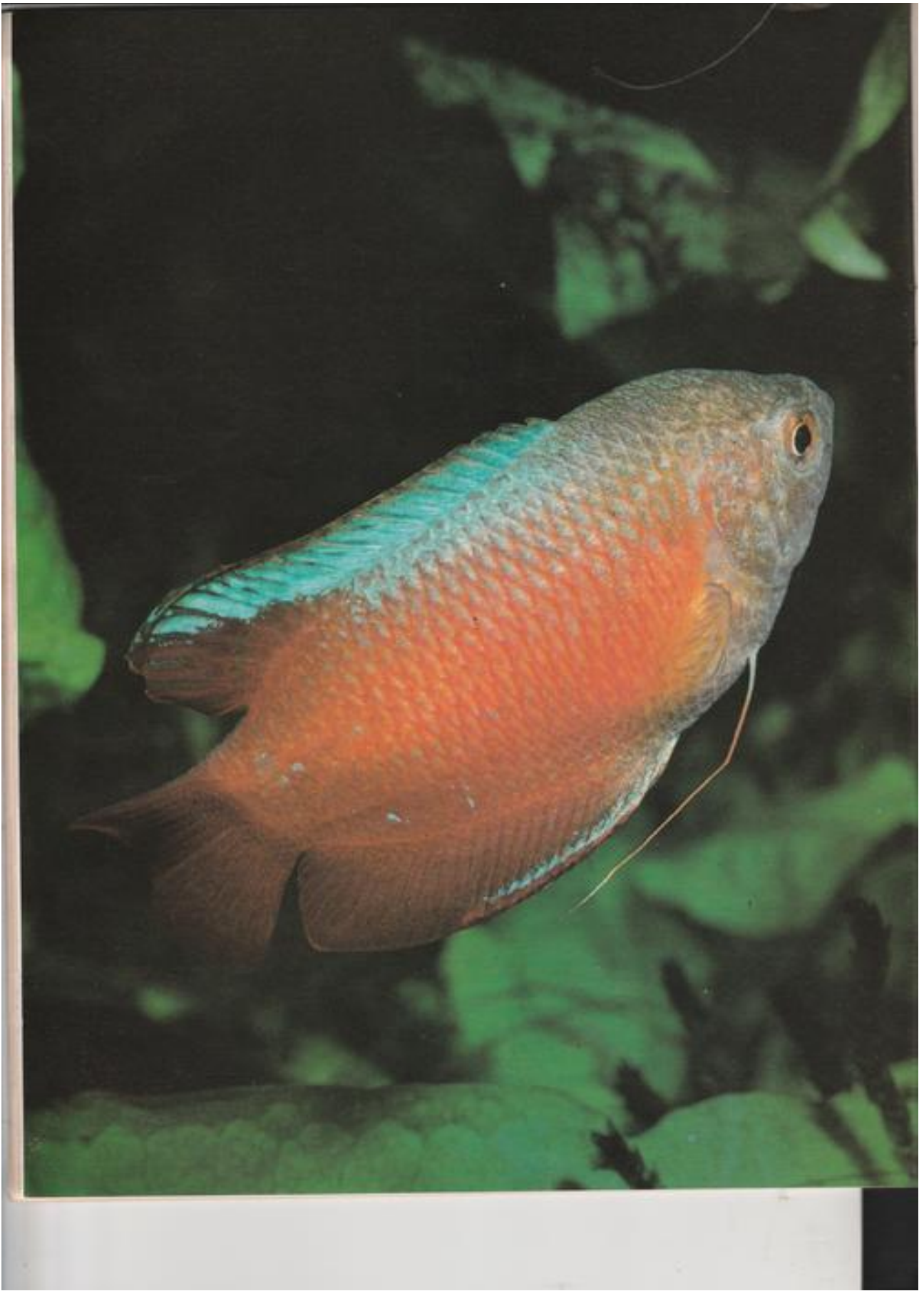
---

## THE DWARF GOURAMI

---

he had to renew his driving licence and that meant a three hour wait in a queue, he changed his mind and took us to a number of breeding stations, including that of Mr. Tan Guk Eng, well known for his numerous and colourful mollies and *Colisa* species such as chuna, fasciata, blue cosby and the standard *Colisa lalia* and the blue form which has been known to us for some years. We were received with extraordinary friendliness, were soon seated in front of a large beer and talking about fish. Then we took a look round the fish farm which has 300 concrete tanks measuring about four metres long and 1.80 metres wide, together with ponds about 13 metres long and 5 metres wide. In addition to Mr. Tan the fish were looked after and cared for by his wife, together with four employees. In this connection Mr. Ong did not speak of fish-breeding but referred to Mr. Tan as a 'fish-culturist', by which he made clear that the main aim was to produce new races and develop mutants. This became very clear as we went about the place. We saw really beautiful specimens of the blue variety of *Colisa lalia*, but we were suddenly halted in front of a plastic bag full of dazzling orange-red *Colisa*'s. At first glance they resembled *Colisa chuna*. When Mr. Tan came to this hybrid he was reluctant to say anything. Later it turned out that it was a *Lalia* mutant, which by strict selective breeding had had its coloration improved, for we saw in Singapore not only orange-coloured specimens but more reddish fish. This red coloration is not a result of hormone treatment, for the beautiful red colour remains constant and in my experience

was just as beautiful after being kept for twenty months. But we had not reached the stage of looking after such fish. We tried to obtain two males but Mr. Tan was anything but inclined to hand them over. Even Mr. Ong, one of his biggest customers, was unable to acquire a single fish. On the contrary, the farm was guarded day and night with the aid of dogs and a watchman. This is understandable when one is aware of how much time and work, investment in other words, are devoted to such a fish. In the past another hybrid which was in the process of being 'developed' had already been stolen, which represented a considerable loss of essential, anticipated income. We were allowed to photograph the fish in the bag, however, and Mr. Tan related that he already had enough specimens for him to begin worldwide exporting during the course of 1978. Looking at the beautiful specimens we shared his hopes and in the autumn the first consignments indeed arrived in the different European countries, in Holland, to be sure, not until the very beginning of 1979. The first arrivals consisted of male fish only and they were mostly orange-coloured specimens. Not until later did the more orange to bright red specimens and also female fish arrive. The latter can be distinguished on close inspection from normal *Lalia* females in that good specimens do not have any lines along the body, which can be seen in the case of the original females and the blue variety. If one has a large number of males of the red mutant it is possible to establish that many specimens are simply uniform





red, but that there are others in which the coloration is built up of a large number of very fine, red, horizontal lines.

Not only the shape and size of this mutant are characteristic of *Lalia*, but also the behaviour, which is adapted suitably to life in the aquarium. At the 1980 National Aquarium Exhibition of the Belgian Association of Aquarists and Terrarium keepers I saw a number of these fish in an aquarium in which there floated a few small 'islands' of *Riccia fluitans*. Beneath some of these islands were the 'Gukengi' males which out of the roof above their heads had immediately made bubble nests, for the most part with rather large air bubbles. In itself the nest did not resemble very much a *Lalia* nest and it was quite different from a nest of *Colisa chana*. But, in the meantime, I had also seen at home how they made quite different nests with the aid of Java moss (*Vesicularia dubyana*) and this fact became even clearer as I set up several breeding tanks. For example, there floated in one a small piece of wood overgrown with small *Microsorium pteropus* and Java moss. On the floor of the tank lay coarse peat overgrown with Java moss and when I introduced a male along with a female the former showed within an hour the greatest interest in the growth at the surface. By the evening he had formed a territory from which the female was expelled.

The following morning was devoted to nest-building, in earnest. The males generally produced very fine foam, holding themselves thirty to forty seconds at the surface of the water as they vigorously gulped mouthfuls of air. Then they disappeared under the vegetation where they released it through the mouth and even more so through their gills as fine, glistening bubbles. The result was not a genuine bubble nest, but just as with the original *Lalia* species a solid construction.

The building of the males always began straight away early on the following morning after their introduction (if they are placed in the tank in the morning then they usually make a start in the afternoon). From time

to time I went into the aquarium room to see how things were going. Things were fine, building went on at a cracking pace. Females were never allowed on the building site. As soon as a female gathered up enough courage to suddenly appear below the unfinished nest, the male would be momentarily nonplussed by this audacious behaviour. Then he would hover around her a little, suddenly spread all his fins and dart around and under her with his body at an angle in the water. The female stayed motionless for the most part. Subsequently, the male nosed against her sides and when she still did not move off pandemonium suddenly erupted. Both fish darted about the tank until the female found a hiding place somewhere and disappeared. The pursuit was so relentless that I thought to myself: "If I were your betrothed, my lad, then you'd have to be more careful!" This went on until about two in the afternoon, by which time the nest was finished and then, of course, the male desired the opposite. He sought out the female which now was scarcely to be seen. Whenever she poked her nose out of the vegetation, he swam back to the nest with his fins fully spread and his coloration so intense that I thought, "In a moment he'll burst into flame!" The female made herself more visible, he approached again and sailed around her with his body on an even plane, then at an angle in front of her nose and finally straight back to the nest until he was positioned with his nose as close as possible beneath the construction in the moss as if he was trying to say: "This is where you must go". Then back to the female in order to show off his finery. In this way the poor fellow ran a sort of shuttle service from the nest to the female and from the female back to the nest. But the female seemed to be of the opinion: "You can wait, you've made my life a misery the whole morning and now I'm staying where I am". So it went on the whole afternoon and I, myself, going constantly to and fro, from my study to the aquarium room and from there to the typewriter in the study, every fifteen minutes, because I did not want to miss anything. By three o'clock

spawning had not taken place, nor at four, at five the same and by six o'clock I was in such a bad temper that I went downstairs and said to my wife: "Give me a drink, I've had enough". I sat down with the newspaper and was firmly decided not to bother any longer about the fish. I had simply lost interest. But after a quarter of an hour I could not rest and went upstairs again and as I entered the room the two fish were at that moment engaged in a mock pairing. From then on I stayed at hand, getting hungrier and hungrier, but by half past nine I had some fine shots of their spawning behaviour and afterwards I really enjoyed my meal.

In conclusion, a few further observations. Not only the body shape and behaviour of the red mutant derive unmistakably from *Colisa lalia*, but also the embryonic development in the eggs. Also, as was mentioned in part one of this article, it is advisable to place newly hatched young into a rearing tank with a very low water level. When they are free-swimming the young keep very close to the surface of the water, so that with a low water level not only can a good concentration of food be achieved, but the fish are kept in the midst of it. Because the number of eggs is high a large number of young are produced and success in rearing them depends on the availability of pond *infusoria* during the first days of their life. For, not even the finest *Artemia nauplii* are acceptable to the young. If one has one's own cultures of *Euglena (ocellata)* or slipper animalcules (*paramoecium*), and they need to be very extensive, then rearing the young is no problem. If one has a source of food outdoors in a pond containing rotifers this is highly desirable. If they are well fed in this way the fish can be given freshly-hatched brine shrimps from the fourth day. During the next four or five days, however, the brine shrimp should be combined with pond *infusoria*. A good magnifying glass is useful in controlling the diet! Very fast growing fish are culled as normal, so that they do not seize their smaller brothers and sisters when there is a food shortage one day.

# colourful celebes beauty

*Glossolepis incissus*

by R. Zukal

Most aquarists visiting a dealer would pass a tank containing the young of these salmon-pink fish without showing them the slightest interest. But this would only be so as long as they were unaware of just what fish it was. As far as their coloration is concerned the young are, indeed, uninteresting, being greyish-green. In order to bring the fish to the attention of his customers, the dealer would have to highlight their presence by discussing them or sticking a colour photograph of the fully-grown male on the tank side. Better still, an adult male could be put in with the younger fish. In this way very many aquarists, without hesitating long and after only a few second thoughts, would go for these splendid fish.

According to Dr. H. J. Frank, this fish was already known to science as early as 1908, but it was not brought to Europe until 1973 from Celebes and New Guinea. They grow to about 12 cm; in the wild state they are reputed to grow to 18 cm.

Differences between the two sexes in adult fish are recognisable at first glance. The male is salmon-pink and when excited, a brilliant red. The female retains a uniform grey to yellowish green coloration.

Like most fish of its type this species needs a largish and, if possible, longish tank, medium-hard, neutral to slightly alkaline water, sufficient and varied live food and, although it attains a considerable size, it remains peaceable towards other smaller species. A water temperature of 22°C is high enough. The fish should be kept in a small shoal. They are fast and agile swimmers, so the central area of the tank should be kept clear. They are ready to reproduce by their second year. At this age the male develops the high-ridged back which is characteristic of it. At the same time its head becomes pointed. The strongest male is always dominant within the shoal and acts as the leader.



Female, on left, is more slender, smaller and drably coloured





May, 1982

51



The female, ready to spawn, seeks a spawning site among the plants



The female often adopts a vertical pose and awaits her partner





Typical spawning action

For breeding, the temperature is raised to 26°C and individual pairs are placed in spawning tanks holding forty to fifty litres. They spawn in fine-leaved plants. As they are fish which spawn markedly over an extended period, like most other closely related fish, it is necessary after every three or four days to remove the plants with eggs adhering to them and to give the spawning pair new plants. During spawning, the fish should be fed quite abundantly, otherwise they will consume eggs. They are, in fact, much inclined to feed on spawn, which cannot be said of other, closely related species. One can, of course, let them spawn in the community tank but then the other fish must be removed. I consider this method of breeding the fish to be the best solution for in the large tank the female has more room to escape from the often aggressive male. The eggs are caught in the plants and held there by tiny

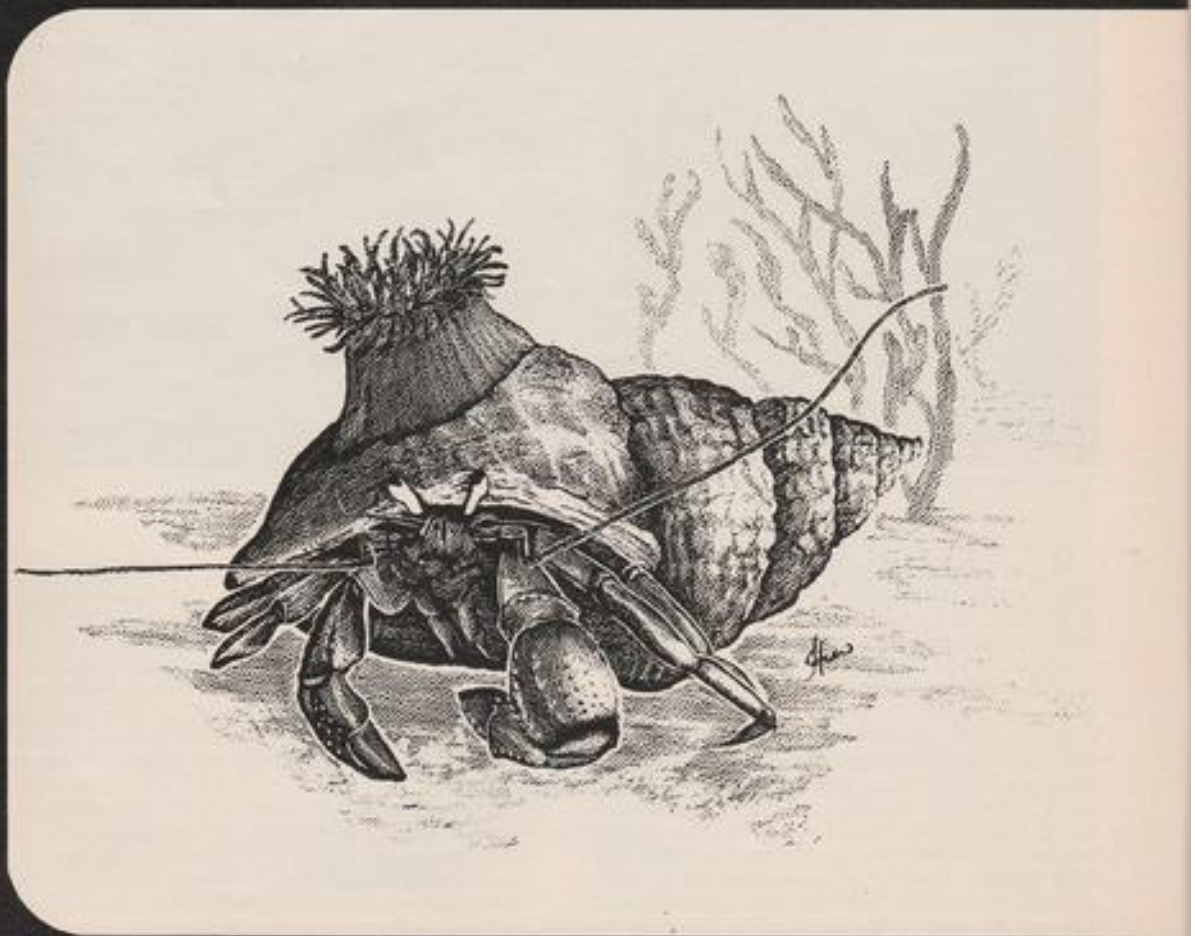
filaments and they are crystal clear and so hardly visible to the naked eye. The hatched young fish are free-swimming on the sixth day and keep themselves near to the surface of the water. They must be fed carefully with tiny live food and dried egg yolk. They grow slowly and do not increase their rate of growth until they are feeding on brine shrimp and nauplii of cyclops. If one puts the spawning substrates from several tanks into one rearing tank, the young fish must be sorted according to size after a few weeks.

In my experience it is advisable to add a little salt to the water containing these fish, at the rate of one soup spoon of sea or cooking salt to fifty litres of water. The fish are inclined to develop fungus on the fins and body, but raising the temperature and adding the salt usually brings everything back to normal after 24-36 hours.

# NATIVE SHORE CRABS

for the  
aquarium

by H. Collingbourne





FEW MARINE AQUARISTS seem to consider crabs to be creatures suitable for inclusion in a home aquarium. They are thought to be vicious, dirty, destructive and dull. Whilst it is certainly true that not all crabs are suitable for inclusion in all aquaria, the negative generalisations which are made about them are quite unjust and it is my hope, in this article, to demonstrate that our own native shore crabs are fascinating animals in their own right and, with a little care in their selection, may enliven almost any marine set-up.

There is quite a range of species of crab living around our shores. Only a few of these are likely to be of much interest to all but the most specialised of aquarists however. At one end of the scale, the tiny pea crab is too small to be any attraction in an aquarium, whereas at the opposite extreme, the edible crab would be big enough to wreak havoc in the simple process of its day-to-day perambulations.

The two most common species which are likely to be of interest to the aquarist are the green shore crab, *Carcinus maenas*, and the common hermit, *Eupagurus bernhardus*.

#### Villains . . . ?

The shore crab is the fellow who we probably all tormented out of hiding places in rock pools when we were children, and may have received many a painful nip from his powerful pincers for our trouble.

When threatened it will raise its pincers in an attitude of defensive aggression and indeed it is able to put them to good use when it needs to for it is capable of gripping and pulling objects up to thirty times its own body weight.

The hind legs of the crab are slightly flattened into a paddle-like shape and in some other species these rear limbs serve as effective aids to swimming mid-water. One such species which is occasionally found inshore is the velvet swimming crab, *Portunus puber*.

#### New Legs

Should one of their legs become damaged, trapped in the crevices of a rock or caught by a predator, both these and related crabs and lobsters are able to discard the limb voluntarily. This process is called *autotomy*, meaning "self-cutting", and is effected by a special muscle which causes the relevant limb to bend at an extreme angle so that it cracks along a groove at a particular point along the limb.

Those crabs, including the shore crab, which have a hard external "shell" or *carapace*, are obliged to moult from time to time in order to grow, and this process may easily be observed in a home aquarium.

First the crab will seek out some sheltered spot, beneath the cover of an overhanging rock perhaps. As the moult is initiated its carapace will be seen to split right across the back edge. At this point the soft body of the crab within will be swelling up with water and gradually the

animal will emerge from its old carapace which will then be discarded like an old coat, or rather, like an old suit of armour.

Shortly after moulting the crab is extremely vulnerable to attack and for this reason it will be sure to hide itself from sight for several days until its new and larger skin has hardened to protect it.

As far as the marine aquarist is concerned it may seem that *C. maenas* fulfils all his worst fears about crabs, and indeed it would be a reckless person who put a couple of adult shore crabs into a tank luxuriant with delicate weeds, fan-worms and urchins!

It has to be said that this species is one of those which is best kept in an aquarium intended especially for its own occupation, although it is unlikely to cause any trouble to anemones or to fairly large and robust fishes.

The dedicated shore-line aquarist may choose to keep the crab in an aquarium in which the daily tides are simulated (this normally requires a second reserve tank of water and a syphoning and pumping system, and is certainly not a construction to be recommended to any but the most devoted observers of tidal life), though crabs will readily adapt to both entirely submerged or only partly submerged aquarium terrain.

When there are rocks projecting from the water, the shore crab will normally take advantage of the opportunity to climb out onto them periodically. The times they choose to do this are by no means random. For at least the first few weeks in captivity shore crabs will tend to make these excursions at regular intervals which actually coincide with the tidal rhythms of the area from which they were collected. This behaviour appears to be regulated by a sort of "biological clock" which, research now suggests, is located in the animal's eye-stalks.

Whilst, as I have said, the observation of *C. maenas*' behaviour would be facilitated by an aquarium devoted to it exclusively, there is no reason why small specimens should not be included in large aquaria containing communities of fishes and animals (excluding the more delicate sedentary invertebrates) and even in coral-fish tanks tiny crabs may make lively and entertaining scavengers.

If native crabs are to be kept in tropical marine aquaria I should recommend that they be taken from the shore during the summer months when the water of rock pools may be of a temperature similar to that of the aquarium.

However, these crabs are surprisingly tough—after all, they manage to thrive in that most treacherous and unpredictable of environments, the tidal shore—and they are able to tolerate quite large changes in both the temperature and salinity of the surrounding water.

#### Easy to feed

The feeding of these creatures presents no problem; they will eat anything from earthworms to tinned dog-food or flaked fish-food. In a large aquarium there will probably be plenty of left-overs for them to scavenge without the necessity of introducing food especially for them. They will also attack and eat sick or dying fish and this, far from being a factor arguing against their inclusion,



can prove to be a positive benefit, particularly if the fish should chance to die in the aquarist's absence—during a holiday, say—when, if left to rot, the body could cause serious pollution.

Of course, I would not recommend including shore-crabs in a hospital tank full of delicate and expensive invalids that you are nursing to recovery!

When looking for crabs on the shore, you may well come across individuals with what appear to be clumps of eggs attached to them. The true eggs of the shore crab take the form of dark orange granular collections beneath the tail of the female in springtime. A smooth yellow lump beneath the crab's tail, however, is indicative not of parenthood but of parasitism, for this is not an egg cluster but the reproductive organs of the parasitic barnacle, *Saccadini carcini*. This barnacle settles on the crab and bores into its bloodstream where it sends out long food-absorbing threads into every part of the host's body.

When a crab is parasitised in this way its normal growth is hindered and it is unable to moult its carapace (this would, after all, cause complications for the barnacle), and is only able to do so once again when the parasite has died after releasing its sperm and ova.

#### . . . and Clowns

The hermit crab, *Eupagurus bernhardus*, does not encounter the same problems of moulting as its hard-carapaced relatives, for only the front portion of its body is hard-skinned, whilst its abdomen is soft and vulnerable. This, of course, provides other troubles for the hermit, for, left unprotected, its abdomen would soon provide an easy meal for a hungry fish or another crab. However, the hermit crab is perfectly adapted to cope with this problem—its abdomen is coiled in such a way that it fits perfectly into the empty shells of univalve molluscs such as winkles and whelks. The end of the abdomen anchors itself firmly into its molluscan home by means of curved appendages which are perfectly suited to this purpose.

In an emergency, the crab will suddenly retreat into the depths of its shell, the opening of which is then sealed by the larger of the crab's two front claws.

As this crab grows it must, every so often, change into a roomier shell which will more comfortably accommodate its body and the aquarist must be sure to provide a selection of shells of all sizes in an aquarium containing these animals. Before changing into a new shell, the hermit will examine it thoroughly with its pincers to ensure that it really is empty.

When assured of this and, presumably, satisfied that the new shell is as desirable a residence as it appears to be, it will seize the point of the empty shell and, in a swift movement, leap from its present home and plunge its abdomen into the new shell. As with the moulting time of hard-carapaced crabs, the shell changing of hermits constitute, perhaps, the most dangerous moments of their lives; it is a time when, for a second or two, their succulent bodies are left unprotected from potential predators and we may speculate that it is the great danger of this which leads hermits to choose shells which are much too big

for their present body size but allow plenty of room for growth.

#### Good Mixers

Hermit crabs are well known for the variety of animals with which they live in close union, often in symbiotic partnerships which, unlike the parasitism of the barnacle already described, seems to provide benefits for both the creatures involved. *Callinectes parasitica* is one such creature which is often found resident upon the shell of the hermit crab. Popularly called the "Parasitic Anemone", *C. parasitica* is not in fact a parasite upon the crab; it merely settles on its shell and takes the benefit of the remnants of the crab's meal which it captures in its tentacles. The benefit which the crab may derive from the association with the anemone is less obvious, though perhaps the anemone's stinging tentacles discourage predatory fishes from venturing too close to the feeding crab.

The small hermit, *E. prideauxi*, is accompanied by another anemone, *Adamsia palliata*, which engulfs the hermit's shell and covers the body of the hermit itself. As the crab grows the base of the anemone extends itself around the hermit so that eventually the crab is living inside the anemone and has no need to change into another shell.

A similar association sometimes occurs between the hermit and a sponge, *Ficulina ficus*, which engulfs the mollusc shell and may gradually absorb the lime from it so that the sponge itself replaces the shell and forms a living, growing, protective camouflage around the hermit crab.

One animal which often lives *inside* the shell of the crab is the rag worm, *Nereis* spp. Again, this creature does not harm the crab. It may benefit it by causing the circulation of water inside the crab's shell, whereas the worm itself reaps the benefit of feeding on the remnants of the crab's meal.

The hermit crab is indeed the ideal inhabitant for almost any marine aquarium and has few, if any, of the disadvantages of the shore crab, although, once again, I would not be inclined to keep them in tanks filled with lush growths of delicate seaweed.

Hermits are continually entertaining and fascinating, always on the move, lumbering about and clicking their shells across the aquarium floor. They will not attack healthy fish and are unlikely to damage all but the most fragile of invertebrates. They are common around the shore and are easily found—just sit quietly staring into some rock pools and watch out for those winkles and whelks which jerk about rather more in their movements than you would normally expect. What is more, they are relatively easy to keep in the home aquarium.

I first kept hermit crabs as an addition to an aquarium featuring fishes as the star attraction, but in no time at all the bustling antics of the hermits upstaged all the other aquarium occupants. I hope some of you will be tempted to try keeping these animals yourself. I don't think you'll regret it.



# COMMENTARY

by  
Roy Pinks

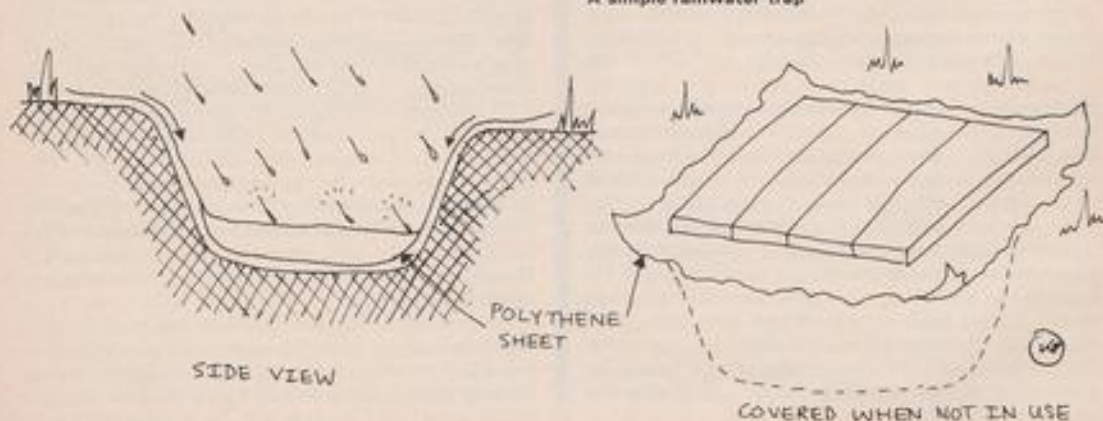


It seems that every month or so brings with it some climatic freak which causes interruption of the power supply. Ignoring the fallible nature of the grid and the tenacity of maintenance staff in restoring it to rights after nature has taken its latest toll, there must be nagging uncertainty in the minds of many aquarists, particularly those in the north of the British Isles, about the long term safety of their fish. It is almost like the troubles of the owner of the deep freeze, who increasingly feels he has to insure the thing, or rather its contents, against warming up. Whereas we have to worry about cooling down.

I am not prone to decry technical achievement out of hand, but we don't seem to have progressed markedly, in terms of reliability, from the days when the vast majority of aquarists entrusted their charges to the Little Marvel paraffin heater, marketed during the 1930s by a firm which has meantime doubtless gone the way of all good things and disappeared completely. The fact that electricity then was not always available, and that gas was not easy to apply to aquarium heating, caused many tank owners to rely on oil, and although some ingenuity was called for in using this medium, the capital costs were not great.

So far as I can recall, the source of power was a single paraffin burner which sat in a metal enclosure underneath the tank, the flame being directed to the underside of a metal spreader plate on which the tank was situated. Several heaters could, of course, be inserted into the heating enclosure to boost the level demanded by larger aquaria. No thermostats were applicable to this contrivance and much depended on guesswork, but somehow it all worked, albeit with a smell which would not be very popular nowadays, as old fashioned paraffin was something to be reckoned with! The spreader plate principle was, of course, the way of using gas to heat aquaria, but the capital cost of providing suitable and adequate burners was rather more than the average enthusiast could accept.

A simple rainwater trap



Whilst calor gas today will appeal to many as an immediate and effective way of maintaining a high temperature in the room containing aquaria, this medium is again not applicable directly to a tank. I wonder, therefore, how many aquarists will have been thinking about simple ways of using paraffin when all the world is tumbling about them and other emergency measures are not available. I have in mind people way out in the country or in areas where facilities seem most frequently to fail. There is probably nothing on the market today quite like the Little Marvel, and the nearest we can get to is the car sump heater or the type one can use for outhouses. However, the flames of these are not very large, and wicks of at least an inch in width would seem to be a minimum requirement. I should be interested to receive any information on this, in particular whether any members of the trade have workable solutions.

#### pH worries

A fairly constant niggle from aquarists who have passed the beginner stage is that they cannot get the pH right—the acidity of their tank water is either too high or too low. The consequence is that they worry themselves to and fro from their dealer and around all their friends in an effort to achieve "the right" conditions. Usually this involves them in the purchase of bottles and packets of chemicals, often very expensive and usually with inadequate instructions as to use. Rarely do these packets disclose what their contents are. In fact, the ones which help to increase alkalinity are based on sodium bicarbonate and those in the opposite direction on sodium acid phosphate, both of which are fairly cheap and obtainable from the chemist, and which should be added slowly and in small quantities to the water for best effect.

There are lots of additives, many based on doubtful trade secret formulae and similar claptrap. What has to be remembered, and the careful aquarist will have worked this out for himself, is that even when you have got the conditions nominally right they are usually extremely unstable, so you have to continue the treatment almost indefinitely if you are to get the reading constant. The effect, long term, on the chemical composition of the tank water, can be quite astonishing, and one may be somewhat puzzled why, though the readings are all as they should be, the fish are looking fairly sickly about the gills.

The answer here would be to net the fish, gradually acclimatize them to your tap water via a smaller container, and finish up using just this alone or in a combination with pure rainwater. There are very few fish indeed which have such peculiar needs that they will not do quite well under these conditions, and those which have specialized requirements need the help of a permanent buffering process. This is something which the average aquarist can completely forget about. Far better to set up a rainwater trap in the open garden, into which rain can fall unsullied by passage across polluted roofs or via unclean drainpipes. This can be made from heavy gauge polythene laid into a large box or a hole in the ground with raised edges. Preferably, it should be covered, to prevent the build-up of algae and other unwanted fallout.

#### Naturalist's Notebook — Continued from page 32

There was much talk the other year about salmon back in the Thames. Yorkshire shared such welcome news last December when a salmon weighing 23 lb 5 oz was caught in the Wharfe at Green Beck, Boston Spa, the first for many years. Whirling disease, the protozoan infection of rainbow trout continues to spread north through trout-farms. At the time of writing it has been detected in Shropshire and Powys.

How bright is a mollusc or shellfish? Not very, we assume, but Sahley, Rudy and Gelperin have recently shown at least associative learning in a terrestrial mollusc. Research by Falcon and Meissl has shown that the pineal organ of the pike, a gland at the back of the brain, linked in some reptiles with a third eye, has a photosensory function. This was known long ago with the eel, for example, and explains the adult's sensitivity to light, for the young eel, relatively insensitive to light, has not developed the gland. This applies to young salmon too.

In another interesting investigation, Gerhardt has shown that two frequency bands functioning from sound pressure are the basis of mating call recognition in the green tree-frog. In South America, the mating calls of frogs attract a species of bat which feeds on them, seizing them in its mouth.

#### South American Fauna

Though South America has the richest fauna of all the continents, it receives far less publicity in natural history literature this side of the Atlantic. Michael Andrew's *Flight of the Condor* (BBC and Collins £12.95) is not a book specially about this culture, but the fascinating story of filming the recent TV programmes on 20th century Wildlife and its problems in Chile, Peru and Ecuador. Much is in the footsteps of Darwin. For example the male Darwin's frog, *Rhinoderma* takes the eggs into its unusually large vocal sac until the froglets grow large enough to jump out of its mouth. It leaps into the water and floats away on its back, showing its brightly coloured belly which camouflages with the dead leaves of the beach trees. Antelope frogs have black backs to absorb the energy of the strong sunlight. An iguanid lizard, *Liolaimis* immediately warms up when emerging into the sun after the cold night because its colour darkens to absorb more radiation when it is cold.

Of the Amazon's 25 species of piranha, six feed on seeds. As well as the fierce red-bellied piranha being attracted by blood to attack humans, (the expedition caught some piranhas for food) the whale-candiru fish (*Cetopoidae*) accounts for deaths of fishermen annually. A tiny unrelated candiru which parasitises the gill-chambers of fish has the dangerous habit of entering the anus or vagina of human bathers when its reverse spines make expulsion painfully difficult.

Incidentally, the German technical publishers Springer Verlag have launched an expensive new quarterly journal *Coral Reefs* in co-operation with the International Society for Reef Studies and edited by David Stoddart of Cambridge University. Another is *Polar Biology*.





## Coldwater Queries

by Arthur Boarder

I have about sixty goldfish in a concrete pond and all feed well and appear to be in general health, but a number of them have small yellow cysts about the size of a pea on head and body. What do you think these small lumps are?

I am aware of cysts on goldfish but I do not recall seeing any which are yellow in colour. As they seem to be all of the same size I am inclined to think that there is a parasite of some kind inside. As you are in El Salvador, C.A., it may be that you have certain parasites of which I have no knowledge. As you have several fishes so affected, I suggest that you take one fish and puncture the cyst with a sterilised needle, press it and see if there is any pus or other matter inside. Then treat the spot with a disinfectant such as T.C.P. and then smear the spot with Vaseline. If this treatment appears to be effective you can deal with the others in a similar manner. Some cysts are just a malformation of cells under the skin and may never increase in size or do any harm to the fish.

I have just set up a tank, 18 x 12 x 12 in. with about 30 water plants. After a week I put in a small fantail goldfish. In the morning I found masses of bubbles clinging to the glass but none on the goldfish. Can you suggest the cause?

If bubbles are found on the surface of the water it is a fairly sure sign that the fish has been mouthing at the surface for air, but in such a case they would not appear on the inside of the tank. There may be nothing to worry over but it does appear to me that you may have overstocked the tank with water plants which can cause trouble at nights when they are not giving off oxygen. Make sure that there are not too many plants for the one fish or you may have trouble at nights.

One of my pond goldfish has a hard white lump on its side. Is this dangerous or catching?

The lump is a cyst and may not increase in size nor cause any harm to the fish. If this is the only fish affected in the pond there is nothing to worry over. On the other hand, if several fishes have lumps which may be soft and apparently containing something, this could be more serious as the lumps could contain pus and parasites. Ordinary hard cysts may be caused by a blow, perhaps when spawning.

### READERS SERVICE

Our experts are always pleased to receive your letters which should be addressed to:  
**Readers Service, The Aquarist & Pond-keeper, The Butts, Brentford, Middlesex, TW8 8BN.**

All queries requiring a personal response must be accompanied by a stamped addressed envelope.

I have a tank, 24 x 12 x 12 in., with fancy goldfish in it. I know that it is slightly over-crowded and wonder if the addition of an under-gravel filter will make it all right?

Even the addition of a filter is not likely to make your tank safe for too many fishes. It is absolutely essential that the stocking rate for the tank is not exceeded. In your case only 12 inches of length of fish should be included, exclusive of the tail. All the filtering and aeration will not mean that your fishes will thrive if over-crowded. Always err on the liberal side so that the fishes have swimming space in which to grow and keep healthy.

I would like to get some good quality Veiltails and wonder if it is possible to buy some eggs so that I could hatch and rear them myself?

I am enclosing an address from where you should be able to get some good Veiltails. As for buying eggs, I think that this is highly improbable. It would be a great gamble both from the point of the buyer and for the seller. A small bunch of water plants such as Hornwort, (*Ceratophyllum demersum*) on which fishes had spawned could hold a dozen eggs, or a hundred. There are not easy to count among plants. Then there may be none hatched or very many, some might do so in transit and be liable to die. A dozen fry could contain several good specimens whereas there may not be one good one in dozens. I know of no one who would be prepared to sell eggs but you might like to try by writing to some of the dealers who advertise in 'The Aquarist'.

I have a garden pond, 40 ft. x 6 ft. x 1½ ft., with water lilies and plants. We built up a stock of Golden Orfe, Shubunkins, goldfish, fantails and Rudd. About two weeks ago we found that the bulk of the fishes had disappeared. There were still a number of fishes left but two days later these had gone. What do you think was the cause of the losses?

I am certain that the fishes were taken by a heron or herons. This is a typical case, as when a heron finds a fish pond it is likely to clear it within a short space of time. There are several birds which take fishes from a garden pond, but they may only take one or two at a time, and in a large pond the fishes may not be missed. The herons usually visit a pond in the early hours before people are



about. You might hear their peculiar call whilst flying. This is medium to high pitched call sounding like "Frank" or "Crank". Fine plastic netting over the pond is one way to keep the birds off, and as they mostly land near a pond and walk into it, a few strands of fine black wire stretched round the pond, a foot or so high and about a foot from the pond, may also be a deterrent.

**What is the advantage of having living plants in a tank as opposed to plastic ones?**

In the first place they look more natural but of more importance, they give off oxygen during the hours of daylight and also use up much of the waste matter from the fishes.

**I have a well established 36 in. tank with a number of fancy goldfish. I think I have room for more and wonder if I can add a Koi. I have no knowledge of how large they grow or if they are aggressive. Can you advise please?**

You did not state the number and sizes of fishes in the tank, and so do not exceed an inch of length of fish, excluding the tail for each square foot of surface area. A koi could grow to twenty inches long and could be aggressive to smaller fishes, especially at feeding time. They would also tear up any water plants and so are quite unsuitable for a tank the size of yours. A couple of Shubunkins would be a better choice, providing you have tank space.

**I am thinking of installing a pond in my front room under the stairs. Have you any advice you can give me?**

I take it that the room must have open planning with light under the stairs. If the underneath is closed in, then the question of light will be the major problem. Even with open planning, the stairs are usually just treads and have no risers. This means that dust and dirt could fall into the pond. You would have to have a fibre glass pool and a good light overhead. A type of lamp similar to a reading lamp would be useful. If the pond is open to view, then you could build up on the outside with artificial rockwork to hide the fibre glass. You would need light on for about twelve hours a day to have success with water plants. One of the most useful oxygenators for your purpose will be Hornwort, (*Ceratophyllum demersum*) as this plant grows well with little light.

**I have a tank, 24 in. x 12 in. x 12 in., with six common goldfish and a moor. One of the goldfish constantly swims around with its head down and cannot get to the bottom of the tank, always floating up to the surface. What is the matter with it and the cure?**

The fish has swim bladder disorder which may have been caused by a chill, but also for other reasons. The cure is to keep the fish in shallow water so that it is just above the extended dorsal fin. If you can keep the container warmer than the usual tank water this will help. A temperature of about 70°F., is a good one. Do not feed

**£10  
PRIZE**

**YOU & US**

**READER  
PARTICIPATION**



The leaflet issued with our April issue inviting readers to send us their own suggestions regarding the kind of articles and information they would most like to see in future issues of 'The Aquarist' has met with a most enthusiastic response. Many of the letters received have proved both helpful and constructive. A selection of these will be printed in next month's issue and the writer whose ideas are judged to be the most interesting and imaginative will receive our ten pound prize.

The competition will continue during May and June and the overall winner will receive an additional prize to be announced shortly. Entries for the current month should be sent to:

**Reader Participation,  
The Aquarist and Pondkeeper,  
The Butts, Half Acre, Brentford,  
Middlesex TW8 8BN.**

**to arrive not later than Monday May 24th.**

Letters should be clearly written and contain not more than 400 words. If you are a Club member please state the name of your Society and should you be amongst the lucky winners your organisation will receive a donation from *The Aquarist* in addition to your own cash prize.

**DON'T FORGET — THIS IS YOUR MAGAZINE!**

the fish whilst under treatment and when it appears to be better, feed with broken garden worms or maggots for a time.

**Why is it that when I introduce fresh fish to my pond they always die within about three weeks from Fungus disease?**

You may have too many fishes in your pond before adding the new ones. New additions do not always fare well when put with fishes which have been in the pond for some time. This is especially the case if the new ones are smaller than the occupants. Another reason may be that when the new fishes were transported and handled, some of the mucus covering may have been removed. This can be done with a net. This then leaves the fish open to attacks of disease, especially Fungus. When adding fishes to your pond see that they are about the same size as those already in the pond and be careful not to handle them roughly.

*Discover the Fish*

**Answer: MOORISH IDOL**





## Tropical Queries

by Dr. C. Andrews

### Can you give me some hints on setting up a tropical freshwater community tank?

Before setting up an aquarium it is vital to read one or two books on the subject—especially if you are a newcomer to the hobby. 'Aquariums' by A. Evans (Foyles, 1976, about £1.50), 'Tropical Fish' by B. Ward (MacDonald Guidelines, 1978, about £1.50) and the *Tetra Beginners Aquarium Digest* (available from the Tetra Information Centre at £0.85p incl. p&tp) are all extremely useful and reasonably priced. Background reading will help a would-be aquarist avoid some of the early pitfalls.

Having read a little about the hobby, the next stage is to draw up a shopping list—and then purchase everything for the aquarium *except* the fish. The fish will be added later, when the system has settled down. Setting up the tank, equipment and decorations should be quite straightforward. The following hints may be helpful.

**Siting the tank:** the tank must be sited away from draughts, room heaters, excessive amounts of sunlight, etc. These may cause temperature fluctuations and encourage unsightly algae.

Remember that when the tank is full it will be heavy (each gallon or 4.5 litres of water weighs 10 lbs) and hence it must never be moved unless first emptied. To provide even support, the tank should be seated on a row of polystyrene ceiling tiles.

**Washing the Gravel:** when first purchased the gravel will be very dusty. It must be well washed in running water before use. It is also a good idea to rinse out the tank with a little clean water.

**Plant Growth:** for good plant growth undergravel filtration should be avoided and a one inch (2.5cm) layer of aquarium peat mixed with garden soil and placed beneath a two inch (5cm) layer of washed gravel on the floor of the aquarium.

**Lighting:** to ensure healthy plant growth, some form of lighting will be necessary. As a rough guide allow 20 watts of fluorescent lighting (or 30-40 watts of *GroLux* or tungsten bulb lighting) per foot length of aquarium. Leave on for 8-10 hours per day.

**Adding the water:** do not add the water until most (if not all) of the equipment, decorations and plants have been arranged in the tank. Do not turn the heater-thermostat on until it is fully submerged. Always condition new tap water with *AquaSafe*. To prevent the water disturbing the gravel cover the tank floor with a polythene sheet whilst filling the tank.

**Conditioning the System:** once the tank has been filled, all the equipment may be turned on and left running for 24 hours. Any final adjustments to the aeration, filtration or heater-thermostat may then be carried out.

If the pH and hardness of the aquarium water is not known then this should be measured before any fish are added. Some fish have quite precise water quality requirements, although others are more hardy.

To speed up the conditioning of the system, a small number of relatively hardy fish (e.g. barbs) should be added—5 or 6 in a one metre tank are about right. These will help the tank and its filter(s) through the characteristic rise and fall of potentially toxic nitrite, a phenomenon which all new tanks go through.

After a further 10-14 days the nitrite level should have fallen to a safe level, although it is probably sensible to carry out a 25-30% water change and then check the nitrite level with a reliable test kit. However, over a period of 6-8 weeks, the stocking level may be gradually increased to its maximum recommended level. This may be calculated by allowing 10 square inches of water surface for each inch of fish (excluding fins). A local aquarium dealer (or the books mentioned above) will give you guidance on which fish will mix with which.

Do avoid overstocking and overfeeding—check the above books for more information on tank maintenance.

### What is the "nitrogen cycle" and why is it important to aquarium fish?

Within an aquarium or pond a process known as the "nitrogen cycle" converts ammonia and similar waste products through nitrite to nitrate, the latter of which is used as a food by the plants. Helpful bacteria, which are harmless to fish, present in the gravel and filter are responsible for this process, and these bacteria are dependent upon a continuous and plentiful supply of oxygen for their survival. Ammonia and nitrite are both potentially very toxic to aquatic organisms, much more so than nitrate. Therefore, every week or so, just *before* a partial water change, the nitrite content of the aquarium water should be tested using a *Tetra* test kit. A concentration of 0.1mg nitrite nitrogen (NO-N) per litre is harmless; more than this may cause problems.

Whilst some fish (eg. certain characins) are more resistant to nitrite than others (eg. guppies, swordtails), a level of 0.2-3.5mg nitrite nitrogen per litre can be quite harmful to most aquarium fish. The fish may appear off-colour, with clamped fins and reduced appetite, and more susceptible to certain diseases. Nitrite levels of this amount suggest that waste products within the aquarium are not being broken down fast enough. At 1.0mg nitrite nitrogen per litre, at least a 50 per cent water change should be carried out, although regular nitrite tests will prevent this situation arising. Increase nitrite levels are caused by infrequent partial water changes, inadequate filter maintenance, accumulated organic debris, overcrowding and overfeeding. The above comments concerning nitrite also apply to marine aquaria, although marine fish and invertebrates are even more sensitive to this pollutant.



# Marine Queries

by Graham Cox

I would appreciate some advice on setting up a 48 in. × 12 in. × 15 in. tropical marine aquarium. The lighting consists of 1 × 30 watt GroLux plus 2 × 30 watt Trulites. Because the bulk of my questions are about my filtration system, I have decided to enclose a few diagrams to help explain what I am on about.

I have two Sicce P34 submersible pumps and wish to incorporate one of these into an Eheim reverse-flow undergravel filter (fig. A) so that its outlet empties water into the airlift, whilst sucking water via a modified (fig B.) Tetra Brilliant filter.

As to my questions:

(1) Do you think this exercise will work in practice?

(2) Incorporated into the airlift of the Eheim undergravel is a small disc-shaped regulator (fig. C) which, when supplied has one small hole punched into it (out of a possible eight) which allows a flow for a floor area of 0.3m<sup>2</sup> (approx 80 cm × 40 cm). I was wondering how many holes I may punch out so as to allow the highest possible turnover without decreasing the nitrification potential of the bed (i.e. is it possible to have too high a turnover?).

(3) Because I wish to keep invertebrates, I was wondering if reverse-flow filtration will interrupt such semi-burrowing, detritus feeders as some sea-urchins, sea stars, etc.

(4) I also wish to use the other Sicce P34 pump and a Hagen Optima air pump for water circulation purposes. Is this okay?

(5) Is my lighting sufficient for invertebrates?

(6) I also have an Eheim 2021 power filter, but I am not sure whether to use it in this tank for fear of depriving filter-feeding inverts of food. What is your opinion?

(7) My intended vertebrate stock will include:

2 clowns (*A. percula*), 1 small hovercraft (*T. gibbona*), 1 small surgeon (*A. leucosternon*), 1 dwarf angel (*C. hispidus*).

Do you think this is okay? If so, what size do you think the hovercraft and surgeon may attain in my tank?

(8) Finally (sorry about this), can adult brine shrimp (*A. salina*) live indefinitely in my tank?

(1) Yes. I have been advocating reverse-flow U/G filtration as the ultimate aquarium filtration system since the Sixties. It is pleasing to see that this system is catching on albeit rather late in the day. The only disappointment which I feel (on your behalf that is), is that you could have achieved your objective so much more cheaply, attractively and efficiently with a Hockney System.

(2) Punch all the holes out for a marine aquarium. It is almost impossible to have too high a turnover rate in a sea aquarium, though you may have to turn your Sicce submersibles off for 15 minutes after adding invertebrate foods.

I am always being asked if it is possible to have too high a turnover rate when considering a filter's nitrification potential. The simple answer is—"It all depends on what you mean by, etc., etc." You see a filtration system's nitrification potential (my own term, meaning the level of ability of a given filtration system to swiftly and safely oxidise the highly toxic nitrogenous excretions of fishes and invertebrates into relatively non-toxic dissolved nitrates) is a function of many complex and inter-affective parameters—not least amongst which are the dissolved oxygen tension, pH, S.G., temperature, lighting levels, nitrite/nitrate and phenol levels, to name but a few.

Any Trader, Hobbyist or Taproom Expert who makes a categorical statement such as "For maximum nitrification potential the depth of gravel/shells/oolitic sand over an undergravel filter should not exceed 3 inches" \* is either plain daft or of genius potential. Without labouring the point, I should tell you that at Longford, my most efficient marine system nitrification beds are 18 ins. deep and my most efficient denitrification beds are 15 feet deep, but the flow rates in both cases are enormous by typical hobbyist standards.

(3) No. At the relatively low flow rate which you are likely to achieve with SICCE pumps, none of the burrowing detritus-feeders would be upset in the slightest.

(4) Yes. Good idea. Will greatly increase the levels of dissolved oxygen and decrease the levels of dissolved free ammonia and carbon dioxide—both of the latter being highly toxic to fishes and invertebrates though not toxic in moderation to plants.

(5) Your lighting is only adequate for nocturnal invertebrates. To succeed with the remaining 98% of the commonly imported photophilic invertebrates you will require a further pair of 36in. cheap and cheerful-British-made "Warm-White" or "Daylight" tubes. Do not pay more than £3 each for these tubes. Throw all fluorescent tubes away after 2,500 hours usage, and replace with new tubes.

(6) Either sell this filter or use it only intermittently during the twice per annum plankton bloom seasons, i.e. generally (but not always exactly!) FEB/MARCH/APRIL and SEPT/OCT/NOV of each year. This will reduce the tendency for your fishes to become diseased during these two critical periods and prevents the water turbidity so often seen in poorly-maintained or poorly designed aquarium systems at this time.

(7) Stocking. This is a very OK selection of colourful and cheap marines suitable for a small aquarium and there



should be little or no aggression provided that you buy the fishes in the order which you state, allowing 10-14 days between each of the four purchases. And provided that you don't buy the *Radianthus* spp anemone which the mated pair of *Amphiprion percula* MUST have, until:

- (i) the nitrite content of the seawater has been less than 0.125ppm for 3 successive days, and
- (ii) you have installed the other two white tubes discussed above.

Over the next 8-10 years the Hovercraft will reach about 3 in. overall length and the Powder-blue Surgeon will make about 4 in. overall. Please remember to give the Powder-blue Surgeon at least one fresh dandelion leaf every week.

(8) No. Many of the *Artemia* will be sucked onto the cylindrical sponge pre-filter. Most of them will be eaten by the fishes and invertebrates.

\*For Taproom Expert read Winebar Expert if remark overheard in a Costa Bomba Hostelry.

# NEWS

## Design Council approve new idea from young fishkeeper

### Aquarium Breeding Tank

FOURTEEN-YEAR-OLD David Chorley of Ifield Comprehensive School, Crawley, was a fish breeder with problems. The fish breeding tanks on the market were too small so that the pregnant fish took fright and died, or the baby fish were born dead, or even eaten by their mother if she were not removed quickly enough. As live-breeder fish can have between 25-100 live young at one time, it is difficult to provide enough oxygenated water in a small tank.

David's enthusiasm led him to design a breeding tank that overcame these problems. His tank, which is made of transparent Perspex, can be clipped over the rim of an aquarium so that the young fish become acclimatised to the water in the aquarium. Air from the supply to the aquarium is diverted and used to circulate the water in the breeding tank. A removable filter plate in the bottom of the breeding tank is covered with gravel to trap the dirt in the water as it circulates.

To solve the problem of the fish eating her offspring, David added a smaller breeding trap with slits in the base which fits in one corner of the breeding tank. The pregnant fish is put into the trap shortly before the young fish are born. The young fish do not start to swim immediately so they fall through into the main breeding tank. The parent fish can then be put back into the aquarium.

David put a lid on the airlift section and a dividing plate between the airlift and fish compartments. "The lid stops the water splashing over the side of the tank," explains David, "and the divider has holes in the top to control the water current and prevent the baby fish from being knocked about."

The Schools Design Prize judges liked the way David had carefully analysed the problems, applied his knowledge of fish breeding and designed a product to meet his needs.

Although David has tested his design in an aquarium, and is satisfied that the water will circulate, he has not had a chance to put it into operation yet—none of his fish have become pregnant since he finished the tank!

#### SPECIAL ANNOUNCEMENT

It is with much regret that the Editor has accepted notice from Mr Graham F. Cox to the effect that, due to business commitments, he has been obliged to ask for an extended sabbatical from his present position as Marine Adviser to *The Aquarist*.

May I take this opportunity to thank Mr. Cox for all his work and invaluable advice in this respect, and wish him all the very best from us for the future.

At the same time we have been most fortunate in obtaining the services of Mr. Richard Sankey whose vast experience over many years will also prove of great value to this magazine. Mr. Sankey is the Managing Director of The Tropical Marine Centre at Borehamwood, an establishment exclusively engaged in the importation and wholesaling of Tropical and Marine fish plus various allied products. We are more than happy to welcome him to the ranks of our regular contributors.

L. E. PERKINS,  
Editor.



Graham  
Cox



Richard  
Sankey

---

## PRESS RELEASE

---

### NEW FACES AT THOMAS'S

THOMAS'S (A Division of Mars Ltd.), are pleased to announce that Andrew Bartyla joined them on the 4th January, 1982 as Export Development Manager.

Andrew joins Thomas's from Tetra-Werke where he had been U.K. Marketing Manager before being appointed Product Manager—Europe when he was transferred to Tetra Head Office in Melle, Germany. Subsequently Andrew was appointed Sales Manager, Europe and Overseas.

Working with Export Sales Director Geoff Blamires, Andrew will be responsible for the selling and marketing of all existing "Petcraft" and "Aquarian" products in Europe and the Mediterranean areas. Andrew will also assist in the marketing and development of new export products and the planning of their launch into various countries.

Andrew with his wife Jean and two young children have re-located from Germany into the Halifax area and he will be based at Thomas's Head Office.

#### Aquarian Appoint New Senior Consultant

JOHN DAWES, Lecturer in Education (Biology) and an eminent authority on aquarium biology, has been appointed as the new Senior Consultant to 'Aquarian'.

'Aquarian' who market a range of hermetically sealed top quality fish foods throughout the world currently dominate the UK market with an estimated 60% share.

Dawes, 36, was born in Gibraltar and took up his present lecturing position at Bath University in 1976.

Over the years Dawes has been involved in a great deal of aquatic research and is a much sought after lecturer at fish clubs and natural history societies.

A Fellow of the Zoological Society, a Fellow of the Linnean Society and a member of the Institute of Biology, he

was recently afforded the honour of being invited to become a member of the New York Academy of Sciences.

A prolific writer, Dawes has had numerous articles and papers published in fishkeeping and specialist journals from scientific, educational and recreational aspects.

"I am a firm believer that everyone can enjoyably learn a tremendous amount from fishkeeping and many of my articles attempt to show various ways in which this can be achieved." Says Dawes.

"I have been and still am very involved in fish societies," continued Dawes who was Research Director of the British Aquarists Study Society. "At present I am inaugural President of the Southern Livebearers Aquatic Group and inaugural Chairman of the Society for the International Conservation of Livebearing Fishes."

In his capacity as Senior Consultant to 'Aquarian' Dawes will be answering aquarists queries, attending fish shows on the 'Aquarian' stand and will be involved in the research and development of 'Aquarian' foods and treatments.

"I was delighted to accept the Senior Consultancy with 'Aquarian'" says Dawes. "It was particularly gratifying because I have been using 'Aquarian' food exclusively for many years and I am aware of its quality and the results that can be achieved from 'Aquarian'."

Anyone wishing to write to John Dawes should address their queries, with a stamped addressed envelope to John Dawes, Aquarian Advisory Service, Thomas's Ltd., Pellon Lane, Halifax, West Yorkshire.



#### "JOGGERS" JOINS PROMIN!

NEWLY introduced "Joggers" a revolutionary all-in-one pelleted fish food formulated to provide a balanced diet. "Joggers" float whilst even the smallest fish nibble at them thus providing both exercise and nourishment for all types of tropical and coldwater fish from 10mm in size to maturity. Excellent growth rate and brilliant coloration is obtained by regular feeding of "Joggers" pelleted food. Retail price £1.76 inclusive of VAT. "Joggers" are available from leading aquatic shops or if in difficulty, direct from Promin Limited, Barton Stacey, Winchester, Hants. SO21 3QL. Telephone: Sutton Scotney 792 & 793.





## ADDITION TO FOOD RANGE FROM TETRA

A new staple food for coldwater fish has been launched by Tetra.

TetraPond Dorofin Foodsticks are a unique concept in foods for goldfish, koi and all other pond fish and are the result of many years' intensive research and development.

The Foodsticks are made by extruding a food mixture especially balanced to the nutritional needs of coldwater fish. They contain a high proportion of vegetable matter, a significant factor in pond fish's natural diets, with a correct concentration of essential proteins. The protein is in a highly concentrated form which is far more digestible than that normally found in pelleted foods. The high level of digestibility (about 90 per cent) means there is less waste and consequently less pond or tank pollution.

The pink and straw-coloured sticks float on the surface of the water, rapidly becoming soft and slippery and resembling earthworms, which are a favourite food with coldwater fish.

The sticks emit a smell which attracts the larger fish to bite into them, thereby breaking off smaller pieces which slowly sink through the water to be eaten by all types and sizes of coldwater fish.

This feeding process precludes the fish gobbling the sticks dry and thus aids digestion.

An estimated six per cent of homes in the U.K. have coldwater fish in a pond or tank, and this figure is increasing every year. Many people mistakenly assume that because

these fish are relatively hardy, diet is unimportant. But a correctly balanced diet, as supplied by TetraPond Dorofin, will improve coloration, vitality, willingness to breed and resistance to disease.

TetraPond Dorofin comes in 100 gram drums and has a recommended retail price of £1.95.

It is packed in outers of six drums, with eight outers per case.

## PLANT EXPEDITION AND TOUR OF SRI LANKA

A SPECIAL EXPEDITION and tour for aquarists is being arranged for April 1982. This is particularly aimed at those interested in seeing aquatic plants and fish of Sri Lanka in their native habitat. The tour incorporates an off-the-beaten track expedition into the wilds, and the participants will have the opportunity of experiencing the problems and delights of exploration.

The tour will also include a sightseeing programme consisting of visits to the many palm beaches, historical sights and a wildlife sanctuary.

Anyone interested should write for further details to: W. V. De Thabrew, 16 Lawrence Road, Ham, Richmond, Surrey TW10 7LR.

## NEW GUIDE FOR GARDEN ENTHUSIASTS

*Gardens to Visit* price 40p from most booksellers or 60p (inclusive of postage and packing) from Gardeners' Sunday, White Witches, 8 Mapstone Close, Glastonbury, Somerset BA6 8EY.

## THE DERBERT FILTER FOUNTAIN COMPANY EXTEND THEIR RANGE

THE Derbert Filter Fountain Co Ltd who lead the field in POND FILTERS, are now extending into marketing a range of SUBMERSIBLE pump kits which will be suitable to the smaller pool. They have an amazing unrestricted flow rate 396 GPH, and are suitable for use with the DERBERT MINOR FILTER for pools up to 200 gallons. Each pump is supplied with 33 ft of waterproof cable. Technical Details:—Dimensions 5½ in. × 5 in. × 4½ in., Voltage, 220V AC50 160hz. Power: 70W, weight 2kg, (4lb 6oz). Maximum flow: 396 GPH. Maximum static height 79 in. A good reliable Pump at the right price. Also stocks of POOL LINERS with 5 years GUARANTEE both in PVC & Reinforced, colour blue/stone reversible, (·35mm) thickness, also BUTYL rubber (·030 thickness), 15 years GUARANTEE. Please send for price lists to: Derbert Filter Fountain Co Ltd, 41 Lambs Close, Dunstable, Bedfordshire.



## Plant Queries

by Vivian De Thabrew

After many years of fishkeeping I am about to try a well-planted tank for the first time. The tank is 48 in. long, 18 in. deep and 12 in. wide. Lighting is by 2 x 30 w fluorescent tubes (one Grolox, one Northlight). I have a 30 w warm white which could be substituted for either of these. For base compost I intend to use the following: 2 in.-3 in. of peat/loam mix, the loam coming from the garden and tending to be clay-like, and it tends to stain everything red, and this stain is difficult to remove. I intend to cover the loam/peat mix with a gravel-tidy, then 2 in.-3 in. of ordinary aquarium gravel. Filtration is by an internal motorised unit, undergravels will not be used (is this likely to cause pollution?) The water is pH 7.0-7.2, and slightly on the hard side. Temperature will be 74°-78°F. The plants I intend to use are as follows: 50 *Hygrophila polysperma*, 10 *Synnum triflorum*, 50 *Vallisneria spiralis*, 10 *Cryptocorynes*, 10 *Echinodorus tenellus*, 10 *Nymphaea stellata*, 25 *Bacopa monnieri* and a specimen plant. Could you please tell me:

1. Will the compost, lighting, etc. suit these plants?
2. I want a thickly planted tank, have I enough plants?
3. Are all these species compatible?

Thank you for giving me so much information about your plants. I shall deal with each aspect as best I can:

- (a) *Lighting*: The use of 2 tube lights is adequate. I suggest you substitute the 30 watt warm white one for the Grolox tube. As a general rule these two lights should be kept on for about 8 to 10 hours per day.
- (b) *Planting medium*: Your idea of peat and loam is good. My only concern is the fact that you say the loam contains a red stain. Is it some sort of ferric oxidation, or even an organic stain? Can't you get some yellowish/brown clay? Some of the pottery clay is quite satisfactory. When you use peat, do not mix it with the clay, simply sandwich a thin layer of fine, 'pea'-type gravel over it. When using peat, first of all soak it in a container for a day or two. Then skim all the excess dusty particles. Then remove the peat and squeeze out the water using a fine muslin cloth. The pulp thus obtained can be spread as a layer as described above. This way you will not find many particles rising to the top, nor will you find the water becoming too acid. The depth of the

planting medium should be at least 3 inches. If you are concerned about the visual effect, you can have a very shallow depth of the medium at the front, but gradually becoming deeper towards the back area of the tank. Provided your filtration is efficient there should not be any pollution problems.

- (c) *Water condition*: You say that your water pH is 7.0-7.2 and slightly hard. Well, ideally you should have a slightly acid to neutral condition. Most aquatic plants grow in these conditions. There are only a few species which actually prefer slightly alkaline conditions. However, if you were to use the peat in the manner I described earlier, you would find that the pH would reduce to a slightly acidic level. Furthermore, if you want to induce this more quickly, you could collect some rainwater, filter it and then carry out a partial water-change.
- (d) *Temperature*: Maintain the temperature range at 74°-78°F, as this is perfectly satisfactory.
- (e) *Planting*: I cannot find fault with your planting scheme. Every individual can produce a good original aquascape. My only criticism is that you are using far too many plants. Provided you get good specimens, you need not plant 50 *Hygrophila polysperma*, you need no more than 20. These will grow out to form a dense bush. The same applies to *Vallisneria spiralis*. Of the species you propose to plant, *H. polysperma*, *Synnum triflorum*, *V. spiralis* and *Bacopa monnieri* are quick growers. *Cryptocorynes* and *Nymphaea stellata* are slow growers. *Echinodorus tenellus* is moderately quick. If you want an alternative, I suggest *Aponogeton undulatus* or *crispus* instead of *Bacopa*. This should give you a dense growth with a few plants.

All the species mentioned above are compatible. As a specimen plant you could grow *Nuphar sagittifolium*, *Nuphar pumilum*, *Nymphaea aurantiacum*, the true *Nymphaea stellata* lily (not the one normally available on the market), or the beautiful *Aponogeton echinatus* var. *purpurea* (purple-leaved).

**I have been trying to grow *Bacopa*. After a few weeks I was left with a bunch of healthy stalks, each with one pair of leaves at the top. This was in a tank with no fish. Why should this have happened? A similar thing happened to *Cabomba* in a tank at the school where I teach.**

The reason why your *Bacopa*, and for that matter most of the plant species are reduced to their shoots is because in some of the so-called 'nurseries' most aquatic plants are grown in emerse conditions (i.e. bog conditions) in order to grow them very quickly in order to meet the demand. Therefore, once these plants are introduced to submerge conditions the leaves drop off, leaving only the crown intact. I am afraid most of the plants imported via Singapore are like this, because the large fish farms over there grow their plants in this manner. This is the only way they can meet the overwhelming demand. Unfortunately it is the hobbyist who has to pay the price for this malpractice.



# News from Aquarists' Societies

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

## SOUTH WEST



**SPEAKING to Bristol A.S.**, Alison Griffiths described the food chain by which fish, living in a pond, obtain their food. Using slides as illustrations, she showed various algae, plants and crustaceans that form the chain and also some of the larvae and beetles that prey upon smaller fish.

## SOUTH EAST



**50th ANNIVERSARY**  
East London Aquarists & Pondkeepers Association announce that 1982 marks the 50th year in the Association's history. In the past the Association has had many knowledgeable members who have always stressed the importance of the breeding aspect of the hobby, and indeed these members have travelled extensively spreading the 'word' to other societies. And still do today. It is from this foundation that E.L.A.P.A. held annual open breeders shows which are almost unique in that other than classes for pairs, all other fish entries are breeders. To mark the occasion the Association hopes to make this year's open breeders show the best ever. The committee and members of E.L.A.P.A. extend a most cordial welcome to friends old and new to enter or attend their show in October this year.

**ON 16th March South Park Aquatic (Study) Society** members were able to show what they knew or didn't know about native and foreign fish. A special quiz was devised and ably presented by John Pollard and Dave (Mac) Mackay to test the knowledge of the audience. This was followed by an interesting talk comparing the various Goldfish standards available and illustrating the main differences of each. South Park Aquatic (Study) Society specialises in coldwater fishkeeping and meets at 8 p.m. on the third Tuesday of every month at the Wimbledon Community Centre, St. George's Road, London S.W.19. Full details

from: Mrs. Marguerite Dudley, 163 South Park Road, Wimbledon, London SW19 6RX. (Tel: 01-540 5462).

**THE** March meeting of the **East Kent Aquatic Study Group** attracted over fifty members to St. Bart's Church Hall, Herne Bay, to listen to a talk on the subject of aquatic plants. The speaker, Mr. Bernard Pye, illustrated his talk with colour slides of some of the rare and exotic plants he has kept. He also gave many tips which will help club members to cultivate the plants in their own home aquariums. Table show for the month was for two classes, Guppies and Swordtails. There were seventeen entries which resulted: Guppies: 1, 2 and 4, C. J. Bridgeman; 3, R. Matthews, Swantonville; 1, Mrs. F. Edwards; 2 and 4, C. J. Bridgeman; 3, J. Edwards. The judge was Mr. John Gilbert. Details of the Society's meetings and activities can be obtained from the P.R.O., Bob Spence, 23 Godden Road, Canterbury, Kent.

## MIDLANDS AND WALES



**RESULTS of Workshop Aquarist and Zoological Society** recent open show held at the Lady Margaret Hall, Holbeck, Nr. Workshop: Guppies: 1, Mr. and Mrs. Brunyes (Doncaster); 2, Mr. and Mrs. Beckenbury (Abby); 3, John Sparrow (Abby); 4, Flaxies: 1, Mick Johnson (Forest Town); 2, Mr. and Mrs. Blades (Fishkeepers); 3, Mr. and Mrs. D. Penny (Mex.); 4, Mollies: 1, T. Reid (Ind.); 2, Mr. and Mrs. Lloyd (Ind.); 3, R. N. Smithurst and Son (Forest Town); 4, Swordtails: 1, Mick Johnson; 2, P. Lane (Hallcroft); 3, Mr. and Mrs. Holland (Retford); A.O.V. Livebearers: 1 and 3, P. S. Draycott and Sons (A & D); 2, Mr. and Mrs. A. E. Smith (BBC); Small Barbs: 1, Mr. and Mrs. M. Farrow; 2, J. R. and S. Copson (A & D); 3, R. N. Smithurst (Forest Town); Large Barbs: 1 and 2, Mr. and Mrs. Kemp (Sheaf Valley); 3, S. May (Doncaster); Small Characins: 1, P. S. Draycott and Sons; 2, Mr. and Mrs. Lake (Grims/Clee); 3, Mr. and Mrs. Pickles (Grimsby); Large Characins: 1, Mr. and Mrs. Cullley (Abby); 2, P. A. Hughes (Loughborough); 3, Mr. and Mrs. P. Howell (A & D); Small Anabantids: 1, Mr. and Mrs. S. Waller (York); 2, Mrs. D. Smithurst (Forest Town); 3, Mr. and Mrs. D. Mitchell (Lincoln); Large Anabantids: 1, Master S. Down (Ind.); 2, Mick Johnson; 3, Mr. and Mrs. M. Farrow (Lincoln); Fighters: 1, Mr. and Mrs. Beckenbury; 2 and 3, T. Stansfield (Ind.); Dwarf Cichlids: 1, H. W. Smithurst (Forest Town); 2, Mr. and Mrs. Cullley (Abby); 3, Mr. and Mrs. B. Morrell (A & D); A.O.V. Cichlids: 1 and 2, T. Stansfield; 3, T. Marshall (Louth & Dist.); Rift Valley Cichlids: 1, Mrs. V. Mitchell (Lincoln); 2 and 3, M. A. Hollingsworth (Forest Town); Angels: 1, P. Lane (Hallcroft); 2, Mr. and Mrs. Hind (7 DAS); 3, Mr. Huxton (Grims/Clee); Pairs (Ragglers): 1, Mr. and Mrs. Lake (Grims/Clee); 2, A. Palmer (Hallcroft); 3, Mr. and Mrs. M. Farrow (Lincoln); Pairs (Livebearers): 1 and 3, S. Draycott and Sons; 2, Mick Johnson. Breeders

(Egg) (A & D); 1, Mr. and Mrs. Beckenbury (Abby); 2, B. Morrell (A & D); 3, A. Smart (Chatterfield); Breeders (Egg) (C & D); 1, Brian Todd (Grimsby); 2, Mr. and Mrs. Beckenbury; 3, Mr. and Mrs. Colley. Breeders (Livebearers) (A & D); 1, P. S. Draycott and Sons; 2, Mr. and Mrs. Holland (Retford); 3, Mrs. S. Dawn (Ind.); Breeders (Livebearers) (C & D); 1, W. and H. Rodger (Loughborough); 2, P. S. Draycott and Sons; 3, Tony Sparrow (Abby). Coedwas: 1, Mr. and Mrs. F. Howell (A & D); 2, P. S. Draycott and Sons; 3, S. Clark (Doncaster). A.O.V. Cichlids: 1, J. Marshall (I & E); 2, Hodgson and Jackson (Darfield); 3, Mr. and Mrs. Goldard (Sheaf Valley); 4, B. and L. Lushes; 1, Mr. and Mrs. A. E. Smith (BBC); 2 and 3, Mr. and Mrs. P. Howell. Toothpicks: 1, Mr. and Mrs. Cullley (Abby); 2, S. Hill (Alfreton); 3, Mrs. N. Hancock (Retford); Minnows and Darters: 1, Mr. and Mrs. D. Penny (Mex.); 2, P. A. Hughes (Loughborough); 3, Mr. and Mrs. Lake (Grims/Clee); Rasbora: 1, Mr. and Mrs. Lake; 2, J. R. and S. Copson; 3, Mr. and Mrs. Hare (Grims/Clee); Sharks and Foxes: 1, Mr. and Mrs. Marshall (L & R); 2 and 3, Mr. and Mrs. P. Clifton (Chesterfield); Junior A.V.: 1, A. Palmer (Hallcroft); 2, Master Steven Down (Ind.); 3, Mark Smithurst (Forest Town); Goldfish (Comets): 1, R. Ward (W.A.Z.S.); 2, Mr. and Mrs. Howell (Ind.); Shubunkins and Fancy: 1, Carol Hind (7 DAS); A.O.V. Goldfish: 1 and 2, Mr. and Mrs. Snowden (York); 3, Mr. and Mrs. Lake. A.O.V. Tropical: 1 and 2, F. Martin (Alfreton); 3, Mr. and Mrs. D. Penny (Mex.); Mini Tern: 1, Mr. and Mrs. Beckenbury; 2, Mr. and Mrs. Stanton (Sheaf Valley); 3, Mr. and Mrs. Beckenbury. Novelty: 1, K. Lancashire (Donc.); 2, Mr. and Mrs. Beckenbury; 3, Sharon Mee (Forest Town); Mini Tank: Mr. and Mrs. Beckenbury. Best in Show: T. Stansfield (Ind.); A.O.V. Cichlids. Best Pair: Mr. and Mrs. Lake (Grims/Clee) Pairs (Egg).

**AT** their recent a.g.m. **Port Talbot & District A.S.** the following officers were elected: Chairman, R. Perkins; vice-chairman, S. Callister; secretary, D. D. Nicholls; assistant secretary and P.R.O., T. Rees; treasurer, A. Callister; show secretary, J. Egan; assistant show secretary and librarian, C. Davies; trophy secretary, M. Harfield. Please note the new show secretary's address is now J. Egan, 47 Beverley Street, Port Talbot. (Tel: Port Talbot 883700). The summer programme is now planned and new members are always welcome at their meetings.

The club was honoured recently by a visit from Colin Richards, of Sudbury A.S., who brought some fabulous slides of some of his fish and a step-by-step account of building a tabletop. The club are looking forward to your next visit.

**A NEW** Committee for the **Coventry Pool and Aquarium Society** has been elected: President, R. Cleaver; chairman, A. Simmonds; secretary, M. Viles; news letter editor, S. Bowen; treasurer, J. Scholfield; social sec./P.R.O., D. Carding; show sec., C. Bates; committee member, T. Manning.

FROM THE UK'S LEADING  
AQUATIC SPECIALISTS  
**WATER GARDENS**  
with a Difference

**MATLOCK WATERLIFE CENTRE**



Send now for the Water Gardens' full colour catalogue which contains all the information you need to know about ponds, fountains, plants, and fish.

And an enchanting touch of Japan with ornamental lanterns, pottery and beautiful Bonsai Trees.

Prices held throughout 1982

Whether you are starting or re-stocking, compare our full range and low prices - nobody gives you better value in Water Gardening.

Send for your FREE copy now, enclosing 25p only for postage to:

**MATLOCK WATERLIFE CENTRE**  
Nottingham Road, Tansley, Matlock, Derbyshire DE4 5FR

AT the March meeting of the Cannock and District A.S. the following officers were elected: R. Potts, secretary; 25 Oaks Drive, Cannock, Staffordshire WS11 1JU; H. Evans, chairman; B. Smith, treasurer; J. Shaw, show secretary; A. Potts, assistant show secretary; J. Shorthouse, librarian; M. Hall, assistant librarian; P. Griffiths, minutes secretary; D. Dunn, R. Hall, D. Hawkins, F. Smith, Committee members. Meeting are held each first and third Tuesday every month, upstairs at the "Progressive Working Men's Club", Market Hall Street, Cannock, starting at 8.30 pm. New members and visitors are always most welcome and several special evening visits have been arranged for the future months.

AT the first a.g.m. of the East Leicester A.S. the following officers were elected: Chairman and show co-ordinator, John Capewell; secretary, Chris Small; treasurer, Mick Lock; minutes secretary and P.R.O. officer, Gordon Stronon; assistant secretary and treasurer, Alan Pounds; ex-officio, Robbs Perrie; junior member, Martin Small. The society meets on the 2nd and 4th Tuesday of each month at the Home Farm Community Centre, Strashburg Drive, Beaumont Leys Estate, Leicester. Many visits, shows and activities are planned. All enquiries to secretary at 139 Marwood Road, Stocking Farm Estate, Leicester or P.R.O. on Leicester (0533) 365315.

### NORTH



**Keighley A.S.** 14th open show, held on 7th March. Results: Guppies: 1, A. E. Berry (Bradgarth); 2, Mr. and Mrs. Kenworthy (Otley); 3, M. and I. Crowther (Nelson); Plaques: 1, A. E. Berry; 2, Mr. and Mrs. White (Bury); 3, G. Pochard (Nelson); Mollies: 1, M. and I. Crowther; 2, Mr. and Mrs. J. Riley (Leeds P.O.); 3, G. Pochard; Swordtails: 1 and 2, Miss J. Lee (Ind.); 3, Michael Simpson (Otley). A.O.V. Livebearers: 1, A. and E. Berry; 2 and 3, Miss J. Lee. Small Characins: 1 and 3, Miss J. Lee; 2, M. and L.

Price (Castleford); Large Characins: 1, H. Hutchinson (Huddersfield); 2, Mrs. Stanfield (Bradford); 3, Mrs. Anderson (Ind.). Banded Rift Lake Cichlids: 1, P. Jackson (Aireborough); 2, N. Gerkes (CAGB); 3, M. and L. Price. Angels (York): 1, Macbeth (Ind.); 2, Mr. and Mrs. R. Tooby (York); 3, Mr. and Mrs. Kenworth (Otley). A.O.V. Cichlids (Small): 1, M. and L. Price; 2, L. C. Heap (Keighley); 3, M. H. Smith (Wyke). A.O.V. Cichlids (Large): 1, Mr. and Mrs. Rodway (Ind.); 2, K. M. Fisher (Forest Town); 3, L. Gatenby (Bradford). Rainbow and Minnows: 1, D. Horner (Sutton); 2, R. J. Fazlaker (Ind.); 3, Mr. and Mrs. J. Riley. Danios: 1, Richard Cartwright (Otley); 2, Mr. and Mrs. White (Bury); 3, D. Armitage (Sutton). Small Barbs: 1, Mr. and Mrs. Rodway (Ind.); 2, D. Horner (Sutton); 3, S. Stanfield (Bradford). Large Barbs: 1, Mr. and Mrs. J. Riley; 2, Mr. and Mrs. Sykes (Huddersfield); 3, Gary Common (Keighley). A.V. Apistogramma: 1, Mr. and Mrs. Wright (Darfield); 2, R. Proctor (Wyke). A.O.V. Killifish: 1, M. and L. Price. Small Anabantids (Truss Colour): 1, Mrs. Anderson; 2 and 3, Mr. and Mrs. J. Riley. Fighters (Midis-Colour): 1, Mrs. Anderson; 2, Mr. and Mrs. Fawcett (York); 3, Mr. and Mrs. J. Riley. Corydoras and Bechtis: 1, J. T. Morris (CAGB); 2, J. T. Morris (Ind.); 3, M. and L. Price. A.O.V. Catfish: 1 and 3, J. T. Morris; 2, Mrs. L. Lee. Loach: 1, A. and E. Berry; 2, Mr. and Mrs. Fawcett (York); 3, Miss J. Lee; 3, M. Storey (Ind.). Sharks: 1, Mr. and Mrs. R. K. Shaw (Aireborough); 2, Mr. and Mrs. Fawcett; 3, Mr. and Mrs. White. Poises: 1, W. Coops (Ind.); 2, L. Gatenby (Bradford); A.O.V. Tropical (up to 15 cm): 1, A. and E. Berry; 2 and 3, L. Gatenby. A.O.V. Tropical (over 15 cm): 1, F. and N. Watts (Droivich); 2 and 3, A. Smith (Forest Town). Pairs (Livebearers): 1, A. and E. Berry; 2, Miss J. Lee; 3, Mr. and Mrs. Rodway. Pairs (Egglayers): 1 and 2, J. T. Morris; 3, A. and E. Berry. A.V. Female (Livebearers): 1 and 2, Miss J. Lee; 3, M. and I. Crowther. A.V. Female (Egglayers): 1, Mrs. Anderson; 2, Neil MacBeth (Moorley); 3, S. Stanfield (Bradford). Breeders (Livebearers) A & B: 1, Mr. and Mrs. Fawcett; 2, Mr. and Mrs. Wright; 3, Miss J. Lee. Breeders (Livebearers) C & D: 1 and 2, Mr. and Mrs. Fawcett; 3, Miss J. Lee. Breeders (Egglayers) A & B: 1 and 2, Mr. and Mrs. Bolton (Pocklington); 3, Keith Baker (Keighley). Breeders (Egglayers) C & D: 1, P. Jackson; 2, B. Brook (Huddersfield); 3, M. and L. Price. Common Goldfish: 1, D. Silk (Grimsby); 2, T. Barlow (Accrington). Fancy Goldfish: 1, B. Brook; 2 and 3, C. H. Whitney (Accrington). A.O.V. Goldfish: 1, A. and E. Berry; 2, D. Silk; 3, D. and J. Bishop (Droivich). Mini Jaws: 1, James Wright (Keighley).

### SCOTLAND



THE Edinburgh A.S. was recently reformed and meets on the 2nd and 4th Wednesday of the month at Greeniside Lodge, Edinburgh Wanderers F.C. Cochrane Road, Edinburgh, at 7.30 pm. Club nights they have guest speakers and slide shows. On 24th February they welcomed Mr. Ron Atherton, late of Hartlepool and now resident in the east of Scotland, who gave an excellent talk and slide show of the fish he has kept over the years, including the Champion of Champions at the British Aquarist Festival. They have a full list of speakers booked for the next four club meetings. Any interested person can attend on club night or contact either James Milligan (Secretary on 013-337 4563) or Len Davidson (President on 031-337 1511). Listed are results of table shows for December, January and February:

Senior: December—Bacis 'A': 1 and 2, L. Davidson (Jr.); 3 and 4, J. Milligan. Collis species: 1 and 2, B. Hodge; 3, J. Milligan. Senior: January—Mollies: 1 N. Kendall. Catfish 'A': 1 and 4, B. Hodge; 2 and 3, N. Kendall. Junior: Catfish 'A': 1, A. Jenks. Senior: February—S: Fighters: 1 and 4, B. Hodge; 2 and 3, J. Milligan. Plaques: 1 and 2, J. Milligan; 3, W. McManis. Junior: S: Fighters: 1, A. Jenks.

At a recent club meeting it was decided to enter a tableaux at the Scottish Aquarist Festival at Motherwell Civic Centre on the 3rd and 4th April. The theme is based loosely on the 1994 World Cup in Spain. It was also decided to hold an open show on Sunday 5th September 1992, the venue has yet to be finalized.

**Paisley and District A.S.** held its monthly meeting on 4th March. The table show was Guppies and A.O.V. Results: Senior league—Guppies: 1 and 2, S. Hamilton; 3, B. Dunbar. Senior league—A.O.V.: 1, B. Dunbar, Monodactylus argenteus. Junior league—Guppies: 1, A. Patterson; 2 and 3, A. Findlay; 4, Thomas McIlreath.

## Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

### MAY

**1st May:** Southend, Leigh & D.A.S. open show at St. Clements Hall, Leigh-on-Sea, Essex. Details from Show Secretary D. Chawright, 2 Cedar Avenue, Wickford, Essex. (Tel: Wickford 2511).

**2nd May:** Blith Aquarist & Study Society first open show, at Felling Community Centre, Banching 11.30am-1.30pm. Schedules available from: T. Ogden, 134 Belmont Drive, Felling, Tyne & Wear. (Tel: 0632 999490). s.a.s. please.

**2nd May:** Whiby & District A.S. open show at the Spa Pavilion, Whiby. The show will be judged to the North East Federation of Aquarist Societies rules and standards. Schedules available from: Mrs. A. Forbes, 12 Lockton Road, Whiby, North Yorkshire.

**2nd May:** Hall A.S. open show at the Albermarle Youth Centre, Foreneway, Hall.

**8th May:** North Avon A.S. 3rd open show, to be held at the Church of the Good Shepherd Hall, King's Drive, Bishopcleeve, Bristol. Further details from show secretary, Mrs. K. M. Gidd, 17 Braydon Avenue, Little Stoke, Bristol.

**8th May:** I & E A.S. open show at Monks Dyke High School, South Lincs.

**8th May:** Sudbury A.S. 10th annual open show at Neasden High School, Quainton Street, London, N.W.10. Schedules and further information from Barry Wateridge, 130a Preston Road, Wembley, Middx. (Tel: 01-904 0818).

**8th May:** Throckley A.S. 3rd open show in the Grange Centre, Newburn Road, Throckley. Booking 11-30 to 1-30pm. Schedules available later from Show Secretary, Mrs. D. Laker, 51, Hewley Crescent, Throckley, Newcastle on Tyne. (S.a.s. please). Tel: 6032-477236.

**8th May:** Maclinfield A.S. open show at Ryke Park County High School. Details can be obtained from show Secretary, Mr. J. Merriman, 100 Beck Street, Maclinfield.

**8th May:** Bourne-mouth A.S. annual open show at Kinross Community Centre, Williams Park, Kinross, Bourne-mouth. Show schedules available from 1st April from Show Secretary, Jack Jeffery, 30 Bramer Avenue, Bourne-mouth, Dorset BH16 4JP. S.a.s. please.

**8th May:** Corby & District A.S. open show at Corby Civic Centre, Festival Hall. Booking: 10.30-11 p.m. Schedules on request to Alan Henderson, 5 The Nook, Corby, Northants.

**8th May:** Leamington and District A.S. and Midland Aquarist League open show. To be held at Lillington Community Centre, Lillington, Leamington Spa, Warwickshire. For further details contact Chairman, Mr. J. White, 33 Charles Street, Warwick. (Tel: Warwick 492019).

**8th May:** British Aquarist Study Society meeting at the Great Eastern Hotel, Liverpool Street, London, commencing at 2 p.m. Price per ticket £1.50. Speaker: Mr. Ed Jennings, member of the British Killifish Association. Subject: *Austrofundulus Terrazonis* Dolichopterus, *Cynolebias* (*Simpsoni*) *Bostoni* *Rotifolia* Todd. Tickets obtainable from: Mr. P. L. Bird, treasurer, British Aquarist Study Society, 8 Long Acre Close, Coombe Dingle, Bristol BS9 1RF.

**8th May:** Southern Livebearers Aquatic Group, Yorkshire Area Group, meeting at 3 p.m., at Thorne Town Council Assembly Room, Thorne, Nr. Doncaster. Speaker: John Doves, President of S.L.A.G. and Senior Advisory to Aquarian Foods. Table Show: *Poecilia* and *Xiphophorus*. Further details from Group Secretary, Nairy Noble, 58 Woodside Road, Boston, Lincs. PE21 8AP. (Tel: 0209-30438).

**8th May:** Accrington A.S. open show at New Jerusalem Church Hall, Hargreaves Street (off Manchester Road), Accrington. Further information from S. Walsh, 133 Lamnack Road, Blackburn, Lancashire.



**16th May:** York & District A.S. open show at Folk Hall, New Barwick, York. Schedules available from Show Sec., H. Snowden, 14 Brownlow Street, Geaves, York YO3 1LW (Tel: York 24659).

**16th May:** Aberdeen A.S. open show in the "Centre for the Deaf," Smithfield Road, Woodside, Aberdeen. All enquiries to Secretary.

**19th May:** Accrington & District A.S. open show at New Jerusalem School, Hargreaves Street, Accrington. Details from: P. Hands, 15 Bridgefield Street, Hapton, Burnley. (Tel: 0282 74883).

**21st May:** Meeting of the Central Midlands Cichlid Group. Further details available from Mrs. Maureen Hill, 71 Saxon Road, Penkridge. (Tel: 078 571 3944).

**21st May:** Mr. Derek Lambourn to Lecture at Northern Area Group C.A.G.E. meeting. Details from J. T. Morris, 102 Cale Lane, New Springs.

**23rd May:** North Avon A.S. third open show at the Wesley Hall at the junction of Windness Road, Patchway. (Change of date). Secretary: Mrs. C. Curry, 12 Linnet Close, Patchway, Bristol, Avon.

**23rd May:** Sutton & District A.S. open show at Sutton County Primary School. Further details from Mr. G. Wilkinson, 25 The Hawthorns, Sutton-in-Craven, Nr. Keighley, West Yorks.

**23rd May:** Portsmouth A.S. Inter-Club show at the Portsmouth Community Centre, Madine Road, Portsmouth. Please note change of date.

**29th May:** Mid-Sussex A.S. 2nd open show at the Sydney West Sports Centre, Leyland Road, Burgess Hill, Sussex.

**30th May:** Bridlington & District A.S. annual open show at Hildershorpe School, Kingsgate, Bridlington. Schedules available shortly from T. Smith, Boothouse Cafe, Hildershorpe Road, Bridlington.

**30th May:** Yorkshire Koi Society spring show, to be held at Transcontinental Goldfish Co., Victoria Mills, The Knowls, Steeples, Huddersfield, West Yorkshire. For further information contact Mr. P. Dalton, 151 Hansworth Lane, Cleckheaton, West Yorkshire. (0274 875964).

**JUNE**

**6th June:** Arbroath A.S. annual open show at Arbroath Community Centre, Marketgate, Arbroath. For further details contact J.R. Stiven, 95 Beulah Road, Arbroath. (Tel: 0241-26605).

**12th June:** Llanrwst Major A.S. annual open show at School Hall, Ham Lane East, Llanrwst Major, S. Glamorgan. For further details contact Show Secretary, A. Therman, 84 St. Mary's Avenue, Barry, S. Glamorgan. (Tel: Barry 940282).

**13th June:** Northwich & District A.S. open show at Hatfield High School, Greenbank Lane, Chester Road, Northwich, Cheshire. Details from Show Secretary: D. Valentine, 43 Hatford Road, Daversham, Northwich, Cheshire. (Tel: Northwich 6624).

**13th June:** Dunmow & District A.S. open show. Details from Mrs. P. Perry, Secretary, 5 Randal Close, St. Dunmow, Essex.

**13th June:** The D.D. A.S.: open show at the Foddes Hall, Gt. Dunmow.

**19th June:** Meeting of the Central Midlands Cichlid Group, AGM and arrangements for an Exhibition and Auction to be made. Further details available from Mrs. Maureen Hill, 71 Saxon Road, Penkridge, Staffs. (Tel: 078 571 3944).

**19th June:** South Park Aquatic (study) Society 1982 open show for coldwater fish at the Winkleson Community Centre, St. Georges Road, London SW19. Further details available from Eric Franklin, show Secretary (S.P.A.S.S.) 105, Hascocks Road, Streatham, London SW16. (Tel: 01-879 2680).

**19th June:** Nailsea & District A.S. ninth open show to be held at Clevedon Community Centre. For further details contact P. Fickett, 2 Woodland Road, Nailsea, Bristol (Tel: Nailsea 853096).

**19th June:** East Durrich A.S. special "Silver Jubilee" open show to celebrate the club's 25th birthday, at The United Reformed Church, Highcombe Avenue, Charlton, London SE7. For further information and show schedules: Show Secretary, Mrs. D. L. Winder, 32 Eddystone Road, Brockley, London SE8 2DE.

**20th June:** S.M.T. A.S. and Clyde A.C. first open show at Lindsay House, Kinloch Street, The Village, East Kilbride.

**27th June:** Port Talbot & District A.S. 9th open show at the Talbach Youth Centre, Port Talbot. Schedules from J. Egan, 47 Beverly Street, Port Talbot. (Tel: Port Talbot 885700).

**27th June:** St. Helens A.S. open show at Rainhill Village Hall. Further details from the Secretary, Mrs. H. Soodman, 10 Kibble Avenue, Rainhill, Liverpool, or the Show Secretary, Mr. T. L. Penny, 19 Hawkhead Road, Burtonwood, Warrington.

**JULY**

**4th July:** Gloucester A.S. 8th open show at Churchdown Community Centre, Churchdown, Gloucester. Further details from T. Tapping, 66 Brenchin Road, Gloucester.

**4th July:** Lytham A.S. 16th annual open show at Ansdell Institute, Woodlands Road, Ansdell. Further details from Show Secretary, Mr. P. Ham, 1 Wynborne Grove, Preckton, Preston. (Tel: Preckton 633182 or 635211).

**4th July:** Chard & District A.S. open show at Farnham School, Chard, Somerset. Details from Show Secretary, Mr. D. Shepherd, 30 Furton Road, Chard, Somerset. (Tel: Chard 3993).

**4th July:** Castledorf A.S. open show at Woodhouse Hill W.M.C., Norenton, nr. Castledorf.

**10th July:** Weston Super Mare A.S. first open show at the Emmanuel Church Hall, Oxford Street, Weston Super Mare, Avon. Benching at 10.30 a.m.—12.30 p.m.

**10th and 11th July:** Remford & Becontree A.S. open show at Dagenham Town Show, Central Park, Dagenham. Schedules from Gerry Soplewe, 35 Coniston Way, Elm Park, Hornchurch, Essex RM12 5HQ. (Tel: Hornchurch 44057).

**18th July:** Sandgrounders A.S. 12th annual open show at Meols Cop High School, Meols Cop Road, Southport, Merseyside. Schedules available on receipt of s.a.e. from R. Baldwin, 10 Olive Grove, Southport, Merseyside. (Tel: 0704 43384). 50 Perpetual trophies, New Photograph Contest. **31st July:** Hull Show at the East Park, Haldenese Road, Hull.

**AUGUST**

**1st August:** Leicester A.S. 2nd open show at St. Matthew Community Centre, Malabar Road, Leicester. All enquiries for schedules and information should be made to Show Secretary, J. Richards, 26, Huggate Close, Rushey Mead, Leicester. (Tel: Leics. 666314).

**1st August:** Blackpool and Fylde Aquarium Society open show at St. John Venney School Hall, Glantzbury Avenue, Blackpool. Schedules from Mrs. J. Slater, 103 Kanwick Road, Blackpool, with s.a.e. for return of schedules.

**2nd-7th August:** Portsmouth A.S. annual exhibition at the Wesley Central Hall, Fratton Road, Portsmouth. Open 10 a.m. daily to 9 p.m. Saturday 10 a.m. to 6 p.m.

**7th August:** Northern Goldfish and Pondkeepers Society 6th open show at the Sports Centre, Silverwell Street, Bolton, Greater Manchester. Open to the public from 1 p.m. Details and entry forms from D. W. Load, 40 Hospital Road, Bromley Cross, Bolton, Greater Manchester. (Tel: 0204 58190).

**7th August:** Bristol Tropical Fish Club open show at W. D. & H. O. Wills Recreation Hall, New Charlotte Street, Redemansy, Bristol. Benching 9.00 a.m. (12.00 noon). Schedules will be available from mid-June from the Show Secretary, Mr. I. Littleton, 9 Little Snake Road, Snake Bishop, Bristol BS9 1JQ. S.a.e. with application please. Show will be to F.R.A.S. rules and incorporate Aquaria Gold Pin, Championship Trophy class and Brooch scheme.

**9th August:** Oldham & District annual open show at Werrath Park, Oldham. Further information and show schedules can be obtained from A. Chadwick, 9 Bromville Close, Chadderton, Oldham OL3 2RH. (Tel: 061-652 6207).

**21st and 22nd August:** Yorkshire Aquaria Festival at Doncaster Racecourse. Details from Mr. N. Bolton, 11 Sherburngate Drive, Pocklington, Yorkshire. Tel: 07592 3177.

**15th August:** Dorchester Tropical Fish Society 2nd open show at the Boy's Brigade Hall, Sawmills Lane, Weymouth Avenue, Dorchester, Dorset. Schedules from R. Symes, 8 High Street, Poodington, Dorchester, Dorset. Please send s.a.e.

**27th, 28th and 29th August:** Irish Federation of Aquarists Societies open show in Bangor Leisure Centre. Details from A. Robbins, 160 Berrinbridge Road, Ballee, N. Ireland.

**28th August:** Ashford & District A.S. second open show. Secretary, R. J. Scouting, 6 Manor Way, Ashford, Kent.

**30th August:** Yorkshire Koi Festival arranged by the Yorkshire Koi Society incorporating the 6th Open National Show. Venue: Harwood House, Harwood, Nr. Leeds, Yorkshire. For further information—general or trade stands—contact Mr. P. Dalton, 151 Hansworth Lane, Cleckheaton, West Yorkshire. (0274 875964).

**SEPTEMBER**

**5th September:** North Wilts A.S. open show, details from Show Secretary, Mr. P. Taylor, 7 Ridgeway Road, Stratton, Swindon, Wilts. (Tel: 0793 824114).

**8th September:** Huddersfield Tropical Fish Society open show at Shilohs Civic Hall, Slashwater, Huddersfield. Booking in time is 12.00 p.m.—2.00 p.m., plus afternoon session at the same time.

**11th September:** Bristol A.S. Coldwater Fish Show at St. Andrew Church Hall, Southfield Road, Whitehall, Bristol from 3-5.30 p.m. Details and Schedules from Show Secretary, I. Midon, 67 St. John's Lane, Bristol BS3 5AB. (Tel: 0272-712381).

**11th September:** Hounslow & District A.S. open show. Details from the show secretary, Mr. T. Bellingbrake, 2 Holmwood Close, Addlestone. (Tel: Weybridge 54976).

**12th September:** Buxton & District A.S. annual open show in St. Peter's Church Hall, Fairfield Road, Buxton. Benching 12.00 to 2.00. Judging to commence at 2.15 prompt.

**12th September:** Leamington and District A.S. open show to be held at Lilington Community Centre, Lilington, Leamington Spa, Warwickshire. For further details contact Chairman Mr. J. White, 33 Charles Street, Warwick. (Tel: Warwick 492019).

**12th September:** Dundfermline & District A.S. 12th annual open show at Northtown Institute, Dundfermline.

**26th September:** Northern Area Group open show at Darwen Library Theatre, Darwen, Lancashire. Details from R. Baldwin, 10 Olive Grove, Southport, Lancashire.

**26th September:** Wolverhampton A.S. open show, the venue to be decided at a later date. Show Secretary is Alan Davis, 5 Star Close, Bentley, Walsall. (Tel: Walsall 646265).

**OCTOBER**

**2nd October:** The Bethnal Green and Independent A.S. 2nd open show to be held at Windsor Road School, Manor Way, East Ham, London, E.6. Benching from 9.30 p.m. on Saturday to 11.30 a.m. Sunday. Judging at 12.00 noon. Schedules and further information from Mr. L. Tuck, 9 Harford Street, Stepney, London, E.1. (Tel: 01-791 0965).

**10th October:** Edinburgh Aquarium and Pondkeepers 10th annual open show at Craigroyton Community Centre, Ponnypoll Road, Edinburgh.

**10th October:** Bethnal Green and Independent A.S. open show. Please note changed date.

**NOVEMBER**

**14th November:** Bradford & District A.S. open show at Clayton Village Hall, Clayton, Bradford. Further information available from the Show Secretary.