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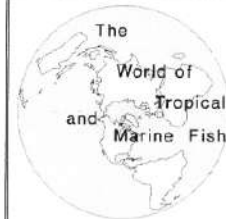
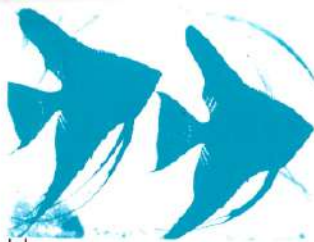
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Dear Reader



May I take this opportunity to wish you all a very Happy and Peaceful Christmas.

This has been a year of change for "FISHWORLD" in both editorship and the introduction of colour. The expansion in the coming year with news from the many specialist societies will be of great interest to our readers. This month we start the first of a series of Marine articles. Reptile corner will continue each quarter, the author Sue Oakey was well received at Western-Super-Mare. Sue's travelling Zoo which she brought to this year's show was an instant success. Her magnificent dogs were admired by both young and old alike.

As we go forward into 1993 we await your articles and suggestions. If you would like to submit an article for inclusion in 1993 please note the following copy dates. 15th January for March issue; 15th April for June; 15th July for September and finally 15th October for December. Material received after these dates will be used subject to space availability in a later issue.

Once again, a very Happy and Peaceful Christmas and may 1993 bring you Joy and Happiness.

Peter A Farze

Peter A Farze, EDITOR

Material for the next issue of this magazine should be in by the 15th January 1993, and sent to:
 The Editor, Fishworld Magazine, 9 Upton Road, Hounslow, Middlesex TW3 3HP.
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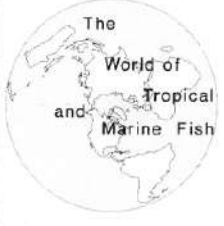
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From ... The Chairman

AS I LOOK BACK OVER 1992, I can't believe that we have ever had such a busy year or that the Federation would be involved in so many excellent aquatic events.

I have been fortunate, and privileged, to have been your Chairman for the last few years during which time we have extended our services well beyond the Society level to become, in the eyes of our friends in the Aquatic Trade, synonymous with well-organised public events. Among our engagements this year were the Pet Show at Earls Court and the ever-growing Hampton Court International Flower Show; we attended all the major aquatic events including Doncaster; Sandown Park; Perth and Manchester, most of these in association with the Hagen Helpline. On a more 'family' front, we were happy to be associated with the Isle of Wight Society's Weekend 'experience' — an event we are fully committed to in April 1993; we are still recovering from our own fantastic Supreme Festival of Fishkeeping, held at Weston-super-Mare with the generous and continuing support of Interpet, an event which has really become a popular and established feature on the calendar if the attendances are anything to go by — again we are already planning next year's occasion.

Our membership has climbed, reflecting that more and more Societies are appreciating what we can do for them; a fully-comprehensive show-support scheme from Judges to Awards, Brooches to Gold Pins plus incentive schemes generously supported by the Trade all make FBAS Shows the best around. The Supreme attracted nearly 40 entries, and the European Open Show brought in entries from far and wide.

This FISHWORLD magazine is also gathering momentum, it is now featuring an increased number of colour pages (even our latest Booklet, No. 21, has a colour-printed cover) and it is reaching Societies, Judges and Speakers everywhere in the U.K., thanks to the generosity of Aquarian, who also sponsored the Judges' Size Collipers.

I have offered myself for re-election as your Chairman and know that with your continued support we can go on to even greater achievements; I would like to thank members of the Federation Council for their hard work during the year and hope to be bringing you early news of exciting developments for 1993, some of which are well into the advanced planning stages.

I wish you all a very Happy Christmas and Successful Fishkeeping for the New Year.

Joe Netherell, Chairman, FBAS



COLORED ATLAS OF MINIATURE CATFISH

by Dr Warren E Burgess

How many aquaria these days do not include amongst their inhabitants one or more of the species of catfish of the genus *Corydoras*?

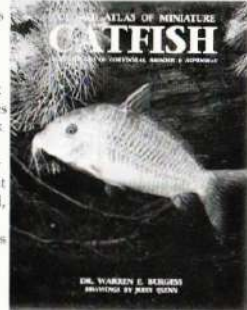
There has been an ever-growing interest and demand for these peaceful, helpful and very interesting fishes.

This demand has caused a tremendous surge in the number of species imported and with them has come also an interest in their close relatives *Aspidoras* and *Brochis*. With the new importations, the cry for information about them has been raised, especially for means to identify the species and how to keep or breed them. This new book addresses both these concerns.

It presents every species of *Corydoras*, *Aspidoras* and *Brochis* that has been described and provides the means, wherever possible, of distinguishing them from species they closely resemble - as well as providing any available information on the keeping and breeding of these fishes. The Atlas includes colour photographs of most of the species currently

available in the aquarium trade as well as illustrations of species that are known only from a few preserved specimens. The water condition requirements are included for every species for which they are available (not all species have yet been imported

alive) as are discussions about individual species' breeding habits, especially if they differ from the more typical *Corydoras* spawning patterns. Illustrated with over 200 full colour photographs and drawings, the 'Colored Atlas of Miniature Catfish' will appeal to all aquarists.



Colored Atlas of Miniature Catfish by Dr Warren E Burgess
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ECHINODORUS

The Amazon Sword Plant by Bill Rundle FINAL PART

E. parviflorus Rataj
SYN. *E. peruensis*

THIS IS A REALLY OUTSTANDING species for the discerning aquarist and one of my favourite aquarium plants. Closely related to *E. amazonicus* and *E. bleheri*, it is much more attractive than either. The foliage is abundantly produced, forming a more compact plant of smaller habit. The laminae are similar in shape to *E. amazonicus* but on shorter petioles. Its popular name 'The Black Amazon Sword' derives from the dark coloured veining that develops when well grown. As the synonym suggests it is found on the western side of South America.

Propagation is similar to *E. amazonicus*, but the flower stalks are not so freely produced. The species is categorised as a 'short day' plant, which indicates that it is from tropical latitudes and requires twelve hours of illumination in a regular cycle. It has been said that longer periods of light than this will inhibit flower spike production.

I have experienced long periods when the plants have failed to propagate, on the other hand, I have had them propagating readily. Very likely lighting is a major influence.

E. maior (Micheli) Rataj
SYN. *E. martii*

Micheli first described this beautiful species in 1881 when it was found growing in Brazil. The pale green foliage may attain 50cm in its natural habitat, but under aquarium conditions adapts to the size of the tank. The leaf blades are distinctively borne at an angle to the stem giving the plant a more open appearance. The attractive wavy edge of the leaves give the species its popular name 'Ruffled Leaf Amazon Sword'.

Unlike the previous species the flower spike on *E. maior* grows strongly erect, emerging at the water surface and in the aquarium both flowers and plantlets are produced. New plants often appear at the rhizome, and very often what appears to be a large specimen will in fact be a plant that has divided into two.

Two similar species are sometimes available. *E. asiris* SYN. *E. rubra* that is of a sturdier habit, and as the synonym implies has a reddish tinge to its foliage when well grown.

A rarer plant that also has similar foliage is *E. horemani*, named for T. Horeman of Tachbrook Tropicals in London. I have never grown this species.

Of the smaller species of *Echinodorus*, three are usually available. They are collectively called either Dwarf Amazon Swords or Chain Swords. This name derives from the runners sent out from the parent plant producing young swords at regular intervals in a long 'chain'. Eventually these may form a dense carpet over the floor of the aquarium.

E. tenellus (Martius) Buchenau

This is the smallest species of *Echinodorus*, and was for a while called *Sagittaria microfolia*. Depending on lighting conditions the leaves may be lanceolate or linear with no stem. As it is native to Southern North America as well as South America slightly cooler temperatures and longer lighting periods may suit it very well. The species adapts well to aquarium conditions but will only flower when grown afloat. This is the ideal plant for the front of the tank.

A plant similar in appearance and usually sold in mini pots as Dwarf Sword is in fact a *Lillaeopsis* species. Although nice it does not compare with *E. tenellus*.

ECHINODORUS

(continued)

E. quadricostatus Fassett
SYN. *intermedius*

Although this species is sold as a Dwarf Sword it can grow to 20cm high in the aquarium. The mid green leaves taper for almost the whole of the blade length then roundly pointed to the tip. They may be 15mm at the widest part. Propagation is by runners along the surface of the sand, sending up plants at intervals. However, if the runners are removed from the parent as soon as they appear, the strength will go back into the plant and will result in a nice well grown specimen.

This species has been sold as *E. magdalenensis* but is in fact a variety of *E. quadricostatus*. Again this species grows afloat when it will produce flowers. The foliage is then shorter and sturdier.

E. latifolius (Seubert) Rataj

This Dwarf Amazon Sword has lighter green foliage than the two mentioned before, and somewhere in between for size. The leaves are about 20cm long when well grown and 5-10mm wide, they are more easily damaged than the others, being of a more delicate texture. The leaves are not so tapered towards the base as *E. quadricostatus*, but they do vary in form according to growth conditions, light, and water depth etc. Propagation is as for the other Chain Swords.

E. horizontalis Rataj

Lastly, but certainly not least, is this truly handsome species with broad, heart

shaped leaves that can be 15cm long and 8cm wide on 15cm stems, but are usually smaller. Of all the *Echinodorus* with this shaped foliage, this species is the most desirable. Most of the others are either too large or too spindly with small leaves on stems. The foliage is a pleasing mid-green with new leaves being tinted red-brown as they unfold. Water and lighting conditions are fairly critical for good results. They are short day plants. Given the right environment they will propagate. The flower spike grows erect, growing out of the water surface when it will produce young plants. This species will also flower and set seed in the aquarium. I have transferred the pollen from one flower to another, using a fine artist's paint brush, as described earlier.

Growing these beautiful *Echinodorus* is both rewarding and interesting, and I would like to recommend to you the following reading:

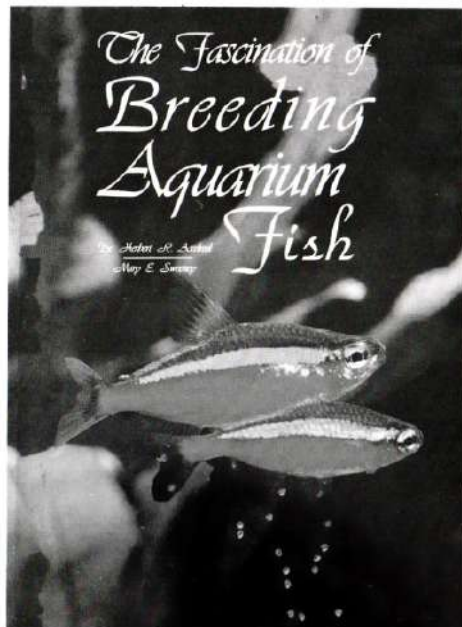
'*Echinodorus in American Tropics*', Norman C. Fassett, *Rhodora*, vol 57 No. 677 May 1955. *Pet Fish Monthly*, Oct., Nov 1968, Jan, March, June, Oct, Dec. 1969, February 1970, Oct. 1975.

The Complete guide to Water Plants, Helmut Mullberg.

Aquarium Plants, Dr. Karel Rataj and Thomas J. Horeman.

Diary Dates for 1993

April 3-4	Am Show, NEC, Birmingham
April 23-25	Full Keeping Weekend, IDW
June 5-6	The London Aquatic Show - London Park
Aug 14-15	Am Show/Billing Aquarists - Northampton
Nov. 5-7	Western Super-Aquarium Weekend of Fullkeeping



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BOOK REVIEW

BEING THE CHAIRMAN OF THE FEDERATION OF BRITISH AQUATIC SOCIETIES does bring huge responsibilities but, on the other hand, there are several occasions when it does have some very nice advantages. I was both delighted and privileged when Sam Hardy from TFH Publications allowed me to have the very first preview of their latest release, but at the same time a little taken aback when he also suggested I might care to review it!

The main problem, no doubt encountered by all reviewers who are qualified to do the job by virtue of being long-term fishkeepers, is to put oneself in the position of the inpart or, or less experienced reader, right back at the beginning again with all the joys (and pitfalls) to endure; again, experienced fishkeepers get very set in their ways, with their own personal preferences and dislikes which may well prejudice their judgement more than a little. I have tried, therefore, to distance myself from such standpoints and will try to assess the book's merits from, say, the collective requirements of the Federation's large membership amongst which are, of course, many beginning aquarists.

Straightaway, and reflecting the Federation's own aim of attracting new people into the hobby, I liked the title: whether you are into fishkeeping to any degree or not, there is a fascination of seeing living creatures go about their natural business of furthering their species, and even more so when you can do just that from the comfort of your own armchair. One of the biggest attractions about breeding fishes, (a slight drawback is that you don't find out about them all immediately) is the many different ways they go about it, depending upon local water conditions, necessities of protecting the young, surviving seasonal elemental changes and so on (we're only talking about fishes in nature here, there's still the extra challenge of breeding the cultivated strains to come). Aiming to breed fish is one thing, getting them to do it in order in your aquarium is quite another matter, and it is a combination of both these aspects that Dr. Axelrod has addressed, I feel, so successfully.

Practice might make perfect in some walks of life but preparation is the real secret in fish breeding: getting the right fish (seeing them correctly) into the optimum conditions (separating the sexes, feeding well and providing the right aquarium conditions) are the necessary groundwork chores — sitting back and watching the performance and the offspring are the pleasures. The opening part

of the book takes you through all these preliminaries step by step, explaining not only what to do but also, more importantly, why.

Once you've grasped these basics then you can turn to the wide range of exotic fishes which will perform this miracle for you, whether it's *Poecilia* or *Pencilfish*, *Plotos* or *Puffers*, *Mollies* or *Mouthbrooders*, *Catfish* or *Cherax*, there's something here to wonder at for everyone.

The quality of TFH photography is legendary (the real secret is that the cameramen are expert fishkeepers too) and each of the 1,000 pictures are individually laminated to give an even higher degree of crispness, almost putting you in the tank with the fish. The book is divided into the popular fish groups — *Borbs* and their relatives, *Catfish*, *Cichlids*, *Killifish*, *Labyrinthfishes*, *Livebearers*, *Tetras* and relatives and *Oddballs*. Some will be familiar, many will be newcomers (*Puffers*, *Polyporus*, *Kribiafish* etc.), all will be fascinating.

Eventually, you realise the alternative and perhaps the real message of the book, breeding fish isn't just an ego trip for the 'look how clever I am' fishkeeper. It's a plea not only for the continuation but expansion of captive breeding in order to conserve and replenish natural stocks in the face of their extinction by the same people who want to keep them — us. I believe the two levels of this book will serve the two inseparable aims equally well — its stunning visual appeal will enhance fishkeeping's already popular reputation even more, and when the underlying conservation message finally sinks in we shall all be the richer for it. I thoroughly recommend this work to existing, and would-be fishkeepers everywhere (it deserves a place in every library) and sincerely appreciate the opportunity to bring news of this magnificent reference book to your attention.

Joe Nethersell, Chairman FBAS



Supreme Championship Winner G. Rossiter of Salisbury A.S. with Interpet's Neville Carrington and FBAS Chairman Joe Nethersell.



George MacMillan from Belfast receives his Special Award from Joe Nethersell, FBAS Chairman.



Members of Hounslow A.S. and their Winning Society Display.



Hounslow's representative receives Best Society Display Award.

Supreme Festival of Fishkeeping 1992

by Dick Mills

I thought I was dreaming when this Ninja Turtle walked by, closely followed by a Laughing Cavalier, Anne Boleyn, Captain Hook, two Cowboys, two Court Jesters and the Chairman of the Federation! (It only needed the tide to be in and then I'd have known it was a dream).

Of course ... I was at Pontin's Sand Bay Chalet Hotel for Interpet's Supreme Festival of Fishkeeping and, being the Friday evening before the two public days, the residents were letting their hair down in a fancy Dress Parade. Over thirty devil-may-care entrants took to the floor in the hope of instant stardom and tried to convince the Master of Ceremonies that they deserved to win. The outcome was well-deserved wins for Anne Boleyn (Pam Smith), a Whingeing Ninja Turtle (did you guess it was Brian MacHugh from Isle of Wight A.S.G) and the look-a-like Joe Nethersell, complete with Chain of Office, mobile phone and white jacket (alias Carol Butler from Hounslow A.S.). Whilst all this was going on, together with the ensuing Disco, the final touches were being put to the Trade Stands and Society and Specialist Society Displays within the main building — leaving enough space for both the Interpet European Open Show and the Supreme Championship to be held on the Sunday (or so we thought).

Saturday came and with it not only the planned attractions in the shape of lectures and organised Inter-Society team games, but also lots of visitors. Steve La Thangue took the stage for the first lecture and prepared the way for the morning sessions on Keeping Fish Happy with his presentation on **Water Quality and Management**. Adrian Excell, of Interpet, took up the theme baton with **A Guide to Fish Health**. Those of a less fishy disposition were alternatively engaged at watching a Baultonian restoring Carol's features back from the Chairman's, or trying to beat their fellow residents at Pool, Snooker, Darts or Short Bowls. There is a rumour that some even took part in a pre-breakfast swim. Still more aquatic information was being imparted in Sven Fosse's presentation, **Marine Fishkeeping the Continental Way**, to the International Marine Aquarist Association prior to their A.G.M. Despite the crush of folks visiting, selected members of the Pontins Staff were surreptitiously judging the many trade displays, the **Best Trade Furnished Aquarium** award went to Steve La Thangue of King Fish and the **Best Trade Display** was taken by ENVIRON with a most informative 'River to Reef' three tank display showing freshwater, brackish water and sea water environments plus their own pet Moray Eel; their innovative Labelling System was put to good use on a second display staged by Airport Aquaria where each commonly available aquarium fish had full details about its origins and aquarium care clearly featured on a concise, but comprehensive tank label.

The afternoon brought on Heiko Bleher (500 slides in an hour) with a very much conservation-orientated presentation which took most of the audience away from the Avon Ballroom where the Specialist Rounds of the **Aquarium/Practical Fishkeeping AquaChamp Final** was taking place; the six nervous contestants probably wished they could get it all over in one go, but they had to come back for the General Knowledge Round the next day; no black chair this time but that all too familiar doom-laden music couldn't have helped much. The Festival was disappointed to learn that Dieter Vogt, a planned lecturer, could not attend due to injuries sustained in a very recent car accident but his 'performance slots' were ably filled by Mike and Gina Sandford with their audio-visual presentations.

Come 5pm, the Festival closed for the day to visitors but there was no respite for residents; following a swift shower, swim or even nap, it was time for the traditional Dinner. Knowing the reception long speeches would receive, participants kept it short but not before the Chairman, Joe Nethersell, had thanked everyone for their support, sentiments echoed

Supreme Festival of Fishkeeping (continued)

by the FBAS President Bob Esson, who handed over to Dave Keightley who, in turn, replied briefly on behalf of the Trade. Mike Clarke, for Interpet, then made two award presentations, one a not-too-well-kept secret to Lee Smith whose 13th Birthday coincided with the Festival and the Interpet Man of the Year Award went to Heiko Bleher for his outstanding contribution to the hobby. The annual Chairman's award went to Alan Benson, of Aquavita Advisory Service, for his unceasing support for the Federation throughout the year at every one of its major events. Presentations were also made to Pontins staff, Manager David Sanders and the Catering Managers for their hard work, backed up as usual by Mr. Fix-it-on-the-day, George Harvey. The evening continued with Cabaret in the Ballroom where Shades provided the music for dancing and a very robust lady (her words not mine) came on to defend her way of living, very much to the enjoyment of those within insulting reach!

By the time most had breakfasted on Sunday, entries for the Open Show and Supreme Championship had filled the showbenches (hurryingly rebuilt and re-seated to accommodate the entries). The Rainbow & Goby Society quickly got their meeting under way, as did Mike and Gina Sandford's second presentation; the Mid-Somerset Section of the British Kai-Keepers Society also hosted David Ford's lecture on Kai Nutrition, and soon he was back on Duty for the Final Round of the AquaChamp Final, eventually a triumph for Dr. Isaac den Daas. Heiko Bleher also weighed in with a second presentation of massive proportions. In the Ballroom many relaxed in front of the Flower-arranging demonstration. If you were a Federation Judge, you missed all this activity because you were at your own Judges' Seminar.

Meanwhile, back on the showbenches, excitement was growing as the results came in but, in the time-honoured tradition, details of the Supreme were kept under wraps so we had to be content with Best-in-Show result: (Cobitidae toenia owned by Strood A.S. member Bob Lemon). At the prizegiving a special, and very popular presentation was made to George MacMillan from Belfast; no so much for being the furthest-travelled aquarist (a close thing between George and the Aberdeen boys anyway) but for the sheer endeavour involved when you consider that George, wheelchair-bound had made the journey all alone, driving himself and his fishes from the ferry at Stranraer, slept overnight on the hard-shoulder of Shop Fell yet still had the stamina to greet everyone he met over the whole weekend with a smile (he also took a card in the show!). Hounslow A.S. took the award for best Society Display. You can read the details of the Supreme elsewhere in this issue, suffice to say that after four years of having its own show, Andy Feast's *Boia sidhimunku* had to settle for a very creditable sixth place; Mr. Mabey's *Mystus gulio*, another strong finisher in last year's Supreme, clung on to second but this year's **SUPREME CHAMPION** was a magnificent *Cichlasoma fenestratum* owned by G. Rossiter from Salisbury A.S.

If you get the impression it was hectic, frantic and a good time had by all, you won't be far wrong; congratulations are in order to all who organised the weekend — Colin Richards must have thought he was trying to cram the accommodation equivalent of a quart into a pint pot (431 residents), Alan Henderson, the Trophy Officer, who had to find space for all those eventual 419 entries, John Edwards for the organised sports competition, Colin Farnell for the clockwork precision of the lectures, Mike Clarke for Interpet and, of course, Joe Nethersell who not only was first to appear and last to disappear each day but who also managed to smile after having to turn out at some ungodly hour of the night to deal with a hoax (Pontin's revenge) call over a supposedly leaking tank or an escaped Moray Eel. Will we do it all again next year? You bet, 3,332 people can't be wrong — reserve the date **(5th-7th November 1993)** in your diary NOW!

Weston-Super-Mare F.B.A.S. Supreme Championship Sponsored by Interpet 1992

The SUPREME CHAMPIONSHIP held at Weston on the 8th November attracted an entry of 33 fishes. In our opinion, the standard was very high. It was the first occasion that we had ever awarded "Gold Stars" and to give three at one show indicates the very high quality of the entries. Our printings and comments on each fish are given below.

Entry No.	Sex	Body	Colour	Fin	CO/2024	Final Entry No.	Sex	Body	Colour	Fin	CO/2024		
1	♂	15	13	14	14	10	17	♂	17	18	18	11	12
16. <i>Tetraodon lineatus</i> (♀) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
2	♂	20	16	18	17	18	18	♂	20	16	18	17	17
17. <i>Cichlasoma nigrofasciatum</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
3	♀	12	13	12	11	14	19	♀	12	13	12	14	14
18. <i>Neoglyphis holbrooki</i> (♀) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
4	♂	18	15	15	15	16	19	♂	18	15	15	16	16
19. <i>Anguilla anguilla</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
5	♂	10	10	10	10	10	21	♂	10	10	10	10	10
20. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
6	♂	12	12	12	12	12	22	♂	12	12	12	12	12
21. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
7	♂	28	18	18	17.5	19.5	23	♂	28	18	18	17.5	19.5
22. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
8	♂	17	17	17	17	17	24	♂	17	17	17	17	17
23. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
9	♂	20	16	18	17	18	25	♂	20	16	18	17	18
24. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
10	♂	14	14	14	14	14	26	♂	14	14	14	14	14
25. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
11	♂	20	16	18	17	18	27	♂	20	16	18	17	18
26. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
12	♂	20	16	18	17	18	28	♂	20	16	18	17	18
27. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
13	♂	20	16	18	17	18	29	♂	20	16	18	17	18
28. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
14	♂	20	16	18	17	18	30	♂	20	16	18	17	18
29. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
15	♂	20	16	18	17	18	31	♂	20	16	18	17	18
30. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
16	♂	20	16	18	17	18	32	♂	20	16	18	17	18
31. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													
17	♂	20	16	18	17	18	33	♂	20	16	18	17	18
32. <i>Apistogramma nana</i> (♂) 1992 Winner. (Overseen G. FEWSTER Salisbury A.S. A non-entrant fish.)													

As you can see, no less than fifteen of the entries were full size or over a very high proportion of the total entry. This speaks well of the care and attention that has been given to many of the fish. Without a doubt, it was a difficult class to judge. So many of the exhibits were of a very high quality that it came down to the very end and to reviewing several of them in order to finalise the placings. Our congratulations to all the exhibitors and especially to the winners.

Dave McAlister Pete Coffie

Judging sheet reproduced with the permission of the Judges and Standards Committee.

Fish for the Garden Pond

A Continuing Series

by Stephen J. Smith

TENCH

My personal opinion is that tench, once installed into the pond, are often never seen again, as they tend to lie, apparently dormant, at the bottom of the pond. Even if the pond is well-filtered and crystal clear, the fish still appears to be fairly inactive!

A number of people, I understand, keep a tench because it is a scavenger and being a bottom-feeder will apparently keep the pond clean! Firstly, what on earth are Goldfish and Koi if not scavenging bottom-feeders, and even if the Tench were efficient in its mythical role, what happens to its own debris?

Having said all that, the Tench is nevertheless a popular pond fish and, admittedly, the Golden variety is a beautiful fish which can make a fine addition to a filtered pond setting. Their sheer growth potential is a major attraction, reaching in excess of 18 inches in ideal conditions. Although happy in a still pond, Tench do prefer running water, and feed mainly on natural vegetation.

The scales of the Tench are very fine and covered with an abundance of mucus which has given rise to a further myth that it cures ailments in other fish, giving rise to its nickname of the "doctor fish". I would reserve judgement.

THE DACE

This is a splendid fish, similar in shape to the Orfe, and reaching in excess of seven inches. Yellowish green fins, sometimes tinged with red, are featured on a mainly silver body with a green dorsal margin. As with the Orfe, I would suggest that these are kept in some numbers, as they make an arresting sight when seen shoaling in clear water.

PERCH

If you intend to keep perch, do keep them in their own pond, as they are a

carnivorous feeder and aggressive in mixed company. However, the perch is well worth keeping for its striking colour. One of my favourite native species.

GOLDEN RUDD

This is also an attractive fish and very hardy. Part of the attraction lies in that the Golden Rudd enjoys spending considerable time at the surface. The fins and upper parts of the fish are deep brown-red colour offset against a silver belly.

TROUT

Although an attractive sight at the trout farm, the trout requires specialist treatment and should not be considered for the pond. An especially high oxygen level is called for and few people have achieved any success in keeping trout in the garden pond.

MINNOW

Another shoaling fish and, although also requiring well-oxygenated water, can live quite happily in a good size pond. Do keep it well-filtered, though, or you will rarely see the fish.

When in spawning condition, male minnows lighten in colour from their olive-brown, and add a tinge of red; while their tubercles become quite pronounced around the gills.

FINALLY

Of course, there are scores of further options to be considered if you wish to stock your pond with something different from the ubiquitous Goldfish or Koi. By all means try something new; it may work for you, but do not try to fill your pond with several species of fish in ones and twos. Far better to have a dozen or so good quality specimens of similar size in one good size pond than a "menagerie" of different sizes and varieties.

MARINE FISHKEEPING

by Jason Dixon

IN RECENT YEARS the hobby of marine fishkeeping has seen both market and technological expansion that other aspects of fishkeeping would find hard to match. So great has this growth been that many hobbyists and traders alike have experienced a great deal of difficulty in keeping up.

Due to this the fish-only system seems to have given way in favour of the reef tank, that is one containing not only fish but also invertebrates such as corals and anemones. As a result of the advocacy of high tech equipment the acceptable size of these bio-systems has decreased without any loss to the safety of the tank's inhabitants. Together with less bulk comes less capital required to install such an aquarium in your own home. Don't leap for your cheque book too soon though! The cost is naturally still higher than that of a freshwater aquarium of equal proportions, but for those wishing for a new challenge the dream is now substantially closer.

Advances have been made in all but a few areas and it is generally agreed that the greatest steps have all related to filtration. Recent years have seen the advent of trickle filters on a large scale. Strangely the concept was commonly in use for sewage treatment by the Victorians. Maybe 100 years from now we will see the undergravel filter appear in refined form! It is a great shame that the trickle filters fishkeeping capabilities were not explored sooner for this system is undoubtedly that which gives the finest water quality. Many companies manufacture them, with models ranging from the very basic to the latest state-of-the-art filters from the United States with built-in foam fractionators (protein skimmers), reactors and denitrification equipment. There is now even a pressurized model available with full gas exchange capabilities giving extraordinary results.

Lighting has seen many new ideas evolve, but surely the most important factor has been the introduction of metal halide lighting onto the market. These lamps can easily give the intensity of light required by many marine invertebrates and their spectrum is very close to that of natural sunlight. Due to their growing popularity costs are dropping and their benefits are now open to more people than ever before.

Scientific research has led to many improvements in the area of additives and treatments. Common problems such as nitrate and phosphate can now be solved with little fuss by using compounds designed to do so. Products formulated to enable the successful keeping of hard corals have appeared, with molybdenum/strontium based additives (two compounds found to aid hard corals) being available from a few specialist manufacturers. Solutions of trace elements, vitamins and various nutrients such as those for macro algae have been refined to highly desirable levels.

Of course to every up side there has to be a down side. It must be recognised that the United States has led the way in most of the aforementioned products and this is undoubtedly due to the sheer magnitude of the hobby in that country. However, other countries are now following suit and this can in itself only encourage the hobby. Regrettably though many companies are being formed merely to jump on the bandwagon for financial gain. Some of these operations products are of low quality and their after sales back up is negligible and this can only lead to discouraging results for those new to the hobby and possibly lead to the aquarist giving up after only a short time. The key word has to be perseverance and in time you will become aware of whose products you feel give the best results and should be endorsed. The saying "you get what you pay for" has rarely been truer

Marine Fishkeeping

and although some products may be cheaper or have prettier packaging this could, in turn, lead to a lower quality product inside the bottle.

In the past, many aquarists felt that marine fishkeeping was difficult if not near impossible but with the increasing knowledge available from the growing number of reef keepers and the advent of the equipment and additives that, although not essential, certainly make life much easier, perhaps their views will have a change of direction.

So, if your Beta's can't be bettered, why not give it a try. You may just find the challenge you have been looking for!

Following six years experience in the retail aquatic trade, Jason Dixon joined Coral Reef Technology Limited some fifteen months ago and now holds the position of General Manager. He has kept marine fish for over 10 years and amongst his other responsibilities are the testing of all new products distributed by Coral Reef Technology on living marine systems.

(continued)
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Fishes of North-East Asia

PART I of a Series by V.B. Hunt

IN RECENT YEARS there has been a gradual influx of fish importation from this part of the world and, in general, people have been more than a little confused about the identity of the species involved. The bitterling saga continues, years ago we thought in terms of the European species, *Rhodeus omarus*, BLOCH, being the only one of its kind with, maybe, an offshoot or two in the Far East. Around 1972 we witnessed a flood of fish imports which heralded the arrival of the name "Tanago"; indeed, the species in question at this particular time were bitterling imported from Japan. Yes indeed they were called "tanago", a word which, in effect, is Japanese for bitterling, much the same as koi (or goi) is Japanese for carp. In the meantime its European counterpart was to go out of favour for the next twenty years. The actual name of this new bitterling? I almost forgot, *Rhodeus ocellatus*, KNER, the Japanese Rose Bitterling. People completely lost contact with the original. No longer did they know what it looked like, so much so that some writers on the breeding of the European Bitterling illustrated it with a picture of the Japanese species.

I digress, we are discussing the far eastern exports which have increased alarmingly over the last ten years or so. Another species, quietly introduced, though probably by accident at first, was to remain anonymous for quite some time, was the Topmouth Gudgeon, *Pseudorasbora parva*, TEMMINCK et SCHLEGEL. This fish too reared its ugly little head in the early seventies. I recall one of my fellow members of the Portsmouth Aquarist Society producing one at a local interclub show without actually benching it. At the time I recall mentioning that it definitely was not of North American origin; I suspected at the time that someone had given it the unlikely name of *Notropis coccoensis*. It actually caught some specimens of this species in Virginia a couple of years ago, common name Warpaint Shiner, and they bore no resemblance to *P. parva*. I felt that this fish came from Japan and a few years later

I was to prove myself correct. On the market it was to become known as the "Clicker Bait". I believe it earned this trade name from its loud eating habits on the surface of the water.

Up to now we have spoken of the occasional "odd-bod" but over the last three years there has been a mini explosion regarding imports from the Far East. Two years ago I witnessed the emergence of the Freshwater Barfish, as some Scottish friends described it, from the obscurity of some northern Chinese backwater. Actually it was the 1990 E.A.F. of Manchester which was to unveil the species to my eyes. Some worthy aquarists described it as a new species of catfish, others suggested it was a newly introduced candidate for F.B.A.S. show class "M". At the time I hurriedly sketched this 665 mini-monster and submitted the drawing to the F.B.A.S. with the comment that it was the sole asiatic representative of a North American family of fishes called Carostomidae, the Suckers. This indeed was a very large sucker, *Myxocyprinus asiaticus*, BLEEKER, which grows to 750mm in length. See sketch for adult.



This species is pretty when small but how many would-be buyers know how big it gets? To dwell on this particular species of fish for a little while longer, I must hasten to add that there are in addition two sub-species. There is, initially, *Myxocyprinus asiaticus asiaticus*, BLEEKER, dorsal fin rays 52, anal 12 and lateral scales numbering 53; followed by *Myxocyprinus asiaticus chinensis*, DABRY DE THIERSANT, dorsal fin rays 57, and 14 and lateral scales 55 and *Myxocyprinus asiaticus fukiensis*, NICHOLS, dorsal fin rays 52-56, anal 13-14 and lateral scales 47-49. *Myxocyprinus* abounds in central and northern China and it is subject to great individual age and variation. From the various readings I have seen,

specimens caught in Tungting Lake, Hunan, Anhwei and the Yangtze River have measured 200mm, an ideal size for study. There seem to be slight differences of colour and contour correlated with the technical characters on which the three races here recognised are separable. It is stated that the "chinensis" variety caught in Tungting Lake has brilliant red sides.

The above species and its offshoots are closely allied to the North American quillbacks, Carpiodes, of which there are three species — *carpio*, *cyprinus* and *velifer*, all large. Incidentally, family Carostomidae, to which all the above suckers belong, constitutes 60 species.

To quote-

Acanthorhodes (Rhodeus) atremis
has no barbels and a rather short ovipositor.
Acheilognathus (Rhodeus) lanceolata
has long barbels and a comparatively short ovipositor.
Acheilognathus (Rhodeus) limbata
has long barbels and a short, black ovipositor which extends to the front, or leading edge of the anal fin.
Acheilognathus (Rhodeus) longipinna
has no barbels but a short, light-grey ovipositor measuring somewhat more than the distance to the first ray of the anal fin.
Acheilognathus (Rhodeus) tharabea
has no barbels and a short, grey ovipositor.
Acheilognathus (Rhodeus) marikake
has short barbels and a long grey to black ovipositor that reaches beyond the extremities of the caudal fin when fully extended.
Acheilognathus (Rhodeus) labra
has short barbels and a fairly long, white ovipositor which measures half the body length when fully extended.
Rhodeus ocellatus
has no barbels but a long, brownish ovipositor which reaches the ends of the caudal fin lobes when fully extended.

Families Cyprinidae and Cobitidae, the carps and loaches, feature as the central link-pins of all our problems of fish identification in the Far East, simply because the number of species is so great. The bitterling alone, taking Cyprinidae first, number about 36, given the details before me are correct. Of these the eleven Japanese species are, generally speaking, accounted for. Two peculiar aspects of the above species, apart from the general differences of fin ray counts and lateral scale counts, are the carrying length and colour of their ovipositors (egg-laying tubes)

Fishes of North-East Asia

(continued)

and the fact that some bitterling possess barbels and some don't.

At this moment in time the Chinese counterparts present an enigma, there are, to quote John Treadwell Nichols book entitled "The Freshwater Fishes of China", 25 species in that country — 9 *Acanthorhadeus*, 5 *Acheilognathus*, 4 *Paracheilognathus*, 2 *Pseudoperlampus*

and 3 *Rhadeus*, and precious little in the way of decent illustrations. With the exception of one, there is no cross-reference between the Japanese and Chinese species at all, which seems rather strange. It is logical to me that some of the Chinese species should occur in Japan and vice-versa; in the case of the other carps this does happen, why not the bitterling?

THIS SERIES WILL CONTINUE IN OUR FORTHCOMING ISSUES

We All Have To Start Somewhere

PART 4 by Shorty of Corby

AS THE YEARS ROLLED BY my interest in things aquatic grew, I went through the usual stages of Committee Member, Secretary, Magazine Writer, Editor, Printer, Show Sec., Chairman, etc.

In 1976 I saw the second biggest aquarium in the world and then the biggest. I flew over the top of them — they were called the Atlantic and Pacific Oceans. I paid a visit to America, California to be exact.

One memorable day in San Francisco I spied an Aquatic shop and in a tank at the entrance were the biggest tropicals I had ever seen. Guppies being three inches long, Neons at three inches. Swordtails at eight inches and Angels as large as soup tureens!

Visions of capturing every Championship trophy in the old country came to mind. This is what I would spend my dollars on. Forget the sexy free-loving, sexy nubile, sexy semi-clad, sexy Californian beauties. This was absolute heaven. Corydoras catfish ploughed across the bottom of the tank like J.C.B.s — moving boulders out of their passage with no effort.

Then the disappointment came. The front glass was a huge magnifying sheet, it must have cost a fortune — but it was effective. I did get to see the Steinhart aquarium later, which was something else.

The marine reef fish captivated my soul and I resolved to do Marines when I returned home. Incidentally, there is no such thing as an ugly Californian woman.

On my return I broached the subject with the wife of the moment and after a few visits to the small numbers of aquatic shops which kept Marines in that era, we decided to go ahead.

Everything that was on the market to keep marines successfully was purchased. We only used one trader in Bletchley whom we knew from meeting him at Open Shows. He loved us and told us and sold us everything. He retired early — a very rich man!

Following the instructions given we soon had our very own bit of God's creation underwater in our front room. It was all things bright and beautiful. People came from far and near to gasp in admiration and envy and that was before we even bought a fish!

The first fishes bought were the obligatory clown **AMPHIPRION PERCULA** and the Blue damsel **POMACENTRUS COELISTES**. Gradually we added Power blue surgeon

We all have to start somewhere

(continued)

ACANTHURUS LEUCOSTERNON, long nosed butterfly **FORCIPIGER FLAVISSIMUS**, the bi-colour angel **CENTROPYGE BI-COLOUR**. This was an expensive fish. Wrasse, Cleaner shrimp and the like. We gave away the television set and spent the evenings watching these jewels.

Pound for pound, marines are cheaper now when you consider that I paid £35 for a Butterfly in 1976 and last week saw some similar at £25 — and the size was not greatly different. Then the clowns were about a fiver and today they are still about the same price.

O.K. so we lost the odd one or two here and there and it was soon replaced. This we put down not to our fault but the manner in which some of these fish were caught we were told. If they had been trapped by the natives using the cyanide method and were only slightly tainted they might just be O.K. Of course, all the retailers, wholesalers, importers and exporters denied that their fish were caught in this way. It is difficult enough to catch a clown in a 4 x 2 x 2 which is 1/4 full with coral. Can you imagine trying to catch a clown in a coral reef a mile long without any other aid than a net?

The only other problem I ever encountered apart from THE CRISIS, was my wife of the moment who insisted that the white coral should forever look like the driven snow, the blue coral as a tropical sky and the red coral as red as fresh blood. Me? I loved that covering and growth of green algae — to my mind it was natural and beneficial to the fish. Therefore every time the green stuff grew she would remove all the corals and steep them in bleach overnight. At least she was clever enough to rinse away any deleterious aromas and residues before returning them to the aquarium.

Now to THE CRISIS, 23rd December. About 6.30 in the morning I was rudely awakened by the spouse shouting that the fish were in trouble. I was beside the tank before the second eye was opened. Sure enough — there was a dead £60 floating

on the surface. A fifty pound note was on its last ventilals and as I gazed in horror another fifty pound note did the Kamikaze act by hurling itself full tilt into an optily named Brain coral where it left its brains.

During the next few hours I did the whole gamut of tests to try to establish the cause of the disaster. If breatherizer kits were in force then I would even have tried that.

I continued to die and I was powerless! I decided to ring Dr. David Ford who was at Melton Mowbray at that time. He then suggested that I bring the remaining fish and shrimp to his laboratory immediately. We sped to Melton. Dr. Ford said to say cheerio to the fish because it would be the last we would see of them. He needed them for internal examination.

He promised to let us know the answer within a fortnight and true to his word we heard within ten days and the answer was that the fish had died due to the presence of something out of an aerosol can. It might have been fly killer but one does not use fly spray in the house at Christmas time. Three teenage daughters denied using hair spray in the vicinity of the tank at any time. After days of thought and inquisition one daughter confessed to using window polish on the tank glass and furniture polish on the wooden surround. Both came out of an aerosol problem solved my two powerful pumps under the tank had sucked in copious amounts of poison and poured it into my treasured reef.

You must think that I am one hell of a fishkeeper. The September issue told of my slaughter of 400 Ph. Amates, this one of £400 of marines, but if you can learn by the mistakes of someone else so be it!

I have no doubt that you all have had crises and disasters and you all will have your very own horror story. If you have not — then it is just around the corner waiting to happen — believe me it will happen this month.



CLUB NEWS



ABERDARE AQUARISTS' SOCIETY

The Society would like to thank the Sponsors, the Judges, Society Members and the Competitors/Exhibitors for the support given to their 1992 Open Show. We hope everybody enjoyed their day out. We would also like to take this opportunity to inform Exhibitors of the following advanced information:-

1993 Open Show on 9th May 1993

★ ★ Fish Auction ★ ★

BOURNEMOUTH AQUARISTS' SOCIETY.

1993 OPEN SHOW • 15th JUNE 1993

MID-SUSSEX AQUARISTS' SOCIETY

The Society would like to thank all who attended our Open Show '92, Exhibitors, Judges and Fellow Aquarists who just came for a browse and look forward to seeing you all in '93.

MID-SUSSEX A.S. Meetings are held on 2nd & 4th Thursdays of Month at "JACK & JILL" Public House, Clayton, Nr. Hassocks, W. Sussex. Tel: 0273 843595.

FEBRUARY 20th 1993

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Mature student's cases will be assessed at interview

For further details, please contact:

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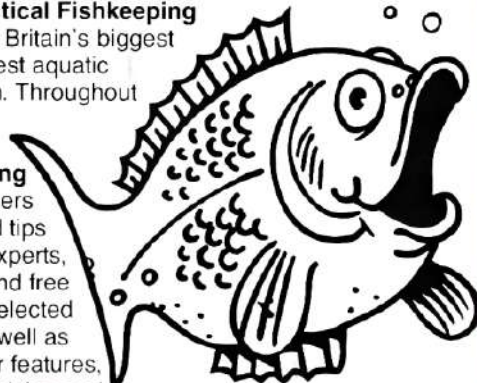
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MAGAZINE

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Judges Corner

by Peter W. Cottle,
Chairman, Judges and Standards Committee

Many of us are asked to judge photographic competitions at Open Shows. How we arrive at a result is down to our own personal taste.

Brian Risbridger of the Tyne Tees Area has suggested a format and the J & S Committee is pleased to endorse and to pass on his ideas.

PRINTS — may be judged on a five twenties system as follows:

- | | |
|-------------------------|----|
| 1. Subject/Interest | 20 |
| 2. Composition | 20 |
| 3. Clarity | 20 |
| 4. Technical difficulty | 20 |
| 5. Presentation | 20 |

TRANSPARENCIES:

- | | |
|-------------------------|----|
| 1. Subject/Interest | 25 |
| 2. Composition | 25 |
| 3. Clarity | 25 |
| 4. Technical difficulty | 25 |

SUBJECT/INTEREST:

Consideration of the aquatic appeal of the photograph. Is it just a plain side view of a specimen or does the subject give an impression of being actively occupied in its environment? Better the latter, if it falls into a blend with the other categories being judged.

COMPOSITION:

Can best be explained in the way the subject fits within the perimeters of the photograph whilst taking into account the fore and background scaping. A subject shown in a natural setting should gain more points than a subject photographed in a bare tank.

CLARITY:

Points will be lost if the photograph is not in sharp focus.

TECHNICAL DIFFICULTY:

Expresses appreciation for the subjects, actions or the nature of its environs. A subject that is shown in an uninteresting pose is not necessarily a difficult subject to photograph. Subjects shown in aggression, courtship or breeding posture or those that are shy or fast moving reflect a greater degree of technical difficulty.

PRESENTATION:

Reflects the effort the entrant has made in presenting the print. Is it nicely mounted on a nice card or is it creased and presented for judging in a lopsided manner? Presentation is not included in the judging of transparencies, for obvious reasons.

Thanks Brian for taking the time to put your ideas down on paper.

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"Some Like it Hot!"

by Sue Okey, Founder of "PETZ"; Sparsholt College, Winchester

AND THIS IS ABOUT HOW WE GIVE THEM THAT CHOICE . . .

As with all animals, it is important that you set up your animal housing before purchasing your pet. This could be where your first problems start!

The size and shape of vivarium you need is going to depend upon the species and lifestyle of the reptile you have chosen, but, whereas if it was a hamster that you were hoping to accommodate then the choice of cage would be varied, your cold-blooded friend is not going to be so lucky — unless you have gone to a specialist shop.

Generally, most shops will have an offer a glass aquarium with a "vivarium" lid, but for long-term captive care this is less than ideal in most cases.

Glass is a poor insulator and the ventilation in such a tank will be poor. The reptile can also feel insecure surrounded by glass and this can lead to all sorts of problems. A better choice is a wooden-style cage with front facing glass sliding doors that are ground to prevent injury to either keeper or pet. The wood will need to be either varnished, painted with gloss paint or plastic laminated and then all the corners silicone sealed to prevent any fluids from soaking into the wood. Ventilation

can be provided by panels of perforated metal or plastic gauze, the edges once again being silicone sealed.

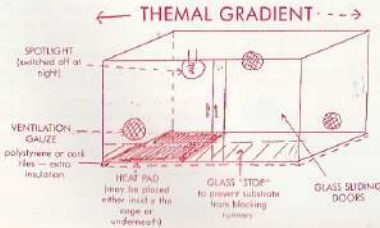
Heat can be provided by using a heat pad* at one end of the vivarium and a spotlight, which when accommodating snakes in approx. a 3 foot cage, need be no more than a standard night light (lizards will require more specialized lighting). See diagram below which shows a standard design.

Remember, your vivarium must meet three essential requirements:-

1. It must be capable of producing the correct environment
2. Easy to clean
3. Probably the most important as far as your neighbours will be concerned — **ESCAPE PROOF!!**

* Heat pads must be of vivarium quality and the wattage output required will depend on the temperature range of the animal and the cage size.

Sue Okey is a Lecturer in Animal Management at Sparsholt College, Winchester.



Interpet Product News

by Dick Mills

CONVERTAGEAR PROVIDES VERSATILE LIGHTING CONTROL —

No less than nine sizes of fluorescent aquarium lighting tubes are accommodated by a range of just four models of Interpet's recently-launched Convertagear lighting control unit.

Such versatility has been made possible by the incorporation of specially-designed endcaps, which can be adapted to suit tubes with a diameter of either 1" (26mm) or 1½" (38mm). The advantage of this, to retailers, is that stock holding levels are reduced to just four different wattage units; while hobbyists using Convertagear have a wider choice of tube fittings and can thus select according to their specific aquarium requirements.

The incorporation of an on/off switch and 2 metre tube leads are additional features of Convertagear which increase versatility and flexibility in positioning the unit within the aquarium set-up.

Mark Senior, MD of Interpet remarked that it was anticipated that Convertagear will also prove popular among retailers of aquatic livestock, who require versatility for their aquarium displays. The need for reduced stock levels and distinctive package design have also proven to be popular features among aquatic accessory retailers.

Samples of each of these products have been passed by B.S.I. Testing as complying with BS 4533:02.1.1990 and EN 60598, 2.1:1989.

* Nine of fluorescent aquarium lighting tubes are accommodated by a range of just 4 models of Interpet's recently-launched Convertagear lighting control unit.



Interpet's recently-launched Powerflow range of internal power filters incorporating a number of special features.



NEW POWER FILTER DESIGN INCORPORATES ADDITIONAL FEATURES—

Internal aquarium filtration without causing stressed fish from unnatural water currents has become possible by means of a number of special features incorporated into Interpet's recently-launched Powerflow range of internal power filters.

The new range not only provides adjustable flow rates over a wide range (to suit fish species accordingly), and built-in adjustable aeration, but also additional unique features such as a multi-directional flow deflector over a 360 degree range, a built-in noise suppressor, and a special cradle which enables the non-spill filter unit to be removed for convenient cleaning and maintenance. The cradle also serves to conduct water from the bottom of the tank to inlets at the top of the filter body. A range of 4 sizes is available, to suit aquaria from 1' (30cm) to over 4' (120cm) in length and, with the exception of the filter sponge, parts are guaranteed by Interpet for 1 year and spare availability is guaranteed for at least 5 years.

For further information contact Tracey Masters, Marketing Manager, Interpet Ltd. Tel. 0306 881033



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AQUATIC FILTRATION

by Alan Benson, Aquavita

FOLLOWING THE THEME of the article in the last issue, feedback from readers again focus us on a non-filter for this issue.

Precised into one question, we arrive at "What is a Biological Filter?" Now, whilst any media in an aquatic system, down to and including the sides and the bottom of the pond itself, will host the necessary bacteria for biological action to take place, such action in fact purifies the water rather than filters it, so strictly speaking the question should read — "What is a Biological Purifier?"

For a Biological Chamber to work most effectively, all solids and suspended matter should have been FILTERED from the water prior to it reaching the Biological Media (hence my own contention commercially that single chamber "black box" type filters are unsuitable for ponds above about 1,000 gallons maximum). We must now pause and ask "What is Biological Media?" I have no intention of getting involved in the ongoing arguments concerning various proprietary products which make magical claims or appear to be the next best thing to the elixir of life, all of which do a satisfactory job in the right circumstances. Biological media is merely a material or substance capable of providing a maximum surface or "grazing area" to support the largest possible colony of Bacteria OED. This in itself will start to explain that mysterious M² or Cm. Cm formula that tends to be quoted whenever you corner the lad trying to sell you a "black box" at the local Garden Centre (with all apologies to the genuine Water Garden professionals who actually send the lad or lass to Sparsholt for pre-season training).

Translation M² (metres squared) M³ (metres cubed) gives you the total surface area available for bacterial "grazing" in one cubic metre (M³) of any given material or media. Now forget it, unless

you are a professional Fish Farmer wanting to support in excess of 50kg of fish in a cubic metre of water, because from thence on it is a matter of PERSONAL convenience and has little if anything to do with your fish. Sufficient to say that ordinary Pea Gravel has a MM of around 450, if you are happy with the gunge, backache and hernia associated with the periodic cleaning out — go to it!! If like me you prefer to enjoy your fish rather than sewage farming then choose anything more convenient, lighter and cleaner from clay aggregate, ring media, brushes or even the magical ingredient, if you can afford it!!

Now, what does a Biological Chamber actually do, for those of us who haven't a degree in Biology or Chemistry for the purposes of this explanation, we will assume that we are dealing purely with a recirculating pond system and will deal with the purity of input systems at a later date, bearing in mind that potable domestic water is NOT produced for the benefit of fish and Fish Keepers. Like most living organisms, fish produce body waste that in a natural environment nature ensures is dissolved or diluted to harmless levels, OR the organism is held at densities which do not produce harmful levels of waste, i.e. a NATURAL ECOLOGICAL BALANCE.

As fish keepers we are rarely satisfied with nature's idea of what constitutes such a balance in the volumes of water which we are able to maintain, it thus falls upon us to redress the balance to meet our requirements and ensure the wellbeing of our fish.

The most dangerous product of a fishes body waste is Ammonia, not so much in itself as in its association with water, where it splits into what is known as ionized ammonia (NH₃) and non ionized ammonia (NH₄⁺). Initially and for most hobby requirements the ionized ammonia

AQUATIC FILTRATION

(continued)

can be ignored (with apologies to the purists). The non ionized ammonia is however toxic to most fish at varying levels and the situation is further complicated due to the fact that toxicity levels vary both with temperature and the PH levels of the pond water. The obvious conclusion for the layman is — get rid of the non ionized ammonia! The next problem: area is NITRITE (I am intentionally not going into the chemical breakdown at this stage) which above certain levels adversely affects the blood flow of most fish and thus impairs the respiratory system — get rid of the nitrite!! Nature herself has provided the means of achieving our objective in the form of minute bacteria known as Nitrosomonas and Nitrobacter, it is now our job to provide a suitable environment to establish a large enough colony of the beasts to rebalance the life support system of our fish — hence a Biological Chamber.

It must be stressed that unlike Mechanical Filtration, Biological Action does not commence instantaneously and provision must be made to protect existing stocks of fish while the biological action matures, normally this will take anything up to three months but can be accelerated by seeding with proprietary products such as ABA or similar. Interim protection can be provided in the form of zeolite, carbon, etc.

The reasons for this protection and an indication of the actual biological breakdown which takes place is as follows: as a bacterial colony is built up in a Biological Chamber the Nitrosomonas bacteria become established first and their objective in life is to breakdown AMMONIA into NITRITE, whilst somewhat slower in developing, resulting in a Nitrite peak necessitating protection of your fish.

We can now see the reasoning for disposing of all or most of the solids in suspension prior to the water reaching the Biological Chamber — why provide our fast expanding colony of Nitrosomonas with large quantities of ammonia rich detritus to convert into Nitrite beyond the capabilities of our slower spreading Nitrobacter. It does not take much imagination to extrapolate this into the reason why single chamber "black boxes" are of little use for large and/or heavily stocked ponds!!!

In closing the article, I would emphasize that I am fully aware that this oversimplifies and side tracks considerable of the scientific theory of the subject and takes no note of some more recent developments in the area. It does, however, provide an understandable layman's outline of the subject sufficient to answer a newcomer to the hobby, who can then build on it at his/her discretion.

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Buying & Planting Waterlilies

POND KEEPERS are extremely fortunate to have a vast selection of waterlilies to choose from, available in many shades of colour and depending on variety, suitable for growing in various depths of water.

Some varieties of waterlilies are fairly new to cultivation, whereas the majority of well known cultivars date back years. Of all the aquatic plants the water lily is undoubtedly the most beautiful, therefore when selecting lilies never buy the first one that takes your eye, always make absolutely sure that the variety you prefer will suit the size of your pond, for example, if you favoured a red variety and were taken by Nymphaea Escarboeille which is a large variety then Nymphaea William Falconer, a medium grower, would be a better choice for the average pond. Most reputable aquatic plant suppliers display charts offering information relating to the depth of water required for planting the different varieties of waterlilies (e.g. V. Vigorous 36" - 48" deep, Med. Medium 18" - 24" deep, Sm. Small 9" - 12" deep, T. Tiny 6" deep for the pygmae varieties).

When purchasing lilies it is important to select healthy well grown stock, you should not be tempted by the price alone, as well chosen lilies will give you many years of pleasure. It is preferable to obtain pot grown plants making absolutely sure they are well rooted and at the same time it pays to inspect for any visible signs of disease or disorders. Alternatively, you may decide to order your lilies via mail order. The plants will normally be sent bare rooted and it is advisable as soon as they arrive to float them in a bucket of water until you are ready to plant them. Buying bare rooted plants should be limited to the early part of the season to ensure that they have enough time to produce fresh roots and become established during the summer months. If you do purchase bare root plants it is important when planting to secure the rhizome of the plant to the planting container — easily done with a piece of string. This will prevent any risk of the plant floating out before fresh roots have started to develop, this would obviously not occur with well grown potted plants. Where ponds have been installed using the pre-formed type of pool or the use of a flexible liner, the easiest and most

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convenient way to plant waterlilies is to use the specially designed baskets made of strong plastic. With most designs of planting baskets a hessian or foam liner is required to retain the compost when it is eventually placed in the pond.

The favourite growing medium for waterlilies is heavy garden soil that has not been in contact with insecticides or weed killers. The majority of water garden centres usually stock various brands of aquatic plant compost, under no circumstances use the peat based seed or potting compost formulated for the growing of bedding and pot plants. When planting your waterlilies it is beneficial to add some form of fertiliser, the old traditional method using well rotted cow manure is as good as any, alternatively you can use a handful of bonemeal or hoof and horn mixed with the soil. Aquatic plant fertilisers are available either tablet, granular or sachet, they all work quite well it is just a matter of preference.

When planting do ensure that the crown (growing tip) is protruding above the growing medium. The final job is to place a layer of pea shingle over the soil this will prevent the fish from disturbing the plant or soil. Before placing the planted lily into the pond it is best to saturate the growing medium using a watering can with a fine rose to settle the soil around the plant.

Planting lilies in natural or earth bottom ponds have no need to be in any form of container the best and simplest method is to wrap the root stock of the lily in a square of socking filled with heavy loam leaving the crown protruding through then tie securely with string around the socking and place on the bottom of the pond. The lily will then eventually grow naturally from then on.

Waterlilies should never be positioned near waterfalls or fountains as lilies prefer fairly static water to flourish properly. The flowers produced by waterlilies will not open properly if subjected to a continuous spray of water.

by Harry Hooper



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Q. I have a serious problem with snails in my fish tank. When I cleaned out my tank I added some Molluzin in it and after 5 minutes they were fit, healthy and MATING! Could you please tell me what to do. S.R. of Essex

A. If you think you have a few snails you should see them in the middle of the night. Being nocturnal feeders they leave the gravel overnight and for every one you see in the day there are hundreds actually present in the tank!

Remove by baiting as follows— an inverted saucer is placed over a piece of meat and raised slightly off the bottom of the tank, just enough to allow the snails to crawl in and eat the bait. This is left overnight and the snails removed the following morning. The procedure is repeated with fresh bait until the snail population is down to a controllable level.

Q. I have recently had an outbreak of disease in my cold water aquarium. Can you recommend a suitable material to disinfect the tank and associated equipment following disassembly and washing.

In the past I have used your "Aquarian No. 10" for this purpose but understand that it is now unavailable. D.K. of Herts

A. Aquarian number 10 disinfectant had to be deleted to make room for the new test kits.

The best cleaner is clear water and elbow grease. Stubborn stains can be removed by soaking in household bleach (diluted in warm water — about 1% strength).

To kill off diseases alcohol is used ... spray it into the dry tank corners and allow it to evaporate. Isopropyl alcohol is best (try the Vets), but methyl will do. A general disinfectant is Potassium permanganate (the Chemists). Add a few crystals to the tank full of warm water.

All traces of bleach or permanganate must be swilled away before reuse of the tank, of course.

Q. I own a fairly large tank and keep seven cold water fish of varied types of goldfish. One of my fish is a Black Moor which has seemed perfectly healthy up to now, when it suddenly started swimming around with one of its bubble eyes completely missing. Unless one of the others attacked it I haven't a clue what happened and I've never noticed any of them showing any violence. Please can you help. E.R.H. of Atherstone

A. Man has bred the common Goldfish into many shapes, which nature never intended. This leaves the fish open to various problems, such as digestive troubles, because of the bulbous body giving buoyancy and poor balance. Another is colour loss because of genetic colour faults, Black Moors usually go gold with age. Another is eye problems, the protruding eyes are not protected and so can be knocked out, or even sucked out by another Goldfish (their mouths are like vacuum cleaners) who didn't mean any harm really (they are not predators).

Nothing can be done, but the fish will still live to a ripe old age. The eyes are less important than ours because their main sense organ is the lateral line.



What's the difference?

by C.A.T. (Cyril) Brown
Riverside A.S. & Judges and Standards Member

USUALLY THE NEED FOR identification is made of the males of the species but here we are discussing the females of APLOCHEILUS WERNERI and APLOCHEILUS DAYI, the reason being that although the females are distinctive the female A. DAYI resembles the male A. WERNERI both bearing black vertical bars on the posterior of the body, while the female A. WERNERI shares with the male A. DAYI the displaying of a few dark body marks. It is necessary that these fishes are correctly identified A. when exhibiting in pairs classes in order to avoid disqualification and B. the inadvertent selection of the wrong fishes for breeding.

APLOCHEILUS DAYI (Steindachner) Size M. 85mm; F. 75mm



Colour — tan with approximately seven short vertical black bars on the lower area of the posterior of the body. Fins — pale yellow with numerous black markings on the dorsal caudal and anal, those on the dorsal and caudal forming irregular bars, pelvics and pectorals without markings.

APLOCHEILUS WERNERI (Meinken) Size M. 85mm; F. 75mm



Colour — dark tan with the posterior half of the body scattered with a few insignificant dark marks, while a larger black blotch is present at the base of the pectoral fins, along the anal contour runs a dark area commencing at the insert of the anal fin terminating on the caudal peduncle, all the dark markings vary in their intensity. Fins — pale orange deeper in hue towards the margins, dorsal and caudal with greyish markings forming irregular bars, other fins without markings.

The above fishes together with others in the series will be featured in a new series of books to be shortly published by the FBAS. These will not only identify fishes and highlight the differences between them, but will also cover Temperature, PH, Ecology, etc., as well as compatibility with other fishes and breeding procedures. The above sizes are taken from the current FBAS No. 6 Booklet entitled National Show Fish Sizes and Technical Information. C.A.T. Brown 1992



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BOOK REVIEW

There are books and then there are books. In the modern literary world, the leading non-fiction bestseller is Stephen Hawking's 'Brief History of Time' which, whilst not necessarily to everyone's immediate understanding and although but a modest volume physically speaking, has nevertheless been accepted as a tremendous feat of writing. The book under review here (if only I could do it justice!) is no less of a literary landmark.

CAPTIVE SEAWATER FISHES — Science & Technology, by Stephen Spotts (Wiley Interscience 1992 £75.00) is almost too big to contemplate as being 'readable' in the ordinary sense of the word but it can be approached confidently enough in some areas, depending upon your interests and abilities to grasp some of the sometimes very complex technicalities.

To give a simple overview of the book's coverage, it deals with the chemical, biological and physical processes that shape the aquarium and aquaculture environment, the biology of fishes relative to their captive maintenance and an up-to-date look at exhibition techniques. The author, in addition to his academic qualifications and scientific knowledge, is particularly well-experienced to describe the latter, as he worked for many years at such public aquariums as those at Niagara Falls, Mystic Marineland and New York; currently he is Director of Research for Sea Research Foundation at the Marine Sciences Institute of the University of Connecticut. All this may appear to be building up a picture of a daunting 'too technical for me' tome, but it needn't be. Let's break down its 942 pages into manageable sections: you won't be needing pages 589-812 or 813-892 all the time even though these respectively contain excellent explanatory notes on the footnotes appended throughout each chapter and a comprehensive list of literature cited; pages 893 to the end contains the Index, Artwork and Photography Credits.

As amateur fishkeepers what you will find absorbing and easy to assimilate are the seven chapters on **Physiology, Sensory Perception, Behaviour, Space, Nutrition, Health and Exhibition**. All these given an incredible insight on what makes the fishes work, how and where they live, how they fit in with each other, how to keep them healthy and public aquaria designing (how would you plan a tank so that fishes' shoaling activities or territorial rights aren't restricted?). Now that you've made serious inroads into pages 201-582 (yes,

381 pages already), you will have gained enough knowledge of some of the technicalities (and of the style of presentation to go back and tackle the more detailed and complex subjects such as the **Chemical Processes, Biological Processes and Physical Processes** of the aquarium environment covered in the opening three chapters. Naturally enough water, the fishes' atmosphere, is the prime concern here, covered with extremely detailed analytical scrutiny (even the author confesses that the section on hydrometer and salinity reading correlations was not only difficult to write but also likely to be difficult to read); all filtration methods are examined along with typical equipment designs.

No matter which subject you encounter, you are led along two common (and soon to become familiar) learning paths: science and technology. Of course in a work of this magnitude the science is complex but most of the technology is practical, and therefore understandable, with many instances of 'hardware' being illustrated either with theoretical line drawings, sketches or photographs of the real thing — from industrial seabed seawater collection systems to domestic 'build-your-own' undergravel filters. Although not a book that everyone will need, the aspiring marine fishkeeper will find it of immense value and interest. Society libraries will not find it collecting dust on their shelves once the word gets out how engrossing, absorbing (and even downright riveting) dipping into truly deep waters can be. All this from a man who, speaking about difficulties in marine fishkeeping, once said, "The water, you see, is everything. It's as simple as that."

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