

MARCH 1974

20p

Pet **Fish**

# PRACTICAL FISHKEEPING MONTHLY



**Contents include:**

A Cichlid Cross-breed  
Personal Comment  
*Polycentrus schomburgki*  
Book Review

Aquarium Mosses  
Keeping Koi  
Marinist's Notebook  
Readers' Queries Answered etc.

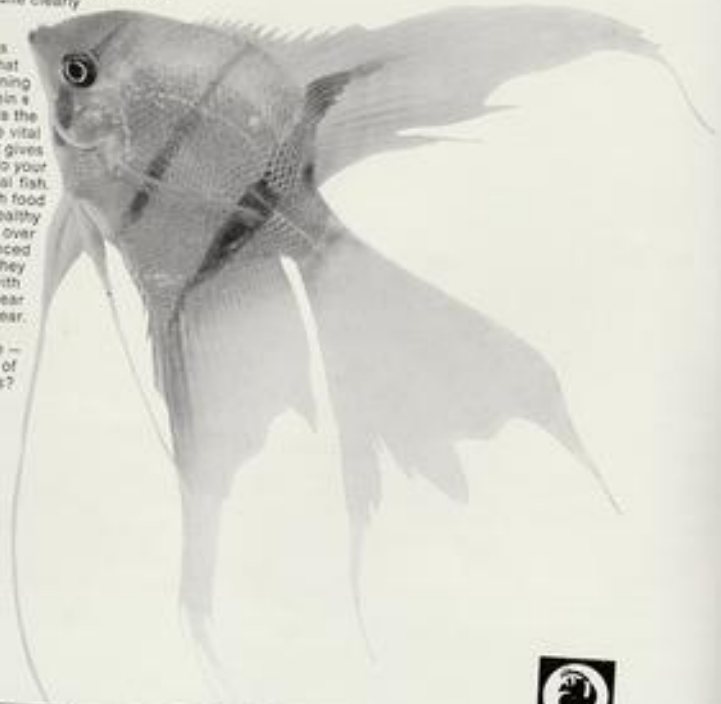


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**pfm**

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**Comments and Quotes**

**Prices of  
 Aquarium Fish**

WHATEVER one's opinion as to the relative cheapness or otherwise of our tropical fishes at present, it is quite certain that their price will be rising in the future. Most aquarists are aware of the general problems being experienced, such as in the increased cost of aviation fuel and its effect on increased freight charges, and the cancellation and shortening of many flights, but understanding some of the more specific problems that importers are facing might help to allay some of the wrath that retailers will no doubt be subjected to if increased prices are the order of the day.

Mr Max Gibbs, an Oxford importer, writing in a recent *PET STORE TRADER* article, suggests that present price levels are at risk from two possible sources. First is the danger from the effect of freight space shortage on the preferential specific commodity rates of many fish exporters. He writes: "At present most of the main exporting countries for live tropical fish enjoy the benefits of specific commodity rates, which provide preferential rates on the general cargo rates for their shipments of fish for Britain. With a shortage of space it will be difficult to protect the existence of specific commodity rates, let alone the implementation of improved rate or new routes to benefit by them". With duty levied not only on the invoiced price of the fish but also on the freight and packing charges (shortage of packing materials is rapidly increasing charges here, too) the landed price of tropical fish threatens to increase quite appreciably.

The second danger stems from our entry into the Common Market. Fish imports into Britain from the Commonwealth preference countries (the majority of imports) have been exempted from duty. Imports from outside the Commonwealth areas

have rated a 6% import duty. In the EEC the average import duty appears to be about 20% and this discrepancy, Mr Gibbs suggests, must soon disappear. The prices of fishes on the home market when compared with the rest of Europe are very low.

However, let us hope that, as Arpee suggests in his column this month, the conditions causing pain to the aquarist may well improve the chances of survival for his fish. There has always been a school of thought that believes the more a thing costs the more it is appreciated.

**Home-bred  
 Tropicals**

ONE likely outcome of the above is that there will be a ready market for home-bred tropical fishes. Specialisation in the production of one or two species in saleable quantities is well within the capabilities of most aquarists who maintain a fish room or fish house, and would not only serve to help immediate difficulties of supply but also to avoid threatened future shortages of species already thinning out in their lands of origin. Obviously what we are thinking of here are those species that, although not exactly classified as 'difficult', require just that extra attention which in the past has made their importation the staple method of supply. What we urge most strongly, however, is that the trading aspect of such an exercise be left to legitimate retail shop outlets. Nothing but harm will come, in the conditions of trade likely to be with us for some time yet, from any misguided attempts by aquarists to sell direct to the public. Home-bred fishes from a skilled aquarist are a very good buy for a dealer; dealers and hobbyists should be able to strike a mutually satisfactory bargain, with advantages to the hobby as a whole as well.



# LETTERS

Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt Lane, London SW17 0NY

### In Praise of Tetras

RECENTLY I re-read an article by James Dunbar (PFM, February 1973) on his tetra tank, and I must agree—they take some beating. I have one of my community tanks, with no less than 15 various tetras. They are in a very well-planted tank (24 in. by 12 in. by 12 in.); the plants are *Cryptocoryne affinis*, *Ludwigia*, *Bacopa* and *Vallisneria* as well as pygmy Amazon swords. All these plants do very well under one 15-inch (20 watt) Gro-lux lamp, illuminated for 5-6 hours per day. The fish are the firm old favourites—six neons, four cardinals, two emperors and four of the lovely head-and-tail lights, two silver tips, two platignums and three glowlights. These tetras have been together for 18 months. To these I have added, as I have come across them, four black tetras and two black-line tetras, two splash tetras, three rosy tetras and two lemon tetras, which make a new colour and shape. The silvers (*Grenobrycon spilurus*) seem to be outgrowing the tank, and along with the odd African tetra, although they are all very compatible, will have to be moved soon. The other odd fish out is one serpaè; though originally a pair, one died and I did not replace him because he was a fin ripper.

I agree that with 40 fishes in this sized tank I'm breaking a lot of rules. Though I have undergravel filtration and air stone I only use them for 30 minutes or so a day. I put my faith in a good growth of plants and a partial water change at least twice a month.

Here's hoping that the crisis is soon over and we can get hold of some more types of these beautiful little fishes.

Eastfield, Scarborough, Yorks.

J. E. GYNES  
Scarborough & DAS

### A Manufacturer's Reply

HAVING read Arpee's personal comments in your December issue, I feel I must make my own comments. Taking the points I wish to make as they arise in Arpee's article, he wonders 'if there isn't something of the (muck and mystery) in feeding live foods to fish'. Further into his article he goes on to answer his own question, when commenting that fish benefit from catching and eating live foods.

A study of the amount of beneficial nutrients in various forms of live foods will show that in most cases there is as much, if not more, vitamin, carbohydrate and protein in most manufactured foods now on the market. A 2 year programme of fish behaviour and feeding habits has been carried out at Promin's own aquarium laboratory. Fishes fed on manufactured foods for a tabulated period of time show better growth rate, breeding rate and general condition. Yet when live foods were presented to them, the fishes' enjoyment and readiness to accept any live food offered was obvious. From the above, it is my opinion a conclusion can be drawn, showing that it is more a built-in psychological reason for a fishes' avid attraction to most forms of live food, i.e. form, colour, presentation and movement, also a natural feeding instinct.

Arpee continues his personal comments by saying that he agrees with Cliff Harrison that freshwater tropicals today are amongst the cheapest and most trouble-free pets imaginable. I would agree most wholeheartedly with this, but disagree with his statement that the 'gadgets', certain food manufacturers and the 'patent medicine boys' have had a field day.

One of the main factors a manufacturer has to take into account when compiling his price structure is the demand for his product; the demand quite clearly has a bearing on the profits. Contrary to what a lot of people think, including the pet and aquarium trade, the numerical value of the market is not as great as they would believe. Apart from a few brand leaders, the majority of manufactured foods, medicine and equipment in the aquatic trade make moderate sales when compared with other sections of the leisure industry, i.e. gardening, photography etc. Out of these sales, the finance has to be found for all the usual over-heads any business has to carry, plus funds for research and development. The question will now be asked, if the foregoing is correct, why do the said manufacturers bother to make anything for the aquarium trade in the first place? The answer is that the majority of manufacturers and suppliers of 'dry goods', as the trade terms them, have, or have had, some connection with the live-stock side of the business. They realise that

Continued on page 547

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# LETTERS

*continued from page 538*

moderate as it may be there is a demand for all types of equipment, foods and medicaments and most important without this need being supplied to the aquatic dealer and shopkeeper, the overall profit margin these gentlemen and ladies would receive for all their endeavours would be very small indeed. Certainly, in my opinion, not sufficient to earn a modest living. Why is this so?—because, as you say in your article Arpee, fish prices are too low. While I agree with Arpee that certain fish foods are relatively expensive, I consider it most unfortunate that he should recommend another continental flake food. There are several excellent home-produced flake foods on the market, not to mention my own company's granulated fish food, all of which are equal if not better than any foreign fish food, and certainly better value for money.

Regarding Arpee's advice to go to a chemist for chemicals and cures regarding fish diseases, I viewed this opinion with both dismay and incredulity. Dismay that some aquarist may take this advice, and so lower the earning capacity of their aquatic dealer. Incredulity that someone with such an obvious interest in the hobby should offer advice like this. How many chemists are in a position to give advice on aquatic problems, or in fact have even got the time to do so, assuming that they were capable? Yet, along with selling to the

hobbyist a good cure for his fish, any dealer of repute will give free, helpful, advice.

Does Arpee know that, at this very moment in time, the pharmacy industry through Parliament are trying to secure sales of certain medicines for pets from chemists only? The trade see this as the thin edge of the wedge, and quite rightly so. What might the eventual price of a cure be if this were to come about? I do, however, agree with Arpee that there are few medicaments (antibiotics apart) that will cure everyday fish diseases, and would like to add that if the hobbyist gives his custom to a genuine and reputable dealer diseased fish would be a very rare thing indeed.

May I end by saying that I always read Arpee's comments, and on balance think that they are excellent. I only hope my comments have helped the balance just that bit more.

Holmes Chapel, Cheshire

E. A. FILLINGER  
Promin Ltd.

## Trops. on the Menu

THANK you for the article about fishkeeping in Thailand (January, 1974). It was really enjoyable. The family fell about laughing at the thought of all those fish arriving on their own if you just dig the hole. The trouble is that the more we hear about fishes like clarias and snakehead 'destined for the table' the more we want to try them. All except my father, that is, who has threatened to put a lock on the clarias tank—not to keep the clarias in but to keep his family out.

Camberley, Surrey

MISS V. BETHAN

*We hope to publish more articles from time to time by Ladda Tongsook—EDITOR.*

# Book REVIEW

**YOUR AQUARIUM** by Jack Heem. 32 pages, 21 colour photographs, 2 line drawings in text. Photo Precision Ltd., St Ives (Huntingdon). 1973. 22p.

HERE is a mighty midget of a book written by an acknowledged authority on fishkeeping. It is divided into Basic Requirements, Feeding and General Care, followed by a section on each of Coldwater Fish, Tropical Fish and Tropical Marine Aquariums. All the essentials are there, supplemented by some remarkably fine colour photographs. The plate on page 9 of emperor tetras really sets the blood pulsing, and in general they seem to have been

selected to show off decor as much as the fish, which is a highly sensible thing to do. One fall from grace, however, is the labelling of *Heros* as Moorish idols on page 31.

This book is so cheap and so condensed that I visualise it in several roles. It has a place on the counter of every pet shop, where it will probably sell like hot cakes. It is the sort of book which children in schools will read and understand because it is concise and written in unmistakable terms. The knowledgeable child will buy it and leave it around for its parents to read in the hope that they will at last acquiesce in that first, exciting, aquarium. They will be impressed by the picture it paints because the colours are not laid on too thickly, so the child may get its wish at little personal cost.

The presentation is also first rate. The immediately attractive cover bears a marine scene which whets our appetite for the text itself, which is tastefully printed and well proof-read and held together by those splendid photographs. Highly recommended for all who seek an introduction to fishkeeping. Older hands shouldn't scoff, either.

## Roy Pinks

**IDENTIFICATION OF BRITISH FISHES** by T. B. Bagenal. 199 pages. Line illustrations. Hulton Education Publications Ltd. Paperback £1.20.

FORMING one of the 'Hulton Group Keys' series, this book provides a systematic approach to

the identification of the 54 British freshwater species and over 50 species of marine fishes, the latter being ones likely to be caught on the shore. Guidance to identification of specimens by family is given, and then by working through the key to species, from the pages covering each family, the user of the book can complete the naming of his fish. In addition to descriptive notes on each species details of habitat, life history and natural foods are also supplied. Clear and helpful line illustrations are plentifully provided.

It is interesting to see that three species of the Centrarchidae, whose natural home is North America, are included as freshwater fishes that have been introduced to British rivers: the rock bass (*Ambloplites rupestris*), the pumpkinseed bass (*Lepomis gibbosus*) and the large-mouthed black bass (*Micropterus salmoides*). A most useful book for the student of river, lake and

seashore fish life, showing every sign of careful preparation and properly provided with a Glossary and Index.

IDENTIFICATION OF THE BRITISH MOLLUSCA by Gordon E. Beedham. 236 pages. Line illustrations. Hulton Educational Publications Ltd. Paperback £1.20.

THE author points out in the Preface to his book that the large number (800 or so) of species of British molluscs means that he has been unable to include every mollusc that might be found. For the beginner in the field, he has therefore presented over 200 representative molluscs in some detail and treated others in less detail. Nearly 300 are illustrated by line drawings. Although obviously not confined to the aquatic members of the class, the text deals with a great many of the

freshwater and marine creatures, particularly the 'water snails' and 'mussels' that attract the interest of quite a few aquarium and pond owners. Specimens collected on pond or seashore hunts can be identified by the use of the book's easily applied keys, or if the animal is one of the less common species its identity can be approached closely enough to facilitate complete identification with one of the specialist works listed in an appendix. Like the companion volume on fishes reviewed above, this Hulton Group Key is extremely well arranged and most helpfully equipped with information and features such as the Glossary that will enable the user who starts off knowing only that molluscs attract his interest very soon to become a knowledgeable amateur malacologist or conchologist.

A.E.

## Meetings and Changes of Officers

**AIREBOROUGH & DAS.** New Secretary: Mr J. Kison (22 Westbourne Drive, Gaisley, Yorks.).

**ANSON AQUATIC CLUB.** New Secretary: Mrs M. Smith (15 Adelstan Gardens, Willesden Lane, London, NW6; phone 01-328 7407); treasurer, Mr M. Furseman (170 Gladstone Park Gardens, London, NW2).

**AYRSHIRE AS.** President, Mr J. Hogg; vice-president, Mr A. Donaldson; secretary, Mr J. Watt; treasurer, Mr H. Spencer; show manager, Mr N. Baines.

**BEDWORTH AQUARIST & POOL SOCIETY.** Secretary, Mr F. R. Shakespeare (9 Rugby Road, Balfington, Nuneaton); show secretary, Mr J. Salisbury (261 Gadsby Street, Nuneaton). Meetings: 2nd Friday in month, Bedworth Working Mens' Club, King Street, Bedworth.

**BILLINGHAM AS.** Chairman, Mr D. Sadron; assistant chairman, Mr A. Crossley; secretary, Mr J. Ryan; assistant, Mr B. Unwin; treasurer, Mrs J. Turner; assistant, Mrs B. Unwin; show secretary, Mr J. Atwell. **BISHOPS CLEEVE AS.** Chairman, Mr T. Viner; vice-chairman & show manager, Mr P. Greenwood (10 Russell Place, Cheltenham); secretary, Mrs M. Scriven (27 Warden Hill Road, Cheltenham, GL51 5AU); phone 571231; treasurer, Mr C. F. Scriven; show secretary, Mrs D. Rossi (22 Selborne Road, Bishops Cleeve, Cheltenham); phone Bishops Cleeve 474368).

**COVENTRY POOL & AQUARIUM SOCIETY.** President, Mr B. Broomfield; vice-presidents, Mr & Mrs R. Fox & Mr W. T. Oliver; chairman, Mr A. Nash; secretary, Mr D. B. Easingwood (7 Cardale Croft, Coventry; phone Coventry 457555); assistant secretary, Mr A. Simmons; treasurer, Mr F. Watts; newsletter editor, P. & C. Hinde; show secretary, Mr S. Woodbridge; P.R.O., Mr F. Hirst; social secretary, Mr R. Peers; librarian, Mr K. Foster.

**EVESHAM FISHKEEPERS SOCIETY.** Chairman, Mr J. R. Goff; vice-chairman, Mr C. A. Sumner; treasurer, Mr Y. D. Cook; joint secretaries, R. & J. Slater;

show organiser, Mr G. V. Ludlow; assistant Mr M. Rogers. Meetings: 1st Tuesday of month, 8.00 p.m., Church Rooms, Market Place, Evesham, Worcs. New members welcome. Details: Mr C. Sumner, Calandina Cottage, 54 Newlands, Preshers, Worcs., WR10 1ER.

**FANCY GUPPY ASSOCIATION, MANCHESTER SECTION.** Chairman, Mr R. Young; treasurer, Mr A. Charlton; show secretary, Mr J. Hesbeth; assistant, Mr F. Campbell; P.R.O., Mr T. Hallett; secretary, Mr Danny Glen (16 Nutall Avenue, Whitefield, Manchester M25 6QA).

**FANCY GUPPY ASSOCIATION, SOUTH LONDON SECTION.** Chairman, Mr H. Vinal; vice-chairman, Mr P. Knorr; secretary, Mr H. Brock (20 Barnsford Crescent, West End, Woking, Surrey); treasurer, Mrs G. Brock; show secretary, Mr A. Willis (83 Middlepark Avenue, Eltham, London, SE9); assistant, Mr K. Hayman; entertainments officer, Mrs L. Knevet; P.R.O., Mr A. Willis; show stewards, Mr P. Knorr, Mr R. Fowler. Meetings: 3rd Sunday in month, Bode Centre, Abbeyfield Road, Barnsford, London, SE11 (near Surrey Docks Station).

**HARWICH & DAS.** Chairman, Mrs B. Mowbray; secretary, Mr P. Smy (51 Harbour Crescent, Harwich, Essex); treasurer, Mr Neal; vice-chairman, Mr F. Chiseman; librarian, Mrs R. Mulder. Meetings: 1st and 3rd Monday in month, 8.00 p.m., Alma Inn, Harwich.

**HAVANT & DAS.** Chairman, Mr H. Armistead; secretary, Mr K. Forder; treasurer, Mr L. Wadingham; show secretary, Mr V. Hunt; show manager, Mr K. Taylor.

**HENDON & DAS.** Chairman, Mr H. G. J. White; vice-chairman, Mr K. L. Furbeck; secretary, Miss Y. Longuet (2 Marsh Drive, Hendon, London, NW9); assistant, Mrs H. C. Thompson; treasurer, Mr J. Peckham; show secretary, Mr H. Watts (49 Selborne Gardens, London, NW4). Meetings: every Thursday, 8.00 p.m., The Henry Burden Hall, The Burreoughs, Hendon, London, NW4.

**HSKAM AS.** New Secretary: Mr H. Peshall (34 Grains Road, Shaw, Oldham).

**PETERLEE & DAS.** Chairman, Mr E. Neworthy; secretary, Mr A. Bebbington (40 Marlborough Road, Hastings Hill, Sunderland, Co. Durham); vice-chairman, Mr H. Hubbard; treasurer, Mr R. Crossin.

**ROMFORD & BEACONFIRE AS.** Change of address. Secretary: 73 Harlow Road, Rainham, Essex.

**RUNNYMEDE AS.** Chairman, Mr L. Duke; vice-chairman, Mr J. Gerrard; secretary, Mr J. Shepherd (8 Guildford Street, Staines, Middlesex; phone Staines 54560); assistant, Miss C. Butler; treasurer, Mr T. Butler; assistant treasurer, Mr D. Ripley; show secretary, Mrs Joyce Gerrard; assistant, Miss Linda Gerrard. Meetings: 2nd and 4th Tuesday of month, Ashford Community Centre, Chesterfield Road, Ashford, Middlesex.

**SOUTH LEEDS AS.** Chairman, Mr J. M. Pearson; vice-chairman, Mr P. Wales; secretary, Mr T. Holdsworth (30 Abbot View, Armsley, Leeds 12 2JN; phone Leeds 635 638); treasurer, Mr J. Sanderson.

Meetings: Cockburn High School, Burton Road, off Dewsbury Road, Leeds 11, 1st and 3rd Wednesday of month. Visitors welcome.

**SOUTH LONDON AS.** New Secretary: Mr P. D. Eton (66 Harold Estate, Pages Walk, London SE1; phone 01-231 0049).

**STOCKTON AS.** New Secretary: Mrs W. Saunders (29 Thornley Avenue, Billingham-on-Tees, Teesside; phone Stockton 94917).

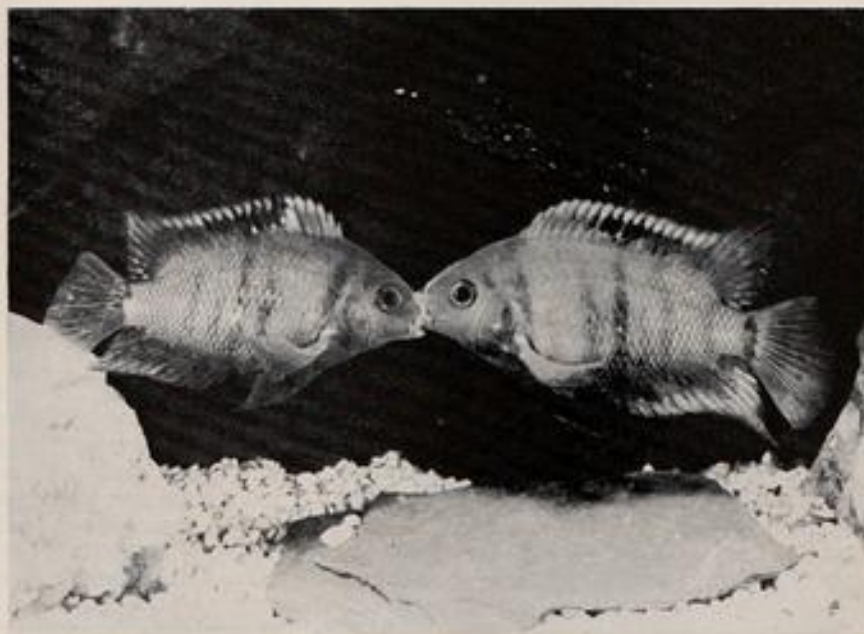
**STONE AS.** Chairman, Mr P. Clements; secretary, Mr C. Smith (8 Terry Close, Weston Coyney, Stoke-on-Trent, Staffs.); treasurer, Mr A. Fell; show secretary, Mr K. Evans; assistant, Mr G. Clewley; P.R.O., Mr A. Burton. New name: Walton Community Centre, Walton, Stone, 1st and 3rd Wednesday of month.

**TOTTENHAM & DAS.** Chairman, Mr G. Royal; secretary, Mr R. Toth (1 Argyle Mansions, 105 South Sisters Road, Highbury, London, N7 9QS); Meetings: 2nd and 4th Thursday of month, T.I. & R. Club, Tottenham High Road, London, N17. New members welcome.

**WEYMOUTH AS.** Chairman, Mr D. Rogers; vice-chairman and FRAS delegate, Mr J. Fancy; treasurer, Mrs Mansel; P.R.O., Mr D. P. Mullen; secretary, Mr M. Clee (36 Collin Street, Dorchester, Dorset). Meetings: 2nd Tuesday of month, 7.30 p.m., Rankife Hall, Queens Road, Radpole Spa, Weymouth. New members welcomed.

Attempted Breeding of a

## CICHLID Cross-Breed



A pair of the cross-breed cichlids indulge in lip-tugging before attempting a spawning

SOME time ago in an aquatic dealers in Brno there appeared some beautiful cichlids. They very much resembled *Cichlasoma facetum* in body shape, and in other ways they looked like *C. nigrofasciatum*. In a word, they were beautiful. They were not uniformly coloured, for one group were predominantly dark and the other were brightly coloured and had diagonal stripes. I immediately bought eight specimens, though I could not get any satisfactory answer from the dealer as to what they might be—they were said to be something quite new.

When I got them safely back home I put these new cichlids in a medium-sized tank and observed them carefully. At first they were all brightly coloured with definite bands. Then after a few days it became clear to me that the colouring of each individual fish varied greatly. Although to my mind the fish were already mature (they were about 3 inches, 7-8 cm., long), I could not establish any

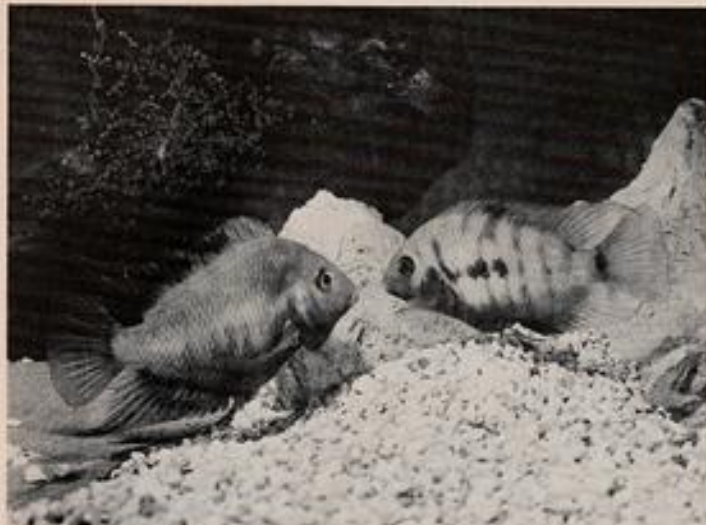
By RUDOLPH ZUKAL

Photographs by the  
author

Translation by F. MARSH

sexual difference. Possibly some of them had a slightly longer dorsal, but this was not pronounced. I looked up all the authoritative literature in order to decide to which species they belonged, but I found nothing. I have to admit that I was delighted to think that I was dealing with an undescribed species!

After a few days, when the fish had acclimatised themselves, I observed reciprocal display and



Both members of the pair took care of the eggs, deposited on a near-vertical rock surface (visible at the upper left of the picture), and one fish was always on guard. Although several batches of eggs were laid all proved infertile.

biting. As the stones were also being cleaned and the sand was moved about by mouth I knew that spawning would shortly take place. Unfortunately, with my fish, I could not see any sign of an ovipositor, which is always the surest sign of mating with cichlids. In spite of this the eggs were there the next day and I was very pleased indeed. To no purpose, unhappily, as the eggs all developed fungus and were all eaten.

The next time they spawned the same thing happened. I repeated my efforts; I let other pairs of fish spawn, changed the spawning site. All in vain. The eggs always decomposed. At first I thought it was lack of fertilisation by the male but this proved a false theory. Then I had another suspicion—and this, later, with the help of Dr S. Frank, was confirmed. The fish were cross-breeds! Much later, after we both knew they were hybrids, which have no progeny, I met the aquarist who brought these crosses into the world. He told me

that they were crosses from *Cichlasoma spilurum* and *Cichlasoma nigrofasciatum*. These two species often breed with each other, but further breeding with the results of the cross does not succeed. Further experiments must be undertaken to verify whether it would be possible to produce living young from one of these hybrids and either a normal *Cichlasoma spilurum* or a normal *C. nigrofasciatum*.

Although these hybrid fish are beautiful, and so peaceful that they can be kept in a community tank as long as the other fish are not too small, it is my opinion that cross-breeding should not be systematically undertaken. It is a different matter if fish breed by natural selection or choice, particularly with the livebearers where cross-breeding can often happen. All the same it is just this sort of possibility that makes our hobby so fascinating for there are always new problems and riddles to solve. It is certainly never boring!

#### Feed Breeders?

*Once fish are in the breeding tank should I continue to feed them or will this take their mind off the breeding process?*

Once most fishes have decided to spawn it takes rather more than a few daphnia or a little dried food to take their mind off the process. Even normally timid fish, once spawning

has started, will ignore outside disturbance until spawning is finished. It does depend to some extent on the time the fish are going to spend in the breeding tank. Egglayers are more frequently placed in the breeding tank only 1 or 2 days, or a week at the most, before spawning takes place and many experienced breeders will not feed the fish under these circumstances. The prospective parents should have been well

conditioned in advance with plenty of live food; a few days without food will do them no harm and may prevent serious pollution of the water when the eggs are hatching. With livebearers, of course, circumstances are rather different. An apparently 'ripe' mollie could get rather hungry if not fed while the owner waits for her to drop her young as this can be a protracted process.





by  
ARPEE

## Personal COMMENT

AT a time of national crisis it seems a bit selfish to indulge in over-analysis of just how the troubles which beset us will affect the fish in our tanks. We have all had ample warning of what was likely to happen this winter, and if we have failed to take adequate precautions to safeguard our stock, we must shoulder the blame and do our best to improvise, even at this late stage. Things may get a lot worse before they begin to get better, so we should look as critically as we are able at the wider issues.

The uncertainties of power availability have indeed made things difficult for the person responsible for keeping alive any tropical or sub-tropical creatures. Unfortunately, fishes seem to have a rather high antipathy to even gradual lowering of temperature below a certain point, and we may expect some losses. However, it should be remembered that some losses would occur anyway, and only the most drastic loss of power makes tropical fishkeeping impossible. The planning of power reductions this winter has been much less severe on the domestic consumer than in previous winters, and there has been less hardship in the context of home fishkeeping than might have been expected. Many have been inclined to extend their coldwater aquarium activities, and to look forward to warmer days, to the time when we can enjoy our ponds again.

In other ways 1974 is going to be an outwardly cheerless year. Many will have to spend their holidays at home, assuming that they have homes or holidays at their disposal. Many of the trimmings of life will have been lopped away and folk will be looking around for means of raising depressed spirits. It seems that horizons will be constricted considerably, and that perhaps the home and the family will become more of a meaningful unit than for some time past. Sad though much of this may be, there must be quite a message in it for the pet trade as a whole, and, assuming that supplies can be obtained, it would seem that things could be really looking up later on this year. When people get fed up they tend to look for ways of making life more tolerable: some will buy a dog, some will invest in a canary, others will

try their skills with frogs, tortoises or fish. Scarcely any of these cost very much, either in initial outlay or in maintenance, and the pleasure of companionship they bring is immeasurable.

It is quite possible that much of the prestige expenditure on pets will fall, and so far as I am concerned, this is to be welcomed. I like it when somebody puts a little on one side over a period and then buys some expensive creature, as in these circumstances it is probably desired in its own right and it will be well looked after. For some years past there has been far too much competitive keeping up with the Joneses, especially in the case of tropical marines (such novelties!), and the true values within the hobby have been partly obscured.

If we are to have to make do with less, we are going to look at what we have with a certain amount of humility. For one thing, we may well find that we can't just take a run in the car and buy just any species we want. We may have to shop around quite a bit until we can run to earth a couple of neons. We may well have lots of vacancies in our tanks by this time next year, just because we have to wait our turn to buy whatever our dealers can get hold of. Whilst I doubt whether we shall actually get around to rationing, I have little doubt that dealers will find any trouble in shifting their stocks, and the breeder always comes into his own in this sort of situation. Thus if we are to be forced to take a little more care of what we already have (and presumably overcrowding will gradually diminish), and if there are more home-grown specimens available, the outcome will be a lot less unsatisfactory than many are expecting.

The newcomer to the hobby may expect to fare pretty much as any newcomer for some years past, though admittedly his choices will be restricted. Nonetheless, he will be as charmed and captivated by his new responsibilities as we all were when we started. Established fishkeepers will find they have fewer fishes but fitter ones—surely not a bad proposition at any time. The trade can, if it anticipates demand in the right proportions, do as well as ever it has done, but it will need to read the signs correctly. These are times when men become more disillusioned than usual with their fellow men and find great solace in the companionship of animals. This is surely the sort of challenge which those with wits will have the ability to meet.



The owner of a new, fairly small, tank is more often than not in something of a quandary as to what to do with it, and as this is a thing that happens most frequently just now, may I suggest



A pair of leopard danios (the female is the left-hand fish)

Photo: R. ZUKAL

that the leopard danio might prove to be the sort of fish to try out—provided, of course, that you can obtain a few. *Brachydanio frankei* is not one of the founder members of the danio family so far as the aquarist is concerned, and appears to have emerged as late as the mid-sixties as a recognisable tank species. It has never, at least in the Midlands, established itself as a regular seller, presumably because of unreliable sources of supply. Anyone who has watched it for any length of time will soon realise that this is a fish of considerable quality as well as charm. The latter asset is taken for granted whenever one thinks of the danios, but only *Brachydanio nigrofasciatus* compares in terms of all-round perfection and gracefulness. I think it is the trout-like markings and general configuration of the leopard danio which I find most appealing: there are a number of characteristics of this fish, however, which suggest to me the looks of our own beloved minnow and the trout, and such mental associations inevitably pave the way to measures designed to determine how much further the resemblance goes.

No-one who obtains some of these fish should consider buying less than ten. They grow only to a little over 2 inches and form natural shoals so convincingly that they should be allowed to

occupy the tank on their own and to perform as a shoal rather than solo. The water requirements are in no way demanding—though an alkaline, very clear and clean and highly aerated water will give the best results in both performance and appearance. Overhead lighting should be quite bright and the rather subdued effects of Gro-lux may be dropped in favour of a colder light-source, though this is very much a matter of choice. A tank for these fish should have lots of open space in the middle and foreground, but with rockwork at the rear so arranged that the shoal can 'climb' it gradually to display its coloration by contrast. A dark rock and a gravelly bottom may be preferred, with smallish stones arranged in the foreground as foils. Plant life must be chosen most carefully, and the smaller *Acovis* can be used sparingly. If you can get hair grasses to grow, this is perhaps the best companion for all the danios, but at all costs nothing too heavy should be employed because the delicate colours of the leopard must be allowed to speak for themselves.

One should not be tempted to settle for this species and then to consider what fish could go with them. There are scores of fishes which will, of course, mix admirably, but I suspect that once the species loses sole possession, something else

will take over completely because these danios are not difficult to overpower visually. One could compare them in this sense with the glass perch, an old favourite of mine, which seldom gets the fame it deserves, perhaps because it is rather a staid old fish. The leopard danio, by contrast, is just

about the busiest thing there is, and if you can persuade yourself to spoil it just a bit with rather more live food than you can spare, you will be rewarded by a tank of fish whose verve and condition make it quite obvious that they are enjoying life to the full.

### COLDWATER SCENE



By FRANK W. ORME

JUST how difficult are koi to look after? What are the hazards and how much space do they require? From various remarks it seemed that many had found the task of keeping these fish alive almost impossible. I was intrigued as all carp that I had come across previously had proved to be extremely hardy and tolerant of ill-treatment. Therefore I decided to investigate these fish further.

Being a fancy goldfish enthusiast I had no previous experience of these colourful fish and it was thus necessary that I placed myself in the same position as an absolute beginner to fish-keeping and, as all newcomers to any livestock hobby should do, read as much available literature as possible and questioned those thought to hold reliable knowledge. The information I have obtained makes me conclude that keeping koi is not as difficult as some would have us believe. I have in fact been assured that once the initial difficulties are overcome and the fish has become established in its quarters it is a very easy fish to look after.

But there are certain requirements that must be met and this article is written to present the facts in, I hope, unbiased terms as a goldfish hobbyist sees them. To rush into any hobby that involves living creatures in a haphazard fashion without giving serious consideration to the essentials needed for their successful maintenance is to court disaster. Consider the facts and then decide whether you can provide the right conditions that will do full justice to the potentially large size that the koi can reach; if you can, then be selective and, bearing in mind the relatively high cost of these fish, buy few and wisely.

As with goldfish, koi are members of the Cyprinidae family although they are of a different branch of the family, being *Cyprinus carpio*

whereas goldfish are *Carassius auratus*. Descended from the common carp, these Japanese coloured carp are sometimes known as nishiki koi, nishiki meaning brocaded and koi meaning carp. They are found in all the various varieties of the common carp. The fully scaled (metallic) types are generally classified as 'ohgon' whilst the mirror and leather carp types are 'doitsu', this Japanese name signifying that the scale variations originated in Germany. In common with their wild ancestors, all koi have barbels, these being 'whisker-like' appendages at the corner of the mouth.

When fully grown these fish can reach a length of 2 feet or thereabouts with a body depth of 6 to 8 inches, which makes them the largest fish to be kept by amateur fishkeepers.

Before setting out to purchase koi it would pay to consult a book containing coloured pictures, from which it will be possible to gain an idea of the various colour types. Of course, the illustrations will depict specimen fish that are not likely to be readily found at a dealers. As no two fish are alike the final choice will become a matter of your own preference, but with a little knowledge you will have some idea of the type from which you would like to choose your prospective fish.

Although koi are now being bred in this country the bulk of available fish are imported from Japan. Normally fish which are exported are starved before shipment and are unlikely to be fed when they reach their final destination ready for sale. In addition, both before, during and after the 9,000 miles journey to the United Kingdom the fish suffer much handling, together with temperature and water changes, so that most are in a weakened state when you see them.

Carefully inspect the fish, rejecting any that are sulking or appear to have difficulty in swimming. A healthy fish has clear bright eyes, is alert and

## A Goldfish Breeder Takes a Look at Koi-keeping

active with fins well spread. The body has a firm well-nourished appearance without trace of any blemish. Should the eyes be dull, sunken or have a whiteish film, if the head gives the impression of being too large for the body, which has a shrunken, pinched look about it with folded fins, if thickened mucus gives a dullness to the colours, then pass that fish by. Next look for any signs of fungus, tumours or other swellings, and look very carefully for symptoms of white spot, anchor worms or fish lice. If the fish passes this inspection and fulfils the description of a healthy fish then that is the one for you. Koi are expensive, so refuse to be rushed into buying a specimen that stands very little chance of survival.

When you get the fish home place it in quarantine for 3 or 4 weeks until you are absolutely certain that it is safe to place with any other stock you may have. Failure to take this precaution might possibly cause the loss of all your fish if disease were to break out. Make sure that water temperatures are equalised at each change of quarters and commence feeding gradually. Remember that the recently imported fish has been starved and must adjust to regular feeding as well as changed water conditions. Treat the quarantine as a period of convalescence during which the fish is slowly built up and brought back to full health.

Possibly the best time to purchase koi is between March and June. Fish of around 4 to 5 inches at this time and in the right quarters with good feeding should reach approximately 8 inches by the autumn. Small fish purchased later in the year may not make sufficient growth and, if less than 5 to 6 inches, may be brought into sheltered conditions to overwinter safely. Those of 8 inches or more will quite safely pass through an average winter provided that a depth of pool water of 2 to 3 feet is available.

If the intending koi-keeper is restricted for space the ultimate size that these fish can reach should be remembered and the limitations recognised. Koi kept in aquaria will not reach their full potential of growth, owing to the restricted area.

A pool of around a 100 square feet with a water depth of 2 to 3 feet will accommodate a few small koi, but exercise discretion and avoid overstocking. Alternatively, a pool of this size will house three or four fish of 12 to 15 inches in length for spawning. The eggs can be removed and hatched in a large aquarium but, again, do not try to raise too many young. The ideal pool should give a straight swim in excess of 10 feet, in order to promote and allow the fish to develop fully; in fact, the larger the pool the better, especially if it can provide a shallow area of, say, 18 inches and a deep section of 3 feet 6 inches. As a method of calculating the number of fish which a pool will support, whilst allowing for growth, it has been suggested that the

rule should be 1 inch of fish to each square foot of surface area; personally I have formed the opinion that with large koi even this basis may not be enough and the rule might well be 1 inch of fish to every 2 square feet.

With the heavy feeding which these fish require, and the amount of excretion and mulm that this will cause, coupled with the natural habit of carp to grub up the gravel or other base material as they constantly search for food, pollution could very rapidly occur in an overstocked pool. One way to avoid the dangerous build-up of toxic conditions is to install a filtration and/or water-exchange system. A method which I saw, and had explained to me, some months ago was set up as follows.

Above the pool a raised concrete container was constructed with a depth of 18 inches and a surface area of one-quarter that of the pool. At base level of the container a piece of 3 inch plastic pipe was built in, to form an outlet, and discharged as a waterfall into the pool. Large stones were placed around the pipe opening, inside the container, to prevent the half-inch crushed stone, with which the container was filled to within 6 inches of the top, being washed away. Across the top of the container were fixed two lengths of  $\frac{1}{2}$  inch plastic overflow pipe, which had been drilled, so that water sprayed from them on to the bed of crushed stone. Each pipe had been sealed with a cork at one end, and the open ends were connected, by means of further tubing and joints, to a water pump, which drew water from the pool through similar perforated pipes buried under a 6 inch layer of the same crushed stone.

The water in the pool was perfectly clear, despite obvious overcrowding by an assorted collection of fish. Of course, this method requires space, but other forms of filtration, including complete under-gravel systems, have been devised and proved highly satisfactory.

The feeding of koi follows much the same pattern as that for goldfish: give plenty of green food, and regular feeding with all forms of live food is appreciated. In fact, if a varied diet is offered you will not go far wrong, for these fish will accept almost any food.

As mentioned above, it seems that answers are being found to the problem of koi breeding and many fanciers have successfully bred and raised young of this species. With time hardy home-bred strains should become established. When this happens many of the losses and other problems which beset koi-keepers should be overcome and they will be able to concentrate upon improving

*Continued on page 558*

## One of the Unsociable Ones — but of interest for all that



*Polycentrus schomburgki*

By RUDOLPH ZUKAL

**I**N this article I am going to introduce to you a fairly well-known 'individualist' or 'loner'. Why 'loner'? Because here we are dealing with a declared 'bully boy' that cannot be kept with fishes smaller than itself. You may wonder then why on earth anyone would want to keep such an unsociable fellow! The answer, of course, is that if one took only the disadvantages into account one's choice of fish would be severely restricted. Each fish, even the troublesome kinds, has its own particular beauty and interesting habits. And this South American "many spined" species, *Polycentrus schomburgki*, has a great deal to offer that is of interest.

Photographs by the author

Aquarists in Europe already had this fish in their tanks by 1907. Its natural habitat is the Amazon basin, west Guyana and the island of Trinidad. It grows to about 3 inches (7 cm.) in length and has a sturdy, compact body, sharply compressed at the sides. The jaw, which is full of teeth, is large and protrusible. Colouring of this fish changes with temperature, mood or even with the background. Normally, however, it is brownish grey to greyish black with black, silver-gleaming spots and flecks on the body. At spawning time the male becomes totally black, his body flecked with countless silver and blue-green spots. The female is merely brown in colour, which lightens at breeding time.

Translated by F. MARSH

As I have indicated, *Polycentrus schomburgki* should be kept only



The breeding pair of *Polycentrus schomburgki*. Colouring of the male (right-hand fish) is greatly intensified during breeding periods. On the preceding page a photograph of one specimen male is shown.

with larger species or, better still, on their own. They tend to lie hidden during hours of daylight (or when the tank is illuminated) and swim freely and hunt for food only at night. They are acknowledged "night raiders". They will only eat live foods and of these their preference is for small fishes. My specimens are in a medium-sized tank that is furnished with a thick growth of plants, stones and roots to provide natural hiding places.

Breeding *schomburgki* is not particularly difficult. In a 12-gallons (50 litres) tank (the one photographed in this spawning sequence) I raised the temperature to 79°F (26°C). Water conditions are not critical. An inverted flowerpot is usually recommended as a spawning site but, after all, the fish spawn quite happily in the wild where there are no inverted flowerpots! There they lay their eggs on firm surfaces. So I provided my fish with



A leaf of an Amazon sword plant was chosen as the spawning site by this pair. The male nudges the female as part of the courtship procedure.

Whilst swimming on her back the female deposits eggs from her ovipositor (visible in the photograph) on the under surface of the selected leaf



a broad-leaved *Echinodorus* and, as the pictures show, the fish accepted this readily enough.

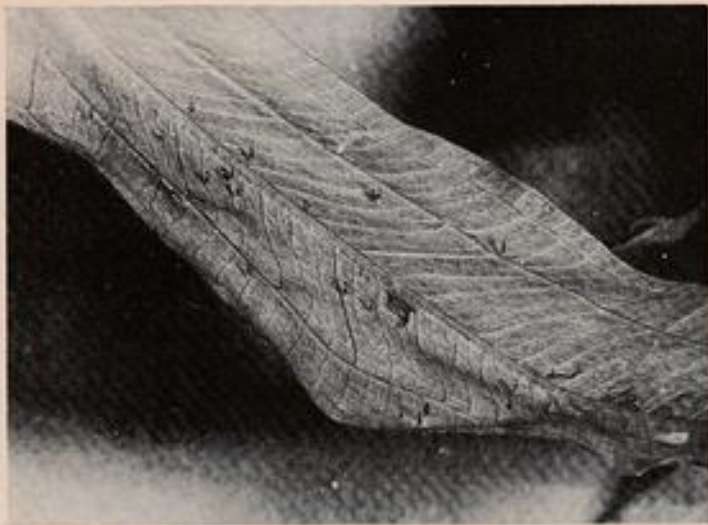
As you will see, the male I photographed was a splendid fish, brown in colour to start with. He takes up his position under the leaf that the female has already chosen to hide beneath and gradually his colour changes until he is almost black. The colour of the female during this time lightens and this is an indication of her willingness

to spawn. This part of the procedure often lasts several days. Then the female cleans the leaf on its underside and while doing this is butted gently in the belly by the male. In the next stage, the fish press together, exchange blows with their fins and change colour more and more. As with the cichlids, the female's ovipositor becomes visible.

When the time comes for the eggs to be laid the female turns on her back, glides slowly along with



Comparison of the appearance of the male in the two pictures on this page shows how much blacker he became during the spawning. He fertilised the eggs without turning upside down



Young fry are seen attached to the leaf's surface after hatching of the eggs. The fry are best reared in the absence of the parent fish.

her ovipositor touching the leaf and lays the eggs. As soon as she has laid a batch of about 10-20 eggs she turns and rests a little. At this point one would expect the male to twist over and fertilise the eggs using the same motions as the female. But no, he does not do this. Instead he places himself obliquely across the eggs, and jerks his body along. So the eggs are fertilised without the male turning on his back. The fish are prolific spawners,

the female laying a great number of eggs and the whole spawning process lasts about 3 hours.

It is the male alone who tends the eggs and in his anxiety over their safety he could injure or even bite his partner fatally, so once the spawning is completed the female must be removed. When the young hatch and the fry are visible, hanging on the leaf, the male is also removed. The fish can be bred more than once during the year.

## A Look at Koi-keeping

*continued from page 554*

the colour characteristics of these colourful carp, which form the most obvious attraction of these easily tameable and friendly fish.

For those readers who would like more information about koi I can do no better than recommend that they join the British Koi-Keeper's Society. This Society, which was formed in July, 1970, now has a nation-wide membership of over 300 with local groups in many areas. Regular Newsletters are issued to all members, and these contain information on the various aspects of koi-keeping, such as feeding, breeding and rearing, pool management and filtration methods.

Periodically the names and addresses of the members are also published so that they may contact each other. In addition visits to various koi importers and establishments are arranged. National meetings of the membership are held in each year in London and Manchester. The cost of membership is only £1.50 for a single member, £1.75 for a married couple and for those under 16 years of age 50p.

I can assure all intending members that they will find the general secretary, Mrs H. M. Allen, most helpful (she has patiently answered many of the questions that I have put to her in connection with this article); her address is 1 Anthony Close, Peterborough PE1 3XU. Full particulars of the Society will be given if you send a stamped, self-addressed envelope.

If after this you finally decide, as I have done, that you may not be able to provide the requirements and space needed for keeping these beautiful fish, well—you can always swim over to my side of the pool and join the fancy goldfish school.



## MARINIST'S Notebook

By ROY PINKS

A COLLEAGUE of mine who does a certain amount of diving for pleasure has been contemplating setting up a marine aquarium for some time past, in order to observe some of his captures at closer quarters than is usually possible on his excursions. He explained that his reluctance to install a tank is due to his present lack of knowledge of native marine fishkeeping and to his fear that he could not maintain the water at the correct temperature.

The first of his reasons is only partly true: he knows enough about the subject, in actual fact, to make a jolly good fist of it if he tried out his skills right now. As it happens he is one of the rare few who are disciplined enough to hold back until they have satisfied themselves that they are competent to take the first steps. To this end he has enrolled at evening classes this winter to study marine biology, and the marriage of this theory with his practical contact with the subject through his weekend diversings should turn him into an even more considerable person than he now is in the course of time. I consistently counsel caution as regards marine fishkeeping—here, for once, is an example of how to exercise it.

The second of his misgivings was something of a surprise to me. His concern about the water temperature related to the downward control of it. He rightly drew my attention to the temperatures he has recorded during his dives off our coasts, and doubted whether he could achieve these in tanks in a centrally heated modern flat without the installation of costly cooling equipment. My reply to his concern was that he really had nothing much to worry about unless he set his central heating at an impossibly high level.

He was still not altogether convinced, and was worried that trouble would surely come whenever summer temperatures climb into the eighties. I have had very little experience with native marines, but I cannot recall reading of aquarists who have, in this country at least, registered this as a major difficulty, though I read recently of some means of converting a domestic refrigerator system to the function of a tank cooler. I have the impression that an uncooled tank at normal room temperature will function perfectly well for native marines, provided that an adequate under-gravel filtration system is employed, with, as with tropical marines, the maximum air throughput that can be brought to bear. Indeed, there are numerous instances of native specimens, especially

anemones, taking their place in tropical tanks as though to the manner born, not just for short periods, but for at least 2 years in some cases.

I can certainly vouch for the extreme adaptability of some specimens of the seashore which I collected a year or so ago. Just before leaving the seaside for home I dropped a number of beadlet anemones into a plastic bag, together with numerous molluscs and bits of seaweed that happened to be lying nearby. This bag travelled for several hours in the very hot boot of the car (yes, the weather is always like that when we come home from holiday!), and the contents were tipped unceremoniously into a shallow plastic tank containing synthetic seawater. This was left under a tree in the garden for a few days, then accidentally moved on to a shelf in the greenhouse, which faces due south. During the next few weeks the temperatures in the immediate surroundings were over 100°F, and the tank water would have reached at least 85°F, and probably nearer 90°F on occasions. All that happened was that the anemones gave birth to lots of small ones, and several of the molluscs died. The tank was moved around and the contents were subdivided several times that season, but eventually all returned to the greenhouse before the winter and it was clear that the majority of creatures had somehow survived.

This year I planned to construct a modest native collection, mainly comprising invertebrates and principally anemones, for which I have great admiration. Unfortunately I overplayed my hand by collecting a number of snakelock anemones on the second day of our holiday. These survived the ensuing 10 days in a plastic bucket of unacrated seawater, and I even got them home with temperatures well up into the eighties. My mistake was to subject them to the same shelf in the greenhouse so enjoyed by the beadlets, for one day the temperature went so high that everything perished. In retrospect this was a nauseating bit of neglect on my part, but these things do happen from time to time. Nonetheless, the tolerance of these creatures was vastly greater than I would have ever guessed—remember that no aeration whatever was available throughout this period! This is not to be repeated, I hope, but it may encourage those with a due sense of responsibility to put together a native collection under more agreeable conditions, in which I am sure compatible species will positively flourish and not just survive.



## Mosses in the Aquarium Decor

By W. A. TOMEY

Photographs by the author

Java moss (*Vesicularia dubyana*) forms a fine background mass in this aquarium. As shelter for livebearer fry in a community tank it is excellent.

IN recent years three kinds of 'moss' have been introduced for the aquarium, though we must make a distinction between the liverworts (of which only the very slow-growing dwarf *Marchantia polymorpha* is available) and the true mosses, *Amblistegium riparium* and, most important, Java moss (*Vesicularia dubyana*).

This last-named plant is one of the most easily kept aquarium specimens, growing best on coarse stone or decorative wood used as aquarium background, under water, at the surface, and even above it in moist surroundings. It is found in Java, Ambon, the Sunda Islands and all the other islands of the Indonesian archipelago and the Philippines. Only moderate lighting should be given and there is no need to provide the moss with a bottom substrate since it grows on wood, cork etc. A temperature range of 68°-82°F (20°-28°C) is suitable.

This really extraordinary small plant consists of fine stems varying in length from  $\frac{1}{2}$  to 2 $\frac{1}{2}$  inches (1-6 cm.), on which are very small leaves. Because of its ability to grow as I have described above, *Vesicularia dubyana* is particularly suitable for hiding the less decorative items in the tank, such as the rims of flower pots, or to camouflage filter pipes and other bits of apparatus if a cluster of the moss is fastened to them with thin nylon line. Also, depending on the light available, the plants show variations in both colour and form, from a rather dark green below to lighter green tops and, remarkably enough, from a somewhat coarse to a much finer leaf.

Propagating it presents no problems: if we take a bit of the moss and place it in a new area then it will grow into a new mass. Once the plant is well settled in we may also discover something about its method of propagation. We will see that the moss

produces very thin, small, red-coloured stems topped by a 'husk' in which are microscopically small spores.

If we take the trouble to look closer at this plant we can discover many interesting things about its mode of life. Let us separate out one small plant and we will see that it consists of a very thin stem with small pointed leaves and very fine, divided, red-coloured hairy 'roots' (rhizoids), which are able to take in nutrients from the ground. At the tip of the plant some bright rose or greeny rose leaves develop, at the base of which are the microscopic female reproductive organs (archegonia). Between the brightly coloured leaves we will find the male organs (antheridia). Both these sexual organs are somewhat bottle-shaped and they occur in the middle of a wreath of cellular hairs called the paraphyses.

The propagating cells (spermatozoids) are developed in the male reproductive organs. These spermatozoids are minute, one-celled and provided with two rather long motile threads by means of which they can move about in the water. When ripe, and in moist or rainy conditions for moss growing emerge, the antheridia will burst and the spermatozoids swarm out. The archegonium or female organ has a long neck filled with secretion that attracts the spermatozoids; because of the moisture they can reach the neck opening and gain access to the neck canal and the ovum or egg cell at the bottom. The egg is then fertilised (giving rise to the zygote). In the archegonium the zygote divides many times and enlarges to form an elongated structure, one end settling into the top of the mother plant while the other end grows



Many fishes, like the emperor tetra (*Nemotobrycon palmeri*) shown here, enjoy nibbling the tops of the Java moss shoots.



Spore husks of Java moss. At the left these are seen erected above the moss stems. In the centre picture magnification reveals a small 'cap' to the husk, and when this falls off (right-hand picture) a circular rim of curved 'teeth' is seen to guard the opening.

upwards and pushes through the archegonium. At the top of this structure (the sporogonium) a rather thick bud arises, the spore husk, at the end of a 1-1½ inch stem, mostly bright red in colour. A part of the torn archegonium will remain on the spore husk like a small cap.

At first the husk is green-coloured. As it ripens it changes colour, finally from bright red to brown, and the small cap will drop but the spore husk itself is still closed by a funny little pointed cover. When the conditions are favourable, however, this little cover becomes loose, and one would expect to find an opening in the spore husk. Not at all.

Instead there is a beautifully formed, orange-coloured peristoma or circular rim of small teeth that fit together to close the opening. When the plant grows emerge this peristoma is extremely sensitive to the moisture content of the air. When the atmosphere dries, the teeth of the peristoma curl outwards, the husk opens and the spores come out and are spread by the wind. If moist conditions operate the teeth close again and block the opening. New moss plants ultimately develop from the spores if these fall in favourable conditions, and in this way the life cycle of the moss is completed.

## Readers' Queries Answered



### Pond Rudd

*I would like to try another type of fish in my garden pond this year (apart from my goldfish—the ordinary shaped ones) but it is a small pool and I think it is probably too small for orfe. What else would you suggest?*

Silver rudd might make an interesting contrast to your goldfish. They are not so much affected by water temperature and lack of oxygen in the summer months as are orfe, but they are likely to be clearly visible most of the time as they are just as fond of surface insects, and will come up for this purpose. They also, unlike orfe which quickly put on size, grow fairly slowly, another advantage with a small pool.

### Breeding X-ray Fish

*I have been trying to breed a pair of X-ray fish but so far without success. I am certain they are a pair and I have them on their own in a small tank at a temperature of 80°F. It's really a case of asking, now what? The fish certainly don't seem to know!*

Although these fish are frequently referred to in the literature as very easy breeders, the number of special 'hints' given, such as using two males to one female or trying several males in succession, or placing the tank in full sunlight really give the

clue to the breeding habits of the X-ray fish. Which are that although it can be a very simple procedure any given pair is not always willing to spawn.

To give the two fish that you have the best chance, condition them on small live food for a week or 10 days before placing them in the breeding tank, to the water of which has been added a teaspoonful of sea salt or cooking salt; this, the author of our breeding series, Mr R. Zukal, has found from experience will often induce these fish to spawn more readily. When the fish do spawn remember to remove the parents afterwards or they will eat the eggs.

### Rock Gobies

*We were delighted last year to catch two rock gobies on a day trip to the coast to add to our native marine tank but we could not get them to feed and both died. We hope to replace them this year but naturally want to make sure they live. Any particular tips about this?*

Once settled in this goby has a very good appetite and should be fed often, even daily, with a small meal, but it can be difficult to start feeding. Since they are very fond of molluscs, try the lure of a small piece of mussel after they have been settled in for 24 hours. Apart from

the problem of getting them to start feeding, other points to remember in connection with this fish are that they do not travel well, and must be carried in a large container, and they also require plenty of crannies in which to hide once they have reached the tank.

### Garden Tank

*I have a large tank in my garden that has housed goldfish for years now. They have done very well but the last one died this winter (it was at least 10 years old). I intend to refit the tank and wonder if you can suggest any other fish that might be kept in this tank in the garden all the year round.*

Provided that the tank is deep enough not to freeze solid in a cold winter it would be interesting to keep peacock-eyed bass (*Centrarchus macropterus*) or pumpkinseed sunfish (*Lepomis gibbosus*). Small ones can usually be purchased in the spring, about 1½-2 in. in size, and they need to be put into medium-hard, well-matured water. Feeding should consist of earthworms (small ones or worms chopped up), tubifex worms, blood worms, water snails, and glass worms and frog tadpoles in season. Plenty of hiding places should be provided, and good plant growth encouraged. These fishes can become very tame but they react rapidly to water deterioration and care must be taken during the summer heat to replace a little tank water at regular intervals.

### Age for Breeding

*I have some young *Nothobranchius guentheri* and they appear to be ready to mate. But as they are only about 3 months old I am wondering if this is possible?*

It is quite likely that these fish are ready to breed provided that they have been well fed from birth with plenty of live foods (brine shrimps, micro worms, daphnia, crushed snails, tubifex and white worms etc.), and that there have been many partial changes of their tank water (which also helps to promote growth). These fish are "annual" fishes and they must, for the perpetuation of the species, commence breeding very young. Three months is, after all, a sizeable part of their life-span.

### Filter Charcoal

*Is it absolutely necessary to use charcoal in my power filters? I would prefer just to use the filter wool that I am having to buy as well at present?*

The purpose of charcoal in a filter is different from that of, say, nylon wool, sand or gravel. Fibre media such as nylon wool will remove the detritus and mulm created by decaying vegetable matter and the solid excreta of the fishes. When fresh, charcoal is capable of removing from the water dissolved impurities (which in excess are just as likely to pollute the aquarium) such as the dissolved organic substances from foods and fish urine. Fibre and particle filter media alone cannot do this. Charcoal must be renewed periodically, however, as it becomes saturated with these impurities. In a planted aquarium containing a community of small fishes, the use of charcoal can be dispensed with; and also in an unplanted tank provided that periodic partial water changes are made, say one-third of the water every month. Of the tanks you list, we would advise retaining the charcoal filter in the 100-gallon tropical freshwater tank.



**LLANTWIT MAJOR AS** commenced their 21st Anniversary year with an exciting table show. This was the third of the current year where the points total towards the Miles Thomas cup awarded annually to the member with most points. The keenness of this competition was evident by the large number of fishes benched on what was a very poor night weatherwise. Result: Class C, av characin: 1 & 2, Mr H. Chick; 3, Mr S. Nelson. Whilst judging was in progress members were entertained by the first showing in Wales of Mr K. Barraclough's film 'Far Eastern Journey'.

**THE SOUTH WESTERN GROUP** of the BMAA held their January meeting at the home of Mr C. Fidock, Exeter. Amongst items discussed was the request by Torbay AS for a centrepiece for their annual show at Torquay Town Hall. This was agreed and from the discussions that ensued as to the form of the stand, it appears that Torquay Town Hall will not be large enough! Mr J. Haynes is venturing into a field which to their knowledge has not been attempted yet, i.e. a rock pool in the grounds of his residence, completely marine. If any members of the BMAA have any knowledge or ideas about this project Mr J. Haynes would dearly love to hear from them. The secretary of the Group, Mr L. Doubleday, suggested it may be possible to arrange a visit to the ICI Marine Laboratories. A considerable amount of interest was shown over Mr C. Fidock's experiment of acclimatising native fish to tropical conditions. His main indoor tank with a temperature of 72°-75°F had, amongst its occupants, a *Syngnathus acus* and *Blennius gattorugine* which had become thoroughly acclimatised to the other inmates, i.e. percula clowns and target fish. Also he had managed to induce the *acus* to accept dried food.

**BEST** fish in show at the **HORSFORTH AS** Open Show was a leaf

fish (78 points), shown by Master A. Barrett (Castleford). Mrs D. P. Copley (Doncaster) won the Ladies trophy and the top Society was Castleford with 43 points. Remainder of results as follows:

Livebearers: 1, Mr & Mrs Daines (Doncaster); 2, Mr & Mrs Toyne (Sheaf Valley); 3, Mr J. S. Hall (Aireborough). Guppies: 1, Mrs C. Asquith; 2, Mr P. Smith (Sheffield); 3, D. & N. Laycock (Sheaf Valley). Mollies: 1, Mrs C. Asquith (Castleford); 2, Mr J. S. Hall; 3, Master Jameson (Castleford). Swordtails: 1, Miss S. Clark (Aireborough); 2, Mr G. Ibbotson (Keighley); 3, Mr P. Smith. Platys: 1, Mrs Furness (Castleford); 2, Master A. Barrett; 3, Mr L. Smith (Castleford). Anabantids (large): 1, Mr White (Infl.); 2, Mr & Mrs Cohen (Castleford); 3, Mr & Mrs Fletcher. Anabantids (small): 1, Mr L. Smith; 2, Mr & Mrs Wells (Doncaster); 3, Mr & Mrs Lodge (Castleford). Fighters: 1, Mr & Mrs Cohen; 2, Mr A. Curchin (Castleford); 3, Mr Gillespie. *Corydoras*: 1, Mr & Mrs Fletcher; 2, Mr L. Smith; 3, Mr G. Ibbotson. *av* Catfish: 1, Mr & Mrs Copley; 2, Mr P. Smith; 3, Mr & Mrs Fletcher. Loach *av*: 1, Mr & Mrs Wells; 2, Mr & Mrs Toyne; 3, Mrs C. Asquith. Barbs (small): 1, Mr & Mrs Wells; 2, Mr & Mrs King; 3, Mr & Mrs Dickinson (Pontefract). Barbs (large): 1, Mr & Mrs Cohen; 2, Mr T. Smith (Sheffield); 3, Mr J. Dunn (Horsforth). Characins (small): 1, D. & N. Laycock (Sheaf Valley); 2, Mr M. Hall (Swillington); 3, Mr P. Kennedy (Keighley). Characins (large): 1, Mr & Mrs Daines; 2, Mr G. Twisdale (York & District); 3, Mr K. Smith (Middleton).

Breeders (egg-layers): 1, Mr & Mrs Wells; 2, Mr Furness; 3, Unique (Wakefield). Breeders (livebearers): 1, Mr & Mrs Cohen; 2, Mr Abbot (Swillington); 3, Mr & Mrs Toyne. Dwarf cichlids: 1, Mr G. Thickbroom; 2, Mr & Mrs Toyne; 3, Mr & Mrs Copley. Cichlids (large): 1, Mrs B. Clark; 2, Mr Abbot (Swillington); 3, Miss S. Clark. Angels: 1, Mr J. Dunn (Horsforth); 2, Mr J. Wood (Horsforth); 3, Mr & Mrs Toyne. Pairs (egg-layers): 1 & 2, Mr & Mrs Wells; 3, D. & M. Laycock. Pairs (livebearers): 1, 2 & 3, Mr & Mrs Parkes. *av*: 1, Master A. Barrett; 2, Unique; 3, Mr & Mrs Cohen.

Ladies *av*: 1, Mrs P. D. Copley; 2, Mrs Hall; 3, Mrs C. Asquith. Sharks & flying fox: 1, Mr J. S. Hall; 2, Mr & Mrs Cohen; 3, Mr T. Smith (Sheffield). Rasbora & danio: 1, Master A. Barrett; 2 & 3, Mr T. Smith. Toothcarps: 1, Mr T. Smith (Sheffield); 2, Mr L. Smith (Castleford); 3, Mr & Mrs Kilvington (Doncaster). Carps & minnows: 1, Miss S. Clark; 2, Mr & Mrs Wells; 3, Mr & Mrs Toyne. Coldwater *av*: 1, 2 & 3, Mr J. S. Hall. Fancy goldfish: 1, 2 & 3, Mr J. S. Hall. Juniors *av*: 1, Master A. Furness (Castleford); 2, K. & N. Parkes (Sheffield); 3, Master A. Barrett. Novice *av*: 1 & 3, Mr B. Runnacles (Horsforth); 2, Mr P. Hayes (Castleford). Marine *av*: 1 & 2, Mr W. Stuart.

1973 saw **COVENTY POOL & AS** celebrate its 25th anniversary and a dinner dance was held. The average attendance at monthly meetings during the year was 45 people and the Open Show in April proved very successful. In October members filled a 40-seater coach to visit the BAF in Manchester. The committee hope that 1974 sees an increase in membership. Anyone interested is invited to attend meetings, which

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See page 542 for full details.

are held at the Biggin Hall Hotel, Binley Road on the 2nd Tuesday of every month. At the AGM the president, Mr B. Bromfield, presented awards to the following: Hogarth & Stone Cups & Essam Bowl, B. & F. Hirst; Beadbury & Society Cups, Mr D. B. Easingwood; Dymond Cup, Mr J. Wileman; Court plaque, Mr D. Ketchell; Clark plaque, Mr R. Patterson & Mr J. Bailey; E. Herson cup, Mr F. Watts; Farran Plaque & Mayer cup, Mr A. Simmons.

140 members and guests of **HOUNSLOW & DAS** enjoyed a very pleasant evening on the occasion of the Society's annual dinner and dance. Chairman Mr R. Allan spoke of the success of the Society's activities during the past year, and high praise was given to the committee members for the many hours they had put in, organising the various activities. Particular mention was made of Mr B. Nelhams, the retiring social secretary, who had for many years worked extremely hard organising all the social occasions which gave such pleasure to members. A fine array of cups and trophies were on display to be presented by Mrs R. Allan to members whose fish had taken 1st, 2nd and 3rd places in the various classes at the Shield event (only fish which had taken cards at the fortnightly table shows being eligible for entry).

MR. F. HYDE, one of the founder members of **WEDNESBURY & DAS**, came to the rescue for the second time in three months when the MAAS judge failed to appear. The entertainment for the evening was provided by Mr J. Reeves with a slide lecture on fish and their food. Table show results were: catfish, class A: 1 & 2, Mr A. Shenton; 3, Mr R. Farmer. Catfish, class B: 1, 2 & 3, Mr R. Law. Characins, class A: 1, 2 & 3, Mr J. Reeves. Characins, class B: 1, Mrs Smith; 2, Mr P. Baugh; 3, Mr R. Hughes. Novice av: 1, 2 & 3, Mrs Smith. Best fish in show was an *N. palmeri* shown by Mr J. Reeves.

THE best fish in show at the **AIREBOROUGH & DAS** Open Show was a mollie exhibited by Mr P. Ebbrell (Hyde) and the highest pointed Society was Castleford. Remainder of results were:

Remainder of results were:

Furnished aquaria: 1, Mr C. Freeman (Swillington); 2, Mr B. Hambury (Swillington); 3, Mr Frye (Halifax). Minnieys: 1, Mr J. C. Robertson (Mr. Pleasant); 2, Mr & Mrs Walls (Doncaster); 3, Mr W. Stuart (Aireborough). Novice Livebearers: 1, Mr Jackson (Keighley); 2, Mr J. Emerson (Castleford); 3, Mrs C. Asquith (Castleford). Barbs: 1, Mr K. Maskill (Castleford); 2, Mr C. Trydale (York); 3, Mr B. & H. Nock (Pontefract). Characins: 1, Mr C. Trydale; 2, Mrs C. Asquith; 3, Mr K. Maskill. Cichlids: 1, Mr McArdle (Castleford); 2 & 3, Mr & Mrs Foster (Sheaf Valley). Anabantids: 1, 2 & 3, Mrs C. Asquith. Carps & minnows: 1, Mr A. Clarke; 2, Mr & Mrs Foster; 3, Mrs C. Asquith. Catfish & loach: 1, Mr & Mrs Lodge (Castleford); 2, Mrs C. Asquith; 3, Mrs J. Johnson (Blackburn). av: 1, Mr B. & H. Nock; 2, Mr & Mrs Hepworth (Castleford); 3, Mrs J. Johnson.

Breeds. Guppies: 1, Mr G. Thickbroom (Castleford); 2, Mr & Mrs Daines (Doncaster). Platy: 1, Mr A. Barrett (Castleford); 2, Mr G. Andrews (Hudd); 3, Mr & Mrs Cohen (Pontefract). Swordtails: 1, Mr & Mrs Cohen; 2, Mr G. Andrews; Mollie: 1, Mr & Mrs Bredall; 2, Mr D. Johnson. av Livebearer: 1, Mr E. Leadbetter (Fleetwood); Barbs: 1 & 2, Mr & Mrs Blades (Crosswells); Cichlids: 1, Mr J. W. Furness; 2, Mr & Mrs Blades; 3, Mr L. Stanforth. Anabantid: 1, Mr & Mrs Wheeler (Harrrogate); 2, Mr L. Stanforth. Carps & minnows: 1, Mr S. Nossley (BKA); 2, Mr A. Barrett; 3, Mr J. W. Furness. Catfish & loach: 1, Mr & Mrs Walls (Doncaster).

Guppies: 1, Mr L. Smith (Castleford); 2 & 3, D. & M. Laycock (Sheaf Valley). Platy: 1, D. & M. Laycock; 2, Mr & Mrs Hepworth; 3, Mr A. Barrett. Swordtails: 1, Mr G. Hibson (Keighley); 2, Mrs Hislop (Swillington); 3, Mr G. Andrews. Mollie: 1, Mr P. Ebbrell; 2, Mrs C. Asquith; 3, Mr E. Leadbetter. av Livebearer: 1, Mr & Mrs Daines; 2, Mr & Mrs Snowden (York); 3,

Mr & Mrs Cohen. Fighters: 1, Mr & Mrs Cohen; 2, Mr L. Stanforth; 3, D. & M. Laycock. Small anabantid: 1, Mr W. Blandell (Doncaster); 2, Mr & Mrs Wells; 3, Mr & Mrs Gates (Pontefract). av Anabantid: 1, Mr & Mrs Cohen; 2, Mr & Mrs Fletcher; 3, Mr P. Ebbrell. Dwarf cichlids: 1, Mr & Mrs Blades; 2, Mr M. T. Pleasant; 3, Mr G. Thickbroom. Large cichlids: 1, Mr & Mrs Blades; 2, Mr P. Smith (Horsforth); 3, Mr & Mrs Snowden. Anguils: 1 & 3, Mr J. Daines (Horsforth); 2, Mr E. Leadbetter. Small barbs: 1, Mr & Mrs King (Doncaster); 2, Mr & Mrs Bredall; 3, Mr & Mrs Daines. Large barbs: 1, Mr & Mrs Cohen; 2, Mr & Mrs Gates; 3, Mr J. Daines. Small characins: 1, D. & M. Laycock; 2, Mr J. W. Furness; 3, Mr M. E. Hall (Swillington). Large characins: 1, Mr & Mrs Daines; 2, Mr P. Wheeler (Blackburn); 3, Mr Kennedy (Keighley).

Corydons: 1, Mr & Mrs Fletcher; 2, Mr L. Smith; 3, Mr & Mrs Wells. av Catfish: 1, Mr & Mrs Gates; 2, Mr & Mrs Fletcher; 3, Mr & Mrs Copley (Doncaster). Loach: 1, Mr & Mrs Marshdale (Blackburn); 2, Mr & Mrs Wells; 3, Mr P. Wheeler. Sharks & loach: 1, Mr G. Thickbroom; 2, Mr J. C. Robertson; 3, Mr & Mrs Cohen. Toothcar: 1 & 2, Mr Sossley (BKA); 3, Mr A. Marshdale. Rasboras, James & minnows: 1, Mr M. E. Hall; 2, Mr & Mrs Wells; 3, Mr & Mrs Copley. av: 1, Mr & Mrs Cohen; 2, Mr A. Barrett; 3, Mr A. L. Heap (Keighley).

Mollies: 1, 2 & 3, Mr W. Stuart. Female livebearer: 1 & 3, Mr & Mrs Wells; 2, Mr Gillespie (Castleford). Female egglayer: 1, Mr & Mrs Fletcher; 2, Mr & Mrs Daines; 3, Mr A. Peasey (Doncaster). Livebearer pairs: 1, Mr W. Blandell; 2, Mr & Mrs Copley; 3, Mr & Mrs Wells. Egglayer pairs: 1, Mr & Mrs Copley; 2, D. & M. Laycock; 3, Mr & Mrs Lodge. Common goldfish: 1, Mr S. Walsh (Accrington); 2, Mr S. Kooze (Accrington); 3, Mr C. H. Whitney (Accrington). Shoebushions: 1, Mr S. Walsh; 2 & 3, Mr S. Kooze. Twinstails: 1, Mr S. Walsh; 2 & 3, Mr C. H. Whitney. av Coldwater: 1 & 2, Mr S. Walsh; 3, Mr & Mrs Blades.

## In Brief . . .

. . . MEMBERS of **HAVANT & DAS** were very active in supporting open shows last year, organising six coach trips for that purpose, with some members in attendance at every open show held by ASAS clubs. Winners of the Society's annual trophies were: Fish of the Year Cup, Mr S. Crabtree; Barb Cup, Master K. Holmes; Characin Cup, Mr P. Hinton; Catfish shield, Mr J. Dickinson; Rasboras shield, Mr A. Taylor; Loach Cup, Mr S. Crabtree; av Tropical shield, Mr D. Hinton; Livebearer Cup, Mr N. Davis; Coldwater Rosebowl, Mr V. Hunt; Breeders Cup, Mr F. Willis; highest points from table shows, Mr S. Crabtree; Junior Cup, Master P. Watt (2, Miss S. Blowfield; 3, Master S. Hinton).

. . . **EVESHAM FISHKEEPERS SOCIETY** held their first AGM recently. Several annual competitions

have been inaugurated by the Society, e.g. Aquarist of the Year, Fish of the Year, Miniature Aquarium, and if other societies are interested vice-chairman Mr C. Summerscales of Celandine Cottage, 54 Newlands, Pershore, Worcs. WR10 1ER will be pleased to supply details and receive information on activities carried out by other clubs.

. . . THE **SOUTH LONDON SECTION** of the FGA holds its meetings every third Sunday of the month at the Bede Centre, Abbeyfield Road, Bermondsey, London, SE 23 (near Surrey Docks Station), and anyone wishing to join this small but very keen section should write to Mr T. Willis, 80 Middlepark Avenue, Eltham, London, SE9 or Mr H. Brock, 20 Barnsford Crescent, West End, Woking, Surrey.

. . . NEW members of the **NEWCASTLE GUPPY & LIVE-BEARER SOCIETY** found it very helpful when at a recent meeting four club members who are FRAS

**YEOVIL & DAS** are holding a film show on Wednesday 3rd April at the Society's normal meeting place of The Moose Center, St. Michaels Avenue, Yeovil. There will be a selection of films on fish and fish-keeping, and anyone who is interested is welcome to attend, a small fee (5p or 10p) will be charged to help cover the costs.

Judges judged a selection of fish taken along by members, answered numerous questions about judging methods and explained how to recognise good quality fish. Table show winners at the second monthly meeting were: male guppy, Mrs Cawton; male swordtail, Mr Gallon; plants, Mr Kerr.

... A BRING-and-Buy stall profited from a very good attendance at the January meeting of **TONBRIDGE & DAS**. Table show results were: cichlids: 1, Mr J. Bellingham (2, Mr R. Baker; 3, Mr G. Burchell.) Leaches: 1, Mr S. Feast; 2, Mrs D. Furnell.

... THE annual Presentation Dinner Dance given by **ROEHAMPTON AS** was a great success; guest of honour, Mr B. Esson, was made to earn his invitation by presenting the trophies to club members for the year's activities. Everyone had a very enjoyable evening. 72 members and guests were present and special thanks are passed to Mrs J. Mason, the social secretary, for all her effort.

... WHEN Mr J. E. (Teddy) Shore retired after 22 years from the position of secretary of **OSRAM AS** he was presented with an engraved tankard and made an honorary life member in appreciation of all the hard work and service that he has given to the Society and the hobby in general. His many friends joined in wishing him many more happy years in the hobby and their Society.

... AT the annual prize-giving of **AYRSHIRE AS** Mr H. Spence won the Member of the Year competition (2, Mr J. Watt; 3, Mr D. Potter). The following awards

were made: Fish of the Year was owned by Mr N. Baines (2 & 3, Mr M. Wilkinson). The first prize in the Home Aquarium competition was won by Mr. A. Donaldson (2, Mr G. Walker; 3, Mr D. Potter). The Breeders' Shield went to Mr H. Spence, who was also second in the competition, with Mr. J. Watt third.

... MR M. CLUSE has given an interesting talk on judging to the **ASSOCIATION OF GOLDFISH BREEDERS**, which was followed by a general discussion on the subject. Mr I. Fleming won the table show; 2, Mr H. Beance; 3, Mr L. Clements.

... NEW members and visitors are assured of a friendly welcome at meetings of **WEYMOUTH AS** on the second Tuesday of each month, 7.30 p.m. at the Ratcliff Hall, Queens Road, Radipole Spa, Weymouth. A varied and interesting programme is planned for the year to include not only table shows and inter-club competitions with Dorchester, Yeovil and Bournemouth societies but also an exhibition of fish at a 'big affair' show in Weymouth.

... AN auction of breeding stock and accessories was a popular event at the January meeting of the **MANCHESTER SECTION OF THE FANCY GUPPY ASSOCIATION**. Major awards at the table show were made to an excellent top-sword bred by Mr Alan Charlton (best male and best in show), and natural tailed females bred by Mr Jeff Hutchins from the Lancashire section (best female and best breeders).

... **AMERSHAM & DAS** report a very successful year. Activities included lectures by FBAS speakers, matches with other local aquarist clubs, Christmas social, and a Home Furnished aquaria competition won by secretary Mr S. Thompson. Programme for March is: 5th, away match with Dunstable; 6th, speaker, plus table show: cichlids and *Corydoras*; 20th, AGM; 21st, away match with Hemel Hempstead.

... **SOUTH LONDON DAS** were delighted to be thanked publicly by Mr R. Kerridge and Mr C. A. T.

Brown at the last FBAS Meeting for their work at The Aquarium Show '73, and record their thanks to Mr R. Burton for putting a very new club on the map in this way.

... MR & Mrs W. D. Gilding had a very successful year at **GAINSBOROUGH AS** last year. When the time came for the presentation of the annual prizes they had won all four major trophies: the premier award, the Bacon trophy, (2, Mr & Mrs R. Harris; 3, Mr & Mrs P. Dixon), the Furnished Aquarium trophy (2, Mr & Mrs R. Harris; 3, Mr & Mrs K. Shaw), the Breeders, livebearers, trophy (2, Mr & Mrs R. Harris), the Breeders, egglayers, trophy (also second place; 3, Mr & Mrs K. Shaw) and Greg Gilding won the Novice trophy (2, Nigel Cowan; 3, Pat O'Halaran).

... A NEW venue for **STONE AS**. This is the Walton Community Centre, Walton, Stone, Staffordshire and meetings are arranged on the 1st & 3rd Wednesdays of every month. The Society has arranged an interesting and varied programme for the coming year. Details are available from the secretary, Mr C. Smith, 8 Terry Close, Weston Coyney, Stone-on-Trent, Staffs.

... MR A. DAWES was the guest speaker at the January meeting of **BRIGHTON & SOUTHERN AS**. He showed numerous slides and accompanied these with an informal chat on fishkeeping, which gave members every opportunity to sort out their aquatic problems. Further information may be obtained from Mr S. Feek, phone: Brighton 682037.

... **YEOVIL & DAS** are holding their Open Show on 19th May at the School Hall, Martock, Somerset. As well as the normal classes of tropical and coldwater, they are introducing a class for marines.

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*It is with regret that, because of the uncertain current situation—petrol crisis etc., members of ROEHAMPTON AS have decided not to hold an Open Show in 1974. However the Society will make every effort to cover other Societies' shows, as has been their policy in the past.*

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## Dates for Your Diary

2nd March. **FBAS ASSEMBLY**. Conway Hall, Red Lion Square, Holborn, London WC1, 2.30 p.m.

9th March. **MIDLAND ASSOCIATION OF AQUARISTS SOCIETIES**. Delegates AGM. Digbeth Civic Hall, Room 3, 7.30 p.m.

9th March. **CATFISH ASSOCIATION (G.B.)** Open Show. Ham Hall, Ham Close, Ham, Richmond, Surrey. Eighteen classes (G & H). Show secretary: Mr D. Lambourne, 7 Whorley Court, Plough Road, London, SW11 2AQ (phone: 01-223 2630).

23rd March. **GSGB AGM**. Conway Hall, Red Lion Square, Holborn, London WC1, 2.00 p.m.

6th April. **THURROCK AS** Open Show. Thameside Junior School, Grays, Essex. Schedules: Mr A. Riddell, 2 Pym Place, Grays, Essex.

7th April. **SHEFFIELD & DAS** 14th Open Show. Grandville College, Grandville Road, Sheffield, 41 classes. Details: Mr H. Burston, 240 Marlborough Avenue, Mansel, Sheffield; phone 292515.

14th April. **STOCKTON-ON-TEES AS** Open Show. St Peter and Paul School, Durham Road, Stockton (adjacent to Mile House Hotel). Details and schedules: Mr C. W. Beck, 22 Danby Grove, Thornaby, Teeside, TS17 8BX; phone Stockton 65284.

15th April (Easter Monday). **SOUTHAMPTON AS** Open Show. Avenue Hall,

Southampton. Details: Mr P. Brown, 215 Spring Road, Sholing, Southampton.

27th April. **RIVERSIDE AS** Open Show. St Saviour's Church Hall, Cobbold Road, London, W.12. Details: Mr W. Netherell, 11 Grayhound Road, Fulham, London, S.W.6.

28th April. **BLAKEBOROUGH AS** Open Show. J. Blakeborough & Sons Cottage, River Street, Bird Royde Lane, Brighouse, Yorks. Details: Mr T. Barker, 41-43 Cannon Street, Brighouse, Yorks, HD 6UJE.

28th April. **COVENTRY POOL & AQUARIUM SOCIETY** Open Show. Further details (s.a.e.) from Mr S. Woodruff, 32 Ridgeway Avenue, Coventry, CV3 5BP.

3rd May. **OSRAM AS** Open Show. Recreation Rooms, Refugee Street, Shaw, nr. Oldham, Lancs.

11th May. **PORT TALBOT AS** Open Show. YMCA Buildings, Port Talbot. Details: Mr A. E. B. Fouracre, 3 Cross Street, Ystrada, Port Talbot, Glam, SA11 1AZ.

11th May. **SOUTHEND, LEIGH & DAS** Open Show. St Clements Hall, Leigh-on-Sea, Essex. Club and individual furnished, aquascapes and marine classes. Schedules: Mr D. Durrant, 172 Trinity Road, Southend-on-Sea, Essex; phone 610578.

12th May. **GLOUCESTER AS** Open Show. Education and Leisure Centre, Patricock Road, Gloucester. Schedules (February): Mr B. Walker, 41 Hales Road, Gloucester.

17th May. **MERSEYSIDE AS** Open Show. Venue to be announced.

18th May. **TROWBRIDGE & DA & PS** Open Show. Nelson Haden Boys School, Trowbridge, Wilts. Schedules: Mr S. S. Huntley, 49 Marsh Road, Hilston, Trowbridge, Wilts.

19th May. **YEOVIL & DAS** Open Show. School Hall, Martock, Somerset. Schedules: Mr P. New, 8 Mayfield Road, Yeovil, Somerset; phone Yeovil 24224.

25th-27th May. **MID-SUSSEX AS** Fish Exhibition. The Park Centre, Burgess Hill, Sussex. Setting up, 25th May. Open to public, 26th-27th May. A day out for the family—entertainments include the famous Crab Derby.

26th May. **BRIDLINGTON & DAS** first Open Show. Alexandra Hotel, Bridlington, E. Yorks. Details to follow.

26th May. **CORBY & DAS** Open Show. Corby Civic Centre. Details to follow.

27th May (Spring Bank Holiday). **EXHIBITION OF FISH AND REPTILES**. Toffin School Fete, Queen Elizabeth Road, Kingston, Surrey, 2.00-7.00 p.m.

31st June. **FBAS ASSEMBLY**. Conway Hall, Red Lion Square, Holborn, London WC1, 2.30 p.m.

1st June. **GSGB General Meeting**. Conway Hall, Red Lion Square, Holborn, London WC1, 2.00 p.m.

2nd June. **BRITISH CICHLID ASSOCIATION (Northern Area)**. Show for cichlids only. Further details to follow.

2nd June. **LDUGHBOROUGH & DAS** Open Show. Schedules: Mr J. Parry, 10 Cleveland Road, Loughborough, Leics. LE11 2SP (phone Loughborough 61715).

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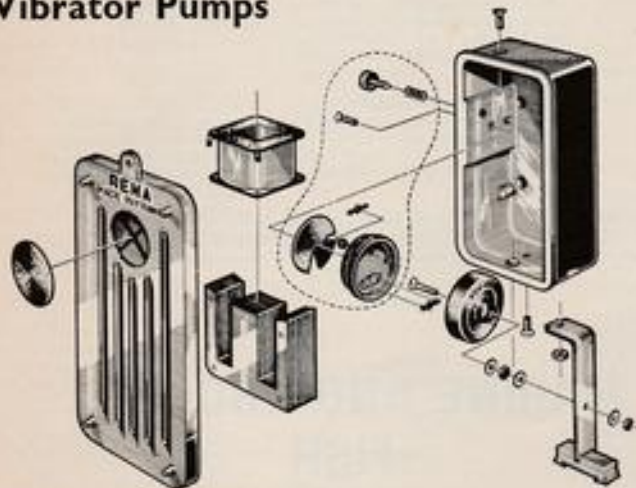
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