

OCTOBER 1974

20p

Pet **Fish**

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Dwarf Cichlid Spawning

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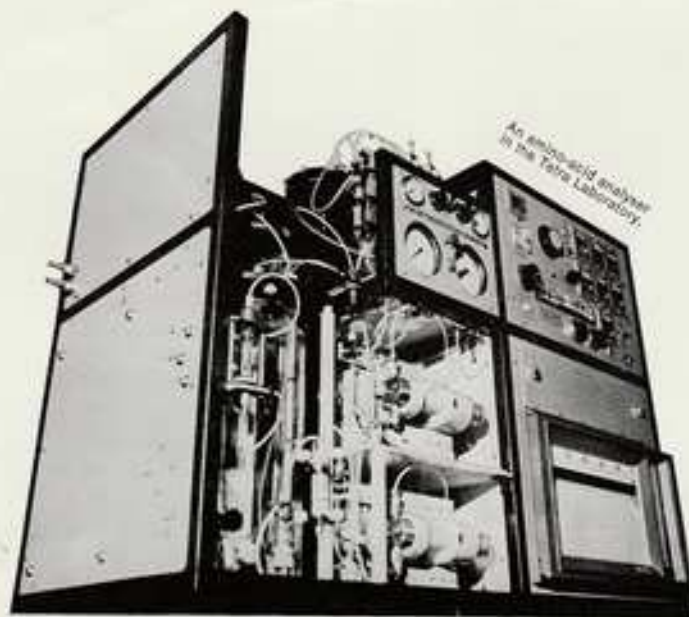
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October 1974

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Comments and Quotes

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Large-scale Fishkeeping

GRADUALLY and cautiously the development in the U.K. of a fish farming 'industry', for both marine and freshwater fishes and in fact for both marine and freshwater 'shellfish', is getting under way. In this we are, of course, following a worldwide trend, and although the size of fish farming operations in larger countries is much greater than is possible in our crowded islands the current developments already approach a scale that would once have seemed economically impossible.

Fish culture of all kinds is of interest to the aquarist, and even if fish farmers are, by and large, not concerned with the popular aquarium and garden pond species, fundamentals of technique are common to both aquarium and farm operations. Since this is so, we can expect some benefits to come our way from the increasing amount of research and investigations it is pleasing to see being made in connection with keeping, breeding and rearing aquatic creatures. One major aspect of such investigations is the incidence and treatment of fish diseases, not by any means the least of the problems of importers and wholesalers of aquarium fishes. It could be that in this field particularly the yield of information will greatly benefit aquarium interests.

We have seen statements such as 'trout farmers should brace themselves to lose one harvest in five through natural disaster' and 'fish farming, which seemed to many to be the ideal family business, in pleasant surroundings with a ready market in the luxury food trade, had turned out to be a very high risk business', and although weather hazards as well as disease are involved just think what havoc among stock is represented by such facts as losses of up to 80% of young rainbow trout being incurred in 1972 by the appearance of the disease infectious pancreatic necrosis. With the large

economic interests now involved (Unilever, British Oxygen Company and Shell Petroleum are a few of the big companies with stakes in fish farming in the U.K.) there will be greater funds to initiate the research that has hitherto had little support.

However, although treatment of disease must be studied, in the long run the emphasis must be on the establishment of disease-free stocks and techniques to keep disease out. To use an analogy employed before, putting out fires is all very well but avoiding the outbreaks is of greater importance. This is still the lesson for the aquarium trade and aquarists, just as it is for the fish farmers.

The Aquarium Show '74

THIS month The Aquarium Show opens in London (Friday 25th-Sunday 27th October) with its annual aim of presenting something of the delights of fishkeeping for the public to see, as well as giving hobbyists the chance to see first-class fishes and to meet the specialists. Also the latest items of equipment can be seen on the stands of the major manufacturers and the opportunity to discuss products with their makers can be taken. This year there is a chance for a visitor to the Show to win a valuable aquarium as a prize. Further details of the Show are given on pages 272 and 275 of this issue.

Diary 1975

AT the end of this month the **PETFISH Aquarist's Pocketbook and Diary 1975** will be published. It has an enlarged aquatic data section, the usual 16 pages of world maps in colour and is fitted with pencil. Price (to include VAT) is 50p (£1.50 post free USA and Canada). Orders for single copies and trade orders can be sent now to P.F. Publications, 554 Garratt Lane, London, SW17 6NY, for despatch immediately the Diary is published.



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

Marinist's Experience

HAVING read the articles in 'Marinist's Notebook' with great interest I thought you might like to read of my experiences.

Living in a very small flat I am limited to a 3 ft by 12 in by 15 in all-glass tank, about 22 gallons. Not wanting very many fish, only the initial experience, at first I decided to try the natural system. Living rock was the most expensive, though I only purchased a small amount. But I am sure my success is due to my cultivation of caulerpa, the marine plant. I purchased a piece of living rock with the plant attached and it soon filled the tank. I must point out at this stage that nothing looks more natural than to see your fish swimming in and out of waving strands of seaweed.

I use Tropic Marin salt and Hilena Integral plant fertiliser and water stabiliser, plus a twice-weekly addition of Sea-Vita. The tank was set up with just a half-inch layer of coral sand, and then a few pieces of living rock. After about 3 days I got a slight nitrite reading but after the addition of the caulerpa there wasn't the slightest trace, and it has remained that way ever since.

My fish consist of a beautiful clown (*Amphiprion polymurus*) from the Philippines, a small blue damsel, and, at the moment, a small majestic angel. I did have a regal tang but I sold it in part exchange in order to obtain the magnificent majestic. There was too much caulerpa in the tank for the tang to do any damage and it found great pleasure in nibbling the leaves. I will try to obtain two or three of these beautiful blue fish when my wife and I move into our own house (and I get my big tank). I am sure it is the rapid growing plant that prevents even the slightest trace of nitrite, so that's half the battle won already. I feed the fish quite heavily and have yet to have any trouble. The clown lives in a yellow rock anemone which I feed only once per week with a small garden worm or prawn.

Caulerpa needs strong light and I have got one 3 ft 30 watts and one 2 ft 20 watts fluorescent tube left on for a minimum of 14 hours per day. The plant not only grows on the rocks and sand but its runners have spread the leaves up the back of the tank and along the surface of the water. It is a known fact that fast-growing algae help to

stabilise the pH of seawater; the importance of algae to the wellbeing of the fish is fairly obvious.

Acocks Green, Birmingham 27

A. JELFS

Size of Marine Tanks

AFTER reading 'Marine Experience Hard Won' by Robert Shaw in your June issue, I feel that I must write to offer my own feelings on the matter.

Let me point out that tank size has nothing to do whatsoever as to whether or not a tank will be successful. I have set up many very tiny tanks with complete success using just an undergravel filter and an inside bottom filter with carbon. One time I set up a 2 gallon tank with 25 small marine fish including several convict gobies, and the gobies spawned three times. The article with pictures appeared in TFH a number of years ago.

Just recently I set up a 4 gallon salt water tank with six marine fish including a royal gramma. All are living fine. I do not use the ozoniser, protein skimmer, powerful undergravel filter or any exotic equipment in any of my salt water tanks and my tanks are on public display.

Upon analysing Mr Shaw's article, I would say that the reason his fish died the first time was because he did not add copper to the tank. He should have left out the coral shrimp and added a dose of copper when he added the fish. On his second attempt, he received much better fish, which he emphasises in his article, and this, rather than the tank size or equipment, is why he was more successful.

I can state categorically that ozonisers and protein skimmers will not keep a fish alive if it is diseased or poisoned. I know very few aquarists who use either one. We have discarded these as well as the so-called bacterial cycle. We set up a tank a day or two after the salt is mixed and add copper to KILL the bacteria!

*Coral Reef Exhibits, ROBERT P. L. STRAUGHAN
Bellevue, Florida, U.S.A.*

Goldfish Association

WITH reference to the letter printed in the August issue of your publication regarding the intentions of the Association of

Continued on page 273

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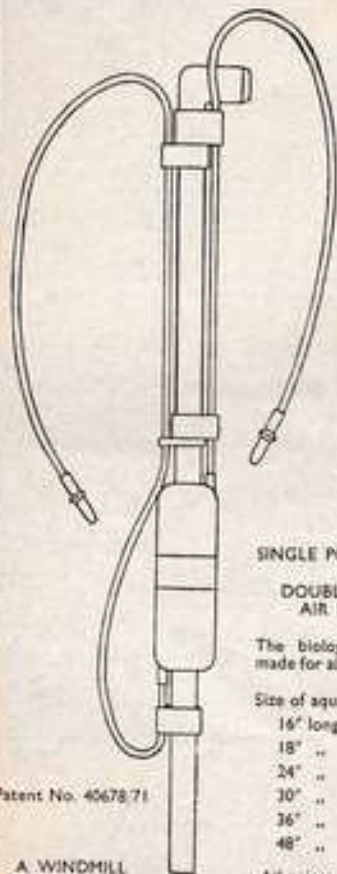
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LETTERS

continued from page 266

Goldfish Breeders, it would appear that your correspondent has been grossly misinformed. Whilst it is perfectly correct that certain members of the AGB are also members of the GSGB, the AGB has at present no connection whatsoever with that or any other organisation. We are at loss to explain on what basis the rest of the remarks are founded, as your correspondent is not known to us, nor has he at any time been in contact with us, and those remarks could not be further from the truth.

We would be pleased to receive a request regarding our true intentions on this matter, upon receipt of which our secretary will be delighted to furnish the correct relevant information, so enabling your correspondent to make fair comments and just criticisms.

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Chairman, AGB

Green Ponds

IN his article 'Novel Way to Prevent Green Water' (PFM, August), Cliff Harrison is wrong in suggesting that undergravel filtration cannot prevent a pond looking like pea-soup. Provided the system is set up correctly, the filter bed is of sufficient size and the water is drawn through it neither too slowly nor too fast, the pond water will remain crystal clear. The Newsletter of the British Koi-Keepers' Society has carried articles describing undergravel filtration for ponds, and I know more than a few members who keep their ponds absolutely clear throughout the summer by using this method.

Amersham, Bucks.

M. G. WAUMSLEY

Fish in Australian National Show

I THOUGHT you might like to hear about our major show in Brisbane. This is the Royal National Show—it runs for 10 days and apart from commercial exhibits covers every aspect and the whole of the state. The fish section is quite small, but the number of people that comes through the exhibition is enormous, over 700,000, and when you are on the stand answering questions you think every one of those 700,000 has come through to you. It may not seem to be a big show fish-wise by English standards, but the work involved even in

putting in one tank is quite a lot as the exhibitor has to provide his own 2 ft by 1 ft by 1 ft tank, his own heater, filters, food, and a fully decorated tank plus the fish to win; further, the fish have to stay there for the full 10 days and so there is always the risk that you will lose your prize fish. This year, we managed to talk the show committee into bringing an inter-state judge, and we were lucky enough to get the curator of fishes from Taronga Park Zoo, Mr U. Erich Friese, to judge for us. The Show opened with 113 tanks (not quite our best, as we have had 161). Of these the Aquarium & Terrarium Society of Queensland put on 52, Cold & Tropical (our sister club) 33, and there were 28 private entries. The A & T Society won 17 firsts out of 43 and 2 out of the 4 champions. The grand champion this year, for the first time, was an invertebrate tank and was really lovely—most of the invertebrates were collected locally, too.

Brisbane, Australia

KEN E. MCCALL

Secretary, Aquarium & Terrarium
Society of Queensland

Misprint

I ENJOY the magazine, especially articles on cichlids, but wish it could be larger. The feature on *H. multispinosa* (PFM, July) was helpful to me, but I think '48-36 hours' hatching time was a mistake. My eggs took over 72 hours.

Kempston, Beds.

W. DARLOW

We thank Mr Darlow for pointing out the misprint in the hatching time, which should have read '48-72 hours'.—EDITOR.

Did You Know ...?

READERS who saw the BBC award-winning 'The Making of a Natural History Film', recently screened on television for the second time, will undoubtedly have found the sequences showing aquatic life of special interest. In connection with these Mr S. Freeman, of Wimbledon, contacted PFM to draw attention in particular to the highly magnified shots of living daphnia and to suggest that many aquarists would have been surprised to hear it said on the commentary that daphnia "retain the eggs in the body for a considerable time; this eventually results in young daphnia being liberated from their egg membranes while they are still inside the parent, and this is called 'brooding'". The daphnia being filmed had the tiny young inside them and subsequently the viewer saw their 'birth' take place as they were released from the brood pouch.

Mr Freeman told us that, 20 or 30 years ago, when he was lecturing to aquarists societies his description of daphnia as a type of livebearer had often been challenged, although from his own

observations without a microscope he had surmised that this must be the case and had made practical fishkeeping use of the fact. He had noticed when he put large daphnia into tanks of tiny tropical fish fry that although the crustaceans were too large to be eaten by the fry these followed the fleas about in the water and could be seen 'snapping' at some food in their vicinity that was too small to be seen by the human eye even with the aid of a lens. This food was, Mr Freeman con-

cluded, the liveborn progeny of the daphnia, and he therefore regularly included parent daphnia in his tanks of fry to provide this valuable source of live food for the youngsters.

Cinematographers who would like to film such aquatic happenings as the birth of daphnia should note that the vibration-absorbing optical bench and ancillary equipment used to record this by Dr Peter Parks of the Oxford Scientific Film group cost £5000!



Life- Spans of Aquarium Fishes

Photo: C. HARRISON

WITH the longer-lived fishes, all too often it is impossible to gauge their likely life-span—either because an accident of some sort has abruptly (and prematurely) curtailed their development, or alternatively a number of changes in ownership has prevented the keeping of accurate records.

However, we have received news of the recent death of a sucker-mouth catfish at the age of around 14 years. Whilst this should not be regarded as exceptional by any means, since catfishes do seem to outlive many of the other occupants in home aquaria, it should be of interest to the readers who will remember seeing

this particular example regularly displayed at open shows all around the country by its owner Mr G. E. Greenhalf. Although thought for most of its long-showing life to be *Hypostomus*, it was subsequently identified as *Pterygoplichthys multi-radiatus*; at 9½ in. it was approximately two-thirds full size.

If readers have any particularly long-lived fishes at home, we'd like to hear about them, particularly with regard to temperatures at which they have been kept, foods and feeding routines followed, size of tank and other tank occupants present.

Dr L. E. Mawdesley-Thomas

LAST month the death was announced of Dr Lionel E. Mawdesley-Thomas, age 43 years, director of the Huntingdon Research Centre since 1969. His work in human pathology developed during his career into a specialisation

into comparative pathology and he became an expert in this field with special knowledge of diseases of fishes. Many aquarists will have had the benefit of his experience as the result of submitting fish for his examination when Dr Mawdesley-Thomas offered to look at aquarium specimens some years back. His tragically early death will be a setback to the advancement of knowledge of fish diseases.



The AQUARIUM SHOW '74

Friday, 25th to Sunday, 27th October
at the Royal Horticultural Society's Old Hall
Vincent Square, London S.W.1

Further information is given on page 272

VISITORS to the Aquarium Show will have the opportunity to win a really magnificent, completely equipped furnished aquarium worth £300. The Vitakraft aquarium is the gift of John Allan Aquariums Ltd (Bury St Edmunds, Suffolk), a member of the Aquatic Development Group, who are arranging its display at the Show and supplying the equipment and tank furnishings. The tank is a hexagonal pillar aquarium that can be viewed from all six sides and forms its own island site. It makes a most decorative feature and will certainly grace any living room. The all-glass tank is mounted on a baroque-styled, hexagonal cupboard, with cover to match, both cover and cupboard finished in white lacquer.

The Aquatic Development Group—a consortium of manufacturers, wholesalers and retailers in the hobby, was formed early this year and is working very hard to achieve its aim of developing and expanding the interest of the general public in fishkeeping. Their success will benefit every aspect of the hobby and we are very pleased that, at this year's Show, as well as the competition for the prize tank, the Group are also arranging a display of aquaria as a feature of the modern home.

THE Ted Jessopp Memorial trophy is one of the awards this year at The Aquarium Show and will be presented to the winner of the Special Class for fishes 12 inches or more in length (FBAS classes B-M).

AMONGST the fishes that it is hoped will be competing in this year's FBAS Supreme Championship Trophy Competition, which are already the winners of Championship classes throughout the season, are *Tilapia sparrmanii* (Mr K. Bissoon), *Andoras grypes* (Mr D. Lambourne), a bicolor angelfish (Mr T. Winter), *C. schwartzi* (Mr & Mrs Murphy), *Boria sidhimunki* (Mr T. A. King), *Tetragomphus chalcus* (Mr P. Coyle) and a *Labeotropheus trewavasae* (Mrs M. Nethersell). As well as the Championship trophy and the five other awards, each entrant in the finals this year will receive a Championship 'Certificate'.

SPECIALIST societies that will be represented at The Aquarium Show at the Royal Horticultural Society Old Hall include the Association of

Goldfish Breeders, the British Cichlid Association, the British Ichthyological Society, the British Killifish Association, the British Kot-Keepers Society, the British Marine Aquarists Association, the Catfish Association, the Fancy Guppy Association, the Federation of Guppy Breeders' Societies and the Goldfish Society of Great Britain. Members of these groups will be in attendance at their stands ready to give help and advice and, hopefully, to persuade visitors of the advantages of becoming new members in their ranks!

Book REVIEW

THE GUPPY: ITS LIFE CYCLE, by Dr William White Jr. 63 pages; 56 photographs. Sterling Publishing Co., New York. £2.10.

HAVING regard to the available potential for the production of a really comprehensive volume on guppies, this book is but a brief treatise to add to the many which have gone before. Almost entirely confined to biological description of the guppy's body and lifecycle it will appeal to the student who is seeking enlightenment to the mysteries which shroud the development and ultimate birth of the baby guppy. The man-in-the-street, who is more concerned about the quality and colour of his guppies than the manner in which they are given life, may find it a little too scientific.

The language, however, is simple and easy to understand, any scientific terms being followed by an explanation of their meaning. There is also a wealth of photographs prepared by the author, who has been at great pains to illustrate what he is writing about. They are in colour and, where necessary, dissections and magnifications have been made. The result is a detailed step-by-step picture of the whole embryonic development, followed by fry in various stages of growth.

The book ends with two very brief chapters, a few words on the guppy's environment and a constricted comparison with other *Poecilia* species.

FRED CAMPBELL

Jubilee of London Zoo's AQUARIUM



Largest public aquarium in the United Kingdom, the Aquarium at Regent's Park, London this year has completed 50 years since its first opening

Photographs by
CLIFF HARRISON

ALTHOUGH the first, modest, aquarium at the London Zoological Gardens was instigated in 1853, this pioneer venture had been abandoned by 1890, and the well-known Zoo Aquarium of today was not completed and opened until 1924, and achieved its fiftieth anniversary this year.

Two years were taken over the building of the Aquarium, the plans for which were drawn up by Dr Chalmers Mitchell (later Sir Chalmers Mitchell), secretary of the Zoological Society at the time, and Mr E. G. Boulenger, who was to become the Aquarium's director. They had visited the main public aquariums in Europe and studied the design of others in existence elsewhere before planning what was to be the most up-to-date institution of its kind. It cost £55,000 to build, a very small sum by today's standards but in 1924 no mean outlay for the Zoological Society.

The basic crescentic plan of the building, nearly 450 feet long and virtually unaltered to the present time, was in conformity with the site chosen for it beneath the curve of the Mappin Terraces (constructed in 1913 and funded by and named after a head of the well-known firm of gold- and silver-smiths). Water reservoirs for both freshwater and seawater were incorporated into the peaks of the reinforced concrete 'mountains' of the Terrace, to act as suppliers of the show tanks by gravity feed in the Aquarium's original water-circulating system.

As described in an early GUIDE TO THE GARDENS AND AQUARIUM—REGENTS PARK the building had

'the form of a crescentic gallery with tanks on each side, those on the outside of the crescent being illuminated by daylight, those on the inside by electricity, the electric light bulbs being so constructed as to select the rays of light which gave an illumination almost indistinguishable from daylight. The building, which is nearly 450 feet long, is divided into three principal parts: a freshwater hall with twenty-five tanks, varying in size from thirty feet to six feet in length; a sea-water hall with a similar number of tanks, two of which are over thirty feet in length; and a tropical hall for freshwater fish with forty tanks, mostly of small size.'

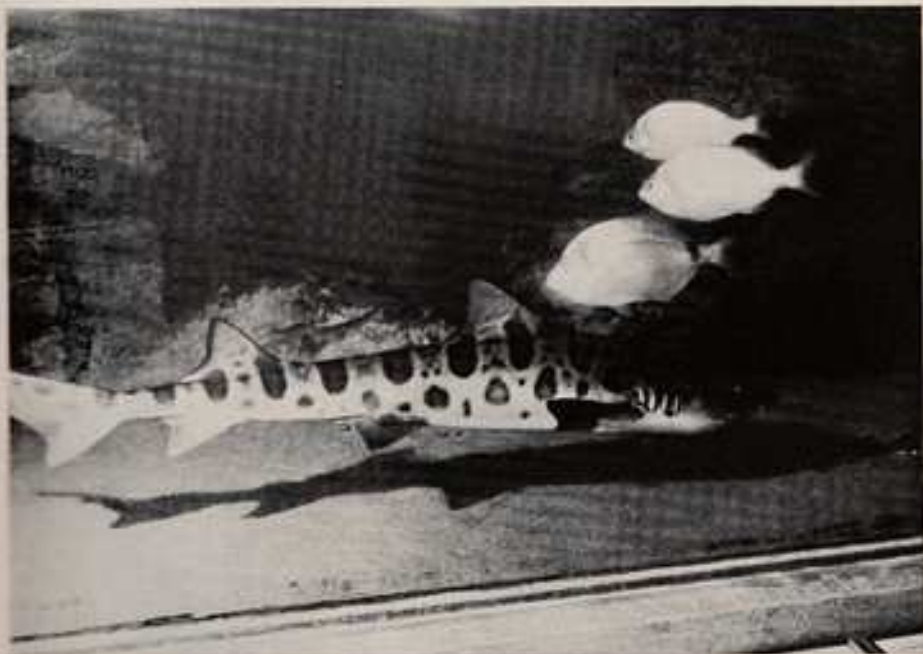
Reservoirs for seawater (120,000 gallons) and freshwater (60,000 gallons) were made beneath the Aquarium, and water was originally pumped from these to the Terrace reservoirs mentioned above, from which the exhibition aquaria were supplied. Outflowing water from the tanks passed through filter beds of sand before its return to the large underground reservoirs. The original enamelled iron pipes used for seawater at the Aquarium were in service until 1970 when they were replaced by plastic pipes. Aeration to individual aquaria was supplied by an air compressor. Today the main reservoirs are of smaller capacity and the gravity feed reservoirs are multiple 100 gallon tanks. Just as in the 'twenties, however, seawater replenishments for the marines still come from the Bay of Biscay.

Although the designers had planned the

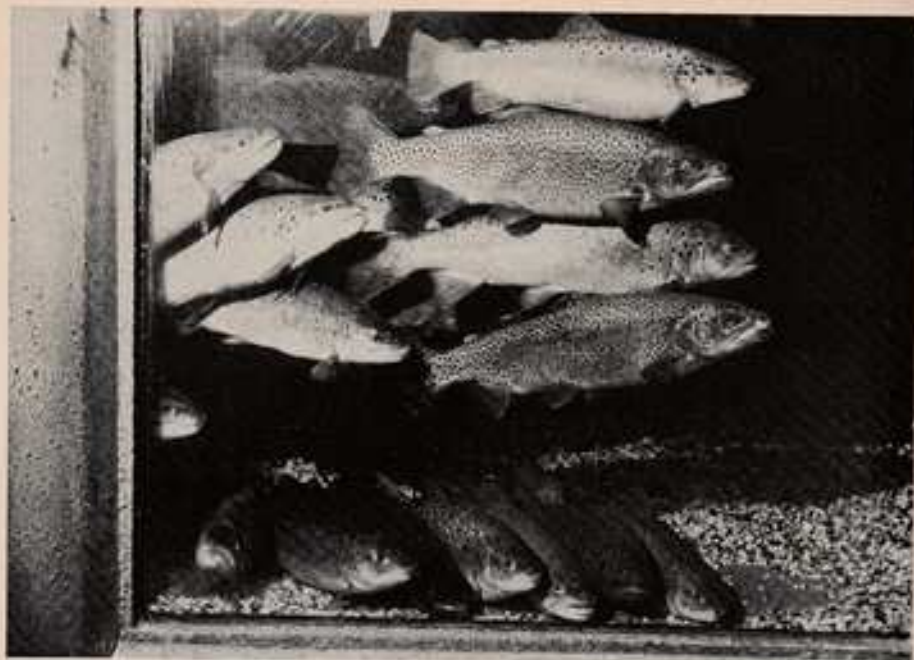
Aquarium with every facility then available to make it the best inland display to be seen, the final result was not without its critics. For example, in a book called *PEEPS AT THE ZOO AQUARIUM* by A. E. Hodge, president of the British Aquarists' Association and who (also in 1924) started his own quarterly magazine called *THE AMATEUR AQUARIST*, the author deplored 'the absence of a "balanced" tank for the edification of visitors wishing to set up a small aquarium on their own account'. The Aquariums' director, E. G. Boulenger, had apparently 'agreed that a "balanced" tank would be useful for the purpose, but, as the lobby was the only available site, he feared that, owing to its accessibility, misguided people might be prompted to throw in all kinds of food for the fishes, and thus contaminate the water.' However, whether because the public in time became less misguided or whatever, the Aquarium entrance hall was later to be furnished with the attractive pond feature it has today and a number of planted tropical aquaria that might be emulated in the home came to be included in the tropical hall.

An aquarium planned today would undoubtedly be of a very different design, so great have been the advances made in displays of all kinds for public edification and so altered are the expectations of a public accustomed to having colourful, intimate contact with the underwater world in their homes through the medium of television.

Throughout its 50 years, however, the Aquarium has been a popular feature of the Regents Park Zoo, 26% (542,759) of the Zoo's 2,045,402 visitors paying the extra admission fee to view its exhibits in 1973, for example. During the 47 years it has been open to the public (it had to be closed during the war years 1940, 1941, 1942) over 17½ million (17,630,126) people have visited it. Some features have been added since the early days, some have disappeared (the colourful tidal rock pool and the decidedly uncolourful, rather smelly manatee pond are ones that will be affectionately remembered by older Aquarium devotees), and changes are still taking place. Most recently, curved backgrounds have been fitted to smaller tanks, new tanks for flat fish are in the process of being made and should be finished next year, improved



This leopard shark (*Triakis semifasciata*) in the seawater hall of the London Zoo Aquarium is the type of exhibit specially popular with the general public.



Trout line-up in one of the large exhibition tanks at the London Zoo Aquarium

exit facilities with a gallery of very fine aquaria for amphibians have been made and what had been since the beginning a rather unprepossessing exterior and entrance has been given an improving face-lift.

Exhibition tanks used in the aquarium at the present time range in length from 1 ft. to 30 ft., with glass viewing panels of from $\frac{1}{4}$ to $1\frac{1}{4}$ inch thickness, and imaginative furnishings produce a varied scene. One of the most impressive tanks must be the huge corner Monaco-type tank housing giant gouramis, arawana and oscars. Its base is below floor level and the water surface comes only half-way up the viewing panel. Above water is a well-planted 'jungle river bank' lit by daylight from the windows in the roof, and below the surface a lengthy view of the underwater scene is given.

The use of internal curved backgrounds in many of the tanks promotes variety in display and removes much of the 'tank' effect. A sea water aquarium housing some large batfish and a grouper shows how an optical illusion can be achieved by utilising the area behind the tank—a centrally placed light outside the tank illuminates

polystyrene 'coral' and seen as this is through an arch of rock inside the tank the impression given to the viewer is that of looking out through the entrance of a cave to lighter seas beyond. In the freshwater section the piranha tank is another pleasingly arranged aquarium with *Ambulia* growing to an impressive height from base to the water's surface.

Gro-lux lighting is used over a number of the smaller tanks, where the effect is likely to be most impressive, such as over the goldfish tank; and its use over a tank of *Herotilapia multispinosa* gives a splendid effect, picking out their brilliant red eyes set in their golden sides. Another skilfully lighted exhibit is that of the blind cave tetras—the low level of lighting overall is relieved by one ray of bright 'sunlight' shining down into the water depths, in which the creamy coloured fish suddenly flash into prominence as they swim through.

Average number of specimens on view in the aquarium today is 3,000, comprising some 350 species, and there are usually some 'special attractions' featured to draw the crowds. A large octopus and a leopard shark have been such exhibits in recent weeks.



by
ARPEE

Personal COMMENT

PENCILFISH are a small, select group of fishes which far too many aquarists completely fail to appreciate. This is perhaps because several of the species are rather frail, some are unpredictable, and all are said to require soft water. There is some truth in all this, but provided that solid-bodied specimens are obtainable, a fair measure of success can usually be obtained after what one should regard as a rather tricky running-in period. Some really gruesome and misshapen fish do seem to reach dealers' tanks far too often, and they should be steadfastly refused, as their chance of survival are virtually nil. Given that the selection and conditioning process can be carried out properly the pencils have the looks which few other species possess, and so long as they remain in good health, their brilliance and perfection are a joy to see.

One particular species eluded me for many years, and I was therefore very pleased to acquire some five-barred pencils—for such they were—somewhat unexpectedly about a year ago. The initial impact of *Pencilobrycon espei* was, I must admit, something of a disappointment: I was examining the contents of a dealer's tank and only became aware of their existence after having turned away from other fish whose identity has now completely faded. A group of gleaming, fawn-coloured fish gradually made their presence felt—perhaps it was the five black vertical bars on each of their sides which had caused them to fade into the background of a tank mainly planted with *Vallisneria*, or perhaps it was their calm, poised attitude which made them less prominent than one would have expected them to be. There was no doubt, though, that they were more than worthy of a trial, even at what seemed to be a rather high price, and I bought a quartet because it was virtually impossible at the size they were to sex them reliably.

I quarantined them for the full 14 days period I now allow, and there was never a problem. They accepted all small food I gave them—crumbled flake, newly hatched brine shrimp and finely cut whiteworm. They spent this 2 weeks in a small floating tank containing water from the tank for

which they were destined. It was old and fairly soft water and maintained at about 76°F (24°C). After release into their final home I lost one, but how this came about remains a mystery. They were then a little under an inch, and are now nearing 1½ inches, which is not a spectacular growth rate in the time I have had them. The book says they should grow on still, but I have my doubts as they have remained at their present dimensions for some time.

They have held their own against fish many times their size, and have shown up well as individuals, though in a less spectacular way than others of related species. A characteristic which always strikes me as giving them the edge over many of their kind is the comparative chubbiness of their body—certainly it is much more solid and more square than is usual with the pencils. They are, of course, dwellers of the upper water, and here they mingle well with the numerous small fishes which favour this position, and the conspicuous markings they bear sometimes bring them into prominence, and at others enable them to achieve the obscurity they are no doubt seeking.

As breeding is not part of my programme I usually make no special provision for this, but these fish have spawned on a number of occasions in the community tank, and I fancy they would prove to be quite a good bet if allocated suitable quarters. McInerney & Gerard recommend a layer of peat on the tank bottom and soft, peaty water. Riccia or a similar floating plant to accord shelter for the fry seems to be the only other suggestion, other than the use of a well-conditioned pair. They clasp and twist in the mating process, and the minute eggs are scattered in a stream which gently drifts to the tank bottom.

The five-barred pencil seems to present a good opportunity for the breeder who is willing to depart somewhat from the ordinary. It is a pity that the quantity of each spawning is not quoted as being very high—less than a hundred, in fact. Nonetheless, the scarcity of this species and its present high price will guarantee to those successful in breeding it a very quick disposal of all surpluses at rather better reward than is usual. But who would really want to sell fish like these?



I suggested recently that, for economic reasons, we should consider to what extent we could make use of aquaria with only half their intended quota of water. I also had at the back of my mind the way in which some of the applications of this notion might appeal to younger aquarists, who are nearly always willing to turn their hands (and

heads) to something new and are refreshingly less affected by conventions than are many adults.

The simplest application is, I suppose, the temperate vivarium complete with miniature pond containing a newt or so. I refer, of course, to the home-made article (ready-made vivaria are no fun at all, and I hate to think what they would cost nowadays). Something about the size of a standard 3 foot aquarium is a splendid start, though something deeper would enable one to incorporate a pool up to about 6 inches deep. An establishment of this order should not prove too difficult for the average boy to knock up, aided by father, and even if it fails as an ecological masterpiece, experience in the use of hammer and nails and so on will have made the effort worthwhile on this count alone. I got immense pleasure from an uncomplicated newt vivarium, though with hindsight I would have done even better had I contrived to include some tiny fish in the same setpiece. As it was I built up a miniature landscape using the raw material which lay around me in the garden and the nearby forest, and the great thing about it all was that it was mine to do what I liked with, and no one interfered.

Such small beginnings as these are good practice for more ambitious schemes in later life, and they provide many opportunities for variations dependent on taste and pocket. Tropical vivaria can be developed (these will probably entail the use of soil warming cables), and not only do they bring with them a change of potential tenant, but they also encourage one to experiment with plants and more exotic backdrops so that maximum impact may be derived from the investment. The balance so far is in favour of terrain, at the expense of water, but after some experience it may be found that one's taste turns the other way, and that what is really wanted is a lot of water and a little of what goes round it. The stage is thus set for the half-full aquarium supported by more than the usual quota of plant life and rather less than the usual quota of fish. The latter, incidentally, is not due solely to the fact that the tank has only half its normal supply of water (this would be of little account as it is the surface area that matters), but also to the need not to subordinate the plants to the fish.

There are numerous ways of setting about the process of creating a scene of half land and half water. Some aquarists build rocky ramparts on to a conventional basic arrangement of sand or gravel, and incorporate waterlogged cork bark and similar natural substances to an amalgam into which plants or groups of plants or other features can be fitted. The way in which this is done is largely dictated by individual flair and ingenuity, but one thing is quite certain: before attempting this type of project it is important that

all or most of the plants, be they submerged or otherwise, should be purchased and prepared for planting before the event. It is no use at all being pinchpenny about the plants, either, and you should be prepared to spend perhaps £20-£30 at a specialist plant suppliers, because otherwise the whole effect is likely to turn into a monumental flop.

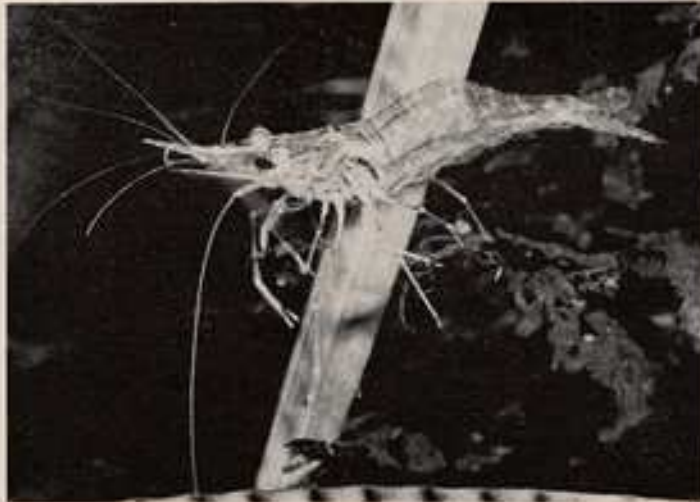
The advent of fibreglass has now made it possible, for those who are able to manipulate it, to create 'platforms' to mount on the sand or gravel bases. These are equipped with channels, nooks and crannies, some for the reception of plants, and others large enough to hold containers of large plants or groups of smaller ones. The above-water section would enable, perhaps, grasses or mosses to be woven into the scheme in such a way that no single sign of artificiality may be seen to exist in the finished article.

These are simply suggestions as to how to set about a project of this sort. It is as well that there are so far no standard ploys and no conventions other than the one which runs through most of our fishkeeping activities—namely, that the aim shall be naturalness.



Some time ago I wrote in fairly disparaging terms about the long-term effectiveness of the silicone sealants now used extensively in tank construction. Whilst I remain unconvinced that they are as permanent as their manufacturers claim, there is no doubt that even hamfisted handy men like me can make passable aquaria when guided by the Cliff Harrisons of this world. Nevertheless I still look rather nervously from time to time at the tiny being I created some time ago and wonder when it will release its contents upon the sitting room floor. It was with some relief that I heard recently of a case of an enthusiast who had constructed a giant tank by this method. When filled with water it had held together overnight, but on the following morning, there was a most extreme unpleasantness, for the front panel had split. For Doubting Thomases like me this was most reassuring, for the joints had in fact held together, and had a greater number of reinforcing bars been incorporated, as like as not there would never have been as much as a drop of water on the carpet. It was perhaps a little foolish to have made a monster tank using this technique, but I have no doubt that there are certain conventions readily enough available if those intending to scale such heights made their intentions known well in advance. Those with problems of this sort could drop a line to the Editor.

Malayan Freshwater Prawns as Aquarium Inmates



The transparent freshwater prawn rests on a water plant.

By W. A. TOMEY

Photographs by the author

ALMOST transparent, with constantly moving feelers, a very unusual animal stands on a tiny stem on the tropical aquarium base: it is one of the freshwater prawns from Malaya that I found among a number of imported fishes. It's not very often that we find any of the lower animals, except perhaps for snails and various planktonic creatures used as live foods, in our freshwater aquaria— seldom prawns or shrimps. But the marine aquarist, on the other hand, often starts off by keeping these lower animals (invertebrates) to acquire the experience needed before moving on to keeping the marine fishes.

Prawns are found throughout the world, in tropical and cold water, in brackish and fresh, and in still or slowly running water. The genus *Macrobrachium* is divided into more than 100 species, most of which are to be found in a very

localised area and which can sometimes be differentiated by the size of their pincers. The tropical species are likely to do best in your tank, will remain alive quite a long time and even, if they are kept correctly, reproduce. But even if they don't achieve this, they are very rewarding objects to study.

The most obvious characteristic of these invertebrates is that they have no internal skeleton at all, but only the external one that we call the 'shell'. The body is divided into the head/breast part (cephalothorax) and the hind part (abdomen). The head is provided with movable eyes on mobile stalks, one pair of long (longer than the body length) and two pairs of short feelers, three pairs of so-called 'jaw-legs' and five pairs of 'running' legs. The first and second pairs of these are provided with pincers, the second-pair pincers

always being larger and stronger than those of the first. The cephalothorax is a strong, one-piece armour and the abdomen has six armoured segments and a paired terminal structure.

This 'armour' is made of horny material, 'chitin', and growth would be impossible for the prawn if it were unable to discard it—which is why the crustaceans have to change their skins.

Under the first five hind segments of the abdomen there are five pairs of remarkable 'swimming' legs, all of which can be moved separately in a wave-like movement. Each leg is made up of a short broad peduncle with two flat, leaf-shaped appendages. The sixth segment of the abdomen carries the two lobe-shaped terminal pieces that are used as stabilisers when the animal is swimming. As creatures with ten pairs of legs, prawns are crustaceans classified as decapods.

Breathing is accomplished by the aid of gills, which extract oxygen from the water, located under the back carapace above the bases of the legs. The dorsal carapace thus protects the gills and forms the gill cavity. A mouth appendage, moving with great rapidity, creates the continuous stream of water passing through the gill cavity.

Macrobrachium lanceolatum occurs widely throughout the whole Malaysian peninsula including Singapore. In the northern part of its range it even reaches the lowlands of Thailand and Burma, and it lives and breeds in slow-running fresh water chiefly in rice plantations and fish ponds. It can survive the most varied conditions—a water temperature from 77° to 91° F. (25-33° C), oxygen content from 1% to 88%, and acidity from pH 4.9 to 7.6. Males can hardly be distinguished from females—if it's bearing eggs it's a female!



One of its most remarkable characteristics is the 'rostrum' projecting between its eyes, with five to seven teeth on the upper edge and about three on the underside.

The shrimps mostly live near the bottom of the water and are not in any way 'dainty' feeders. They catch the food, dead and live animal and vegetable material, with their pincers and carry it to the mouth with their various 'legs'. Since they are so transparent it is particularly easy to control their feeding in the aquarium tank. For instance, when midge larvae (bloodworms) are fed, which are eaten dead as well as live, the



Top of page: the enormously elongated pincer-bearing legs gives the genus name *Macrobrachium*, literally 'large arms', to these freshwater prawns.

Left: microscope picture of developing eggs of *Macrobrachium lanceolatum*.

Right: a newly hatched prawn seen under the microscope.



internal organs turn red, with Grindal worms, white, and with vegetable food, green. In the wild they will probably be feeding on animal and vegetable detritus, dead insects, dead fish, leaves fallen into the water, algae, all sorts of small planktonic animals and perhaps other prawns of their own species and their larvae.

If small *Macrobrachium lanceolatum* are fed correctly it is easy to watch their growth in the aquarium because of their regular skin changes, when they leave their transparent, empty armour on the gravel. The skin-changing process is an extremely complicated one. Suffice it to say that all the legs, jaws, feelers, appendages and 'catching' organs, and even the eyes, go through this process. Some days before it takes place the prawns are 'dull' and lethargic, releasing a great deal of fluid substance that makes them smaller and their shell too large.

You can watch the prawns 'bending' themselves with the contractions of their powerful dorsal muscle and see the old armour beginning to loosen. Greyish-white spots appear on the old skin as it is shed. As soon as it is off the prawns take water in again and increase in size—but this occurs at night! They quickly seek a safe place in which to hide where they will not be very easily seen—holes under stones or in among the plants are where they are likely to be found. They are very fond of their old carapace and will often eat it; possibly it contains material which is physiologically important to them.

The mock fights, mostly performed by the males, are also interesting. The creatures stand on their legs with their open pincers directed at their opponent until one of them turns aside and runs away. The regenerating power of lost appendages is also very important and well developed in prawns. When the skin is next changed the injured limb will be entirely healed. At the start, the new limbs are still small and hardly functional but after several skin changes they will be back to normal size and in full use again.

Most types of prawns are extremely clean animals devoting much time and attention to their toilet. For this purpose the first pair of 'running' legs are unbelievably pliant and are fitted with very tiny short-haired 'cleaning brushes' at the base of the pincers. Because their legs and body are so flexible, the prawns can reach the most remote parts of their body to clean them by means of the 'brushes'. The mobile eyes are also regularly cleaned, and the spaces between the swimming legs inspected and cleaned if necessary.

The breeding process is very interesting and can be seen easily enough in the aquarium. Several members of the prawn family that spend their whole life in fresh water lay a few big eggs but in the brackish and salt water species the eggs are

mostly small. To fertilise the eggs the male deposits a mass of spermatophores on the underside of the female or, depending on the species, into a specially designed receptacle, and these spermatophores retain their capacity to fertilise eggs for months. It is quite likely that there is a relation between the female's skin change and the appearance of eggs in the breeding cavity. Experienced amateur aquarists have observed that the appearance of eggs in this cavity mostly occurs 1 or 2 days after the skin has been changed—sometimes even at the same time. Possibly this links up with the fact that the female's armour is still soft, and so the eggs could pass through an opening in it quite easily, whereas this might no longer be possible once the carapace has hardened. As they are being laid the eggs are fertilised through contact with the spermatozooids.

The female's ovaries are found in the fore-body and eggs from these pass through openings near the third pair of legs. While depositing the eggs the female stands high on her legs with her 'swimming' legs spread out to form an enclosed space. The 'hair' fringes along the sides of the legs then play an important role. The 'swimming' legs are bent forwards so that the front ones reach the egg-opening and the released eggs reach the breeding cavity by means of them.

Macrobrachium lanceolatum lay 30-40 eggs. They are a dirty green colour and adhere together by means of some sticky substance. The eggs are turned regularly and the breeding space is meticulously cleaned all the time. When threatened the prawns can still hold firmly on to their eggs, even jumping above the water surface with them.

Hatching takes a variable time, depending on the temperature of the water. Thanks to the mobility of the prawn's legs the eggs are supplied with slowly running oxygenated water. As a rule, the development time for the eggs in those species that lay a great number of small eggs is short, and after hatching the larvae go through a number of stages and change their skin frequently. Their appearance changes until finally they end up looking like an adult prawn. In those species that lay a few large eggs the development is longer and there are not so many larval stages.

I could see the development of the eggs carried by the female in my tank quite clearly, with the eye of the larvae being visible through the egg membrane. If the eggs are not fertilised the female will usually eat them after two weeks. The newly hatched larvae are also dainty titbits for the parent crustaceans! Possibly because they are in captivity and the exact life-support

Prevention and Treatment of Diseases of Fishes

A recent Conference in the U.S.A. looked at the problems of fish disease

FISH fanciers in America spent nearly \$700 million on tropical fish, fish food and aquarium supplies last year. The United States annually imports some 600 million tropical fish to meet the demands of an estimated 50 million people who buy them.

The economic importance and widespread appeal of tropical fish collecting were underscored recently when importers, retailers and fish distributors from throughout the nation and Mexico gathered at the University of Georgia for a conference on tropical fish diseases. Sponsored by the University's College of Veterinary Medicine and the Pet Industry Joint Advisory Council, the conference featured such topics as the causes, prevention and treatment of fish diseases and environmental control of fish.

Dr John B. Gratzek, professor and head of the medical microbiology department in the veterinary college, who helped organize and stage the meeting, said that despite all the interest in tropical fish as a hobby: "Many people are not aware of some of the practices required for optimum health of fish".

To maintain healthy fish, the professor advised, hobbyists should first be certain they buy healthy fish. "Buy from reputable dealers, check to see that the fish are eating well, have no white spots and that their fins are complete, and ask if the fish have been treated for external parasites," he said.

Water Conditions

Gratzek stressed the importance of good water filtration in aquariums. "Owners should remember that the waste products of the fish are toxic to the fish and can only be broken down by bacterial action in the filter," he said. "It takes about 25 days after an aquarium is first set up for the bacteria to get established. Therefore, only a very few fish should be put in aquariums for the first 20 to 25 days."

Gratzek recommends that filters be cleaned by

lightly rinsing them in tap water, rather than in soap or hot water, so as not to kill bacteria growing on the surface.

Aquarium owners should secure one of the many books sold in most pet stores and written specifically on fish diseases, Gratzek said. But he cautioned that people should seek expert help when their fish become sick rather than experiment with home treatments which may or may not be effective.

"Fish can get sick from many causes," Gratzek said. "Fish diseases are as complex as the diseases of other animals, maybe more so, because fish are completely dependent upon their environment. Poor environmental conditions for particular species of fish could include pH (acidity or alkalinity) extremes and ammonia nitrite and nitrate levels. Bacteria tend to accumulate as nitrate levels increase, and consequently, about 10 to 20% of aquarium water should be changed weekly or at least biweekly. This frequent water change will also tend to reduce the growth of algae."

Common Diseases

Three common tropical fish diseases are fin and tail rot, 'ich' and worms. "Fin and tail rot is a complex disease caused by poor water quality, excessive waste products, parasites and bacteria," Gratzek said.

'Ich', or ichthyophthiriasis, produces white spots and mucus on the gills, causing fish to suffocate. There are several cures, but Gratzek recommends the medications and remedies available through aquarium stores. Flat worms and round worms invade fish in a variety of ways, and can predispose them to bacterial infections, he said.

Sometimes a disease can be imported with the fish. The United States annually imports about 600 million fish, Gratzek said. Approximately 80% come from the Far East, 15% from South America and the rest from Africa. Fully 90% of all aquarium fish in this country are imported.

Gratzek said the industry realises the danger of hazardous organisms coming into the country along with fish, and tries to police itself rather than being forced to this by government regulations.

"We're living in an era of ecological consciousness and the pet industry is interested in finding out if anything is being brought into this country that might be a threat to our public health and animals, including fish," he said.

One safeguard is continuous research, such as is performed by Gratzek and other professors in the University of Georgia College of Veterinary

Veterinary college professors have been teaching and researching fish diseases for 6 years. Most of the research has been on catfish disease because catfish production is an important new industry in Georgia. More recently, however, pet industry grants have allowed the research to be extended to aquarium fish "to make sure importation of fish is not a threat to American fish, including channel catfish and trout," Gratzek said.

The college also offers diagnostic services for fish disease problems through the North Georgia Diagnostic Assistance Laboratory.



Photo: BRAZ WALKER

Channel catfish (*Ictalurus punctatus*) is one of the fishes of economic importance in the U.S.A. and is the subject of research into diseases that affect it.

Medicine. Last year the Pet Industry Joint Advisory Council gave the college \$25,000—and this year a \$30,000 grant—to test water and fish samples provided by importers. So far, the studies have shown that contamination by organisms potentially dangerous to human and animal health is no more common in the foreign water and fish than in the U.S.A.

The tropical fish disease conference was an outgrowth of a catfish disease meeting held 2 years ago by the veterinary college. Both conferences are part of the college's service programme, which offers the expertise of college faculty members to professional, producer and consumer groups in the state and around the country.

Malayan Freshwater Prawns

continued from page 283

system is missing, the development of the eggs in my tank seems to stop and no fully developed eggs have hatched out. These are always finally cleared away by the female. It is difficult to pinpoint the exact reason for this as so many factors could be operating here, but I have never succeeded in having the eggs progress beyond the fully developed stage in my tank. No doubt rearing the prawns from the egg stage would be very difficult because we know so

little about the correct food required. Possibly brine shrimp (*Artemia*) nauplii might be useful here. We also know that many larvae die at the first skin change. However, a Dutch aquarist in Amsterdam noticed, when re-installing his tank, that 72 young prawns had developed in it without one larva having been seen and therefore with no special measures taken to preserve them.

From what I see in my own tank, *M. lanceolateri* are not very keen on light and become more active after nightfall, so it is not very easy to observe them anyway. There are thus a lot of questions concerning these prawns still to answer and there is a wide field for aquarists to investigate here.

COLDWATER SCENE



By FRANK W. ORME

Autumn Cleaning for the Garden Pond ● Cold Conditions Give Vigour

HOW the night starts earlier and autumn has tinted the leaves of trees—reminders that the year is drawing to a close—the wise pond owner will take time to clean the pond in readiness for the winter. The days should still be warm enough to make this task not too unpleasant if a fine weekend is chosen. I believe an autumn clean-up to be preferable to a spring clean. It affords the opportunity to inspect the fish and give treatment to any that may require such attention. Overgrown plants can be thinned out without causing any setback in their growth. Most important is the fact that by removing the accumulated silt, and other decomposed matter, the likelihood of pollution if the water surface becomes iced over is very much lessened. All in all the work will benefit the fish by providing them with clean healthy winter quarters, and the thick ooze, from the pond bottom, will provide nourishment for the garden.

Commence the preparations the night before the pond is to be emptied, by filling suitable containers, such as buckets or bowls, with clean water. Place these near to the site of operations, so that by the next morning the temperatures of water in both the containers and pond are very near equal.

The work of cleaning the pond is begun by baling, siphoning or pumping the water out of the pond into a drainage point. When the water level has been lowered sufficiently to make catching the fish a reasonably easy job, the fish can be netted and deposited into the containers of fresh water.

If your plants are growing in pots they should be lifted out, as they become accessible, and hosed down to remove all slime, mud and algae. Remove any dead parts and place the pots under a sheet of polythene or wet newspaper, to prevent excessive drying. Continue to catch fish and remove plants as the water drops, until the silt is reached.

The muddy silt should be baled out and then inspected, to make absolutely certain that it does not hide any fish, before disposing of it on the garden. Although this muck is likely to have a strong marshy smell this will soon disappear in the fresh air. When the pond has been completely emptied the sides and base can be scrubbed clean. Hose the sides down again and then empty

away the collected dirty water. Repeat the hosing and emptying until the water that gathers is clean. All that remains is to refill the pond and return the plants. Having completed this, the hardest part of the operation, the fish can be looked at for signs of any damage or disease before their return.

★ ★ ★

If you are fortunate, and the pond management has been good, when you look at the fish taken from your pond you may find them all in perfect health. However, if this is not the case the fish should be given the appropriate treatment for the complaint. The more common troubles are easily dealt with.

Torn fins, missing scales. Probably the result of earlier spawning activities. Nothing serious and will heal naturally with time. If you wish, the fish can be treated in a salt bath (1 gallon of water in which two teaspoonsful of salt have been dissolved) for 12 hours.

Fungus, fin rot. Make a treatment bath of phenoxethol as follows: first make a 'stock solution' of 1 cubic centimetre of medicament mixed into 99 c.c. of water; and 90 drops of the stock solution to each gallon of fresh water. The fish can be kept in this bath until cured.

Anchor worm (*Lernaea*), fish louse (*Argulus*), flukes. Nowadays a proprietary medicament makes treatment of these troubles a fairly simple matter. Obtain a bottle of Sterazin from your aquatic dealer. Follow the instructions on the bottle and a cure should be effected.

Having inspected the fish and given treatment where necessary, the fish can be floated in containers in the pond to equalise water temperatures after which they can be released. If a net, of three-quarter inch mesh such as Netlon, is placed over the cleaned pond many wind-blown leaves and debris will be kept out of the water.

★ ★ ★

In preparation for winter, feed your fish at more frequent intervals. The idea is to build up their fat reserves by fully satisfying the appetites of your stock. It is upon these reserves of body

fat that the fish will draw to sustain themselves during the period of dormancy induced by the cold temperatures of the winter. As and when the water temperature falls to 45°F (7°C) food can be withheld. By allowing fish, whether outside in a pool or in fish house tanks, to be hardened by really cold conditions you will find that they will come into breeding condition much more quickly than those which are pampered and will normally display an obvious vigour when driving the female.

The foregoing remarks apply to ponds of reasonable size, with a depth of at least 18 inches. Fish kept in small ornamental pools, of less depth, will be safer if brought indoors for the colder months that are ahead.



During July my best adult lionheads were caught and placed in a plastic swimming pool, in the garden, in order to condition them for the Birmingham Aquatic Festival during August. A net was placed over the pool to keep the fish safe from cats and birds. Alas—I had not considered a friendly pigeon dangerous. This bird caused the family some amusement as it carefully worked its way across the net until sufficient net sag allowed it to drink. This performance took place frequently during the following days.

Rising early one Sunday morning during early August, after a particularly warm night, I visited the pool. A shock awaited me: the water looked slightly milky and the fish were laying at the surface, on their sides, feebly breathing. Quickly they were placed into a tank of clean water and strong aeration was applied, but to no avail. By the end of the day all were dead, apart from one yearling male. The cause of the trouble was that the pigeon had severely fouled the water with droppings and the warm night created the dangerous condition. So—beware the friendly pigeon. These birds are now no longer welcome visitors to my garden!



During August the first Midland Aquatic Festival was staged by the Midland Aquarium and Pool Society in Birmingham. This was in fact the 'new look' Thirty-First Midland Show. It was a great improvement on the shows of the past few years and appeared to provide a display that interested the public. The exhibits covered herpetological, marine and freshwater interests. The main exhibition was devoted to society exhibits displaying various fishes, traders' and associations stands.



Furnished aquaria and fish entries by members of Delson AS were assembled in the form of a barge at this year's Midland Aquatic Festival in Birmingham

In the centre of the Hall was a comprehensive array of coldwater classes—22 classes in all—which attracted a great deal of attention. This was a good start for, hopefully, many successful festivals to come, and certainly future shows should be worthy of support by the trade, competitors, societies and the public. Unfortunately, as the organisers are now aware, the show programme was merely 10 pence worth of advertisements. How much better if the style of the previous show programmes had been retained and a schedule of classes, which listed the exhibitors in each class, together with the advertisements, had been produced. Despite this criticism, which I am sure will not occur again, the organising Society is to be congratulated upon a job well done.



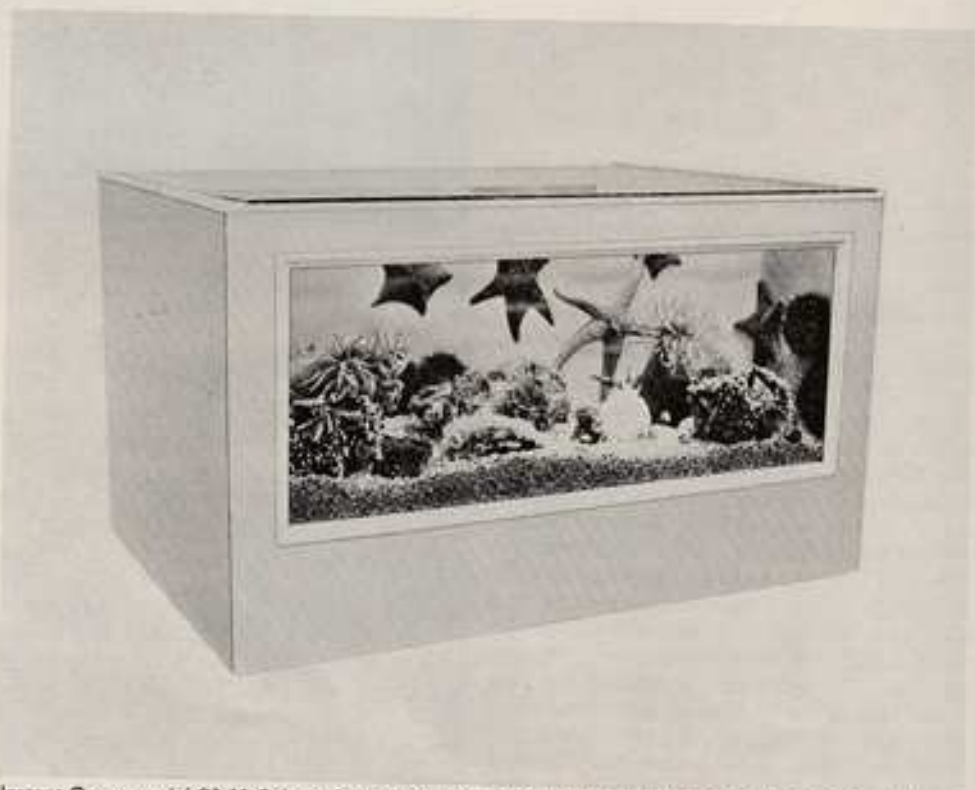
At 'Beum' I had the pleasure of meeting many old friends and a number of new ones. Inevitably the conversations covered many aspects of keeping and breeding fancy goldfish and the general opinion was that quality of young produced this year has, in the main, not been good. A number of breeders reported, as I have found, that the season's spawnings had resulted in fish of a quality inferior to the standard normally raised. In each case it seemed there was a fatalistic acceptance with a resolve to do better next year. Such is the determination of the dedicated breeder of the fancy goldfish!

What's New?

Self-contained Marine Unit

ing any environmental temperature from tropical to near freezing. This American manufacturing organisation undertakes to design and build equipment for special needs 'from minnow tanks to whale pools, from visual teaching aids to artificial oceans' and their slogan is 'If it lives in water, and you need it, we can provide a home for it'. The designs range from tanks such as the 120-gallon circular Instant Ocean Culture System that was originally made for the Dayton Museum of Natural

concealed within the unit, which is made of finest quality epoxy-sealed marine plywood and plastic materials. All that is required, apart from the marine animals, are Instant Ocean Synthetic sea salts and Filter Mix. All the parameters of the environment such as temperature, oxygen, pH buffering, and removal of carbon dioxide and nitrogen wastes are controlled, so that only a minimum of maintenance is required and it is virtually automatic in operation. Overall dimensions are 21½ in. deep,



Instant Ocean model CS-30 Culture System (handled in the U.K. by Laboratory Equipment Consultants, 1 Shore Road, Ainsdale, Southport, Lancs.)

FROM **Aquarium Systems Inc.** (33208 Lakeland Blvd., Eastlake, Ohio 44094) comes news of a new 30-gallon self-contained aquarium unit designed for the maintenance and culture of marine organisms under laboratory-controlled conditions. Manufacturers of Instant Ocean Synthetic Sea Salts and Instant Ocean Marine Filter Mix, Aquarium Systems Inc. specialise in marine aquarium installations for display, teaching and research which operate on a 'closed' circulation/filtration system capable of maintain-

History, Dayton, Ohio and the 200-gallon trapezoidal Instant Ocean Culture System first developed for the Aquarium of Niagara Falls, to the Lobster Stream developed for the short-term maintenance of lobsters in restaurants, hotels and retail stores.

This latest model, the **Instant Ocean Model CS-30 Culture System** contains a completely closed circulation system with a unique sub-gravel filtration device and a newly designed thermostat control sensor. All working components are

30½ in. wide and 18 in. high. Shipping weight is 156 lbs.

Motor Filter

THE Aqua-Joy Enclosed Motor Filter, latest addition to the Interpet range of aquarium filters (Interpet, Curtis Road, Dorking, Surrey RH4 1EJ) is designed specifically to accommodate a new German motor filtration system that incorporates

the use of a special pad to encourage biological filtration within the filter box itself. The use of the special pad (supplied with the filter) does not, however, preclude the use of ordinary filter media since the design consists of two filter chambers, one for the ordinary filtration media that the fishkeeper might

normally be using, and the other for the biological pad or special media such as peat or ion-exchange resins. The filter is designed with a special pump system that the manufacturers explain gives a silent, extra strong and trouble-free motor system whilst enabling the motor to be tucked away neatly under the main part of

the filter box. The box has a filtration area of 28 square inches and the filter's output is 230 litres per hour (about 52 gallons), at a consumption of only 10 watts. Ease of maintenance has been carefully catered for and aquarists will be grateful to learn that spares are available.

MARINIST'S Notebook

By ROY PINKS

WE are all interested in the variations of technique which take place in aquarium keeping. This is not to say that we follow, slavishly, every change of direction we read about, but it is certainly true that there is much food for thought, and for discussion, too, in the opinions and developments of other people. Stephen Spotte, in his latest publication *MARINE AQUARIUM KEEPING* (reviewed in PFM, January, 1974), carries out a masterly and most economical survey of the tropical marine technique, and I have no doubt that many readers will prove to be as surprised as I was about what Mr Spotte regards as the essentials. He appears to settle for much less than one would have expected, and such things as power filters and ultraviolet radiation are put in their proper places. It will be noted that he seldom condemns a particular application, but he qualifies it, and it is right that such fairness should exist in this unproved subject.

Once again we have some emphasis on the need to carry out regular and appreciable water changes—I have recently drawn attention to this increasingly important matter—and it seems that all the evidence points towards the proposition that frequently changed water and healthy marine fishes go together. But what is a 'healthy' fish? Is it a fish which goes from strength to strength over a period of, perhaps, a year, and then suddenly dies? Is it, alternatively, a creature which just about gets by, and somehow survives for 3 years or so? Is it a fish which goes through the breeding routine? It is clear that a definition is not easy, but I would have thought that most of us would settle for 'a healthy-looking fish which lived for 3 years or more'. If this is any criterion we will surely have many marinists claiming that they have such (or more likely 'had') in their possession, and if this is indeed so, how come that these managed to live

so long, whilst others failed, in the complete absence of any water changes?

My own feeling is that longevity is about the only convincing yardstick, as if any of the other attributes are missing, marines are not all that indestructible that they will tend to survive against the odds. Thus if a fish has lasted for 3 years or more, it probably reflects the fact that it has been living in optimum conditions. Perhaps it would be worthwhile collecting evidence about length of survival in order to build up some sort of picture about what is important and what is not. I should be very grateful for any information marinists could send me, and if there is enough response I will attempt some form of tabulation for readers, in due course. This will not just be a list of what the supposedly hardier fishes are, but some indicator about whether and how some of the more touchy species survive in the hands of more talented aquarists than most of us are.

I was greatly interested to hear from Keith Hobbly of Wrexham some time ago on the subject of Moorish idols, and indeed he had done superbly well with them. I have no doubt he will respond to this article in the context of water changes as they might affect this species; as this would be a most useful piece of information to have. We should perhaps remember that the home aquarist and the dealer normally employ quite different techniques, perhaps unconsciously. The former will tend not to change tank water. The latter is constantly doing so by having to make good those precious pints he gives us with our purchases, quite apart from those which he discards as part of his domestic routine. Therefore, if water changes are to account for something, the home aquarist must be at least on equal terms with the dealer before he starts lodging his all too numerous complaints about the quality of the fishes he buys.

Dwarf Cichlid Spawning



Pelmatochromis thomasi

WHEN I first wrote about this fish several years ago I commented upon the correctness of its being designated *Pelmatochromis*. Why was this? Because this wonderful African member of the great cichlid family seemed in no way, either in character or spawning behaviour, typical of the *Pelmatochromis* genus. Since then, several species of *Pelmatochromis* have been transferred to the genus *Pelvicachromis*, and so it is possible that this fish will also one day change its generic name. The various species of *Pelmatochromis* we know, of course, come from Africa, but when I observed the *P. thomasi* in my community tank I found it difficult to believe that this was not a member of the *Aequidens* genus. It reminded me of the explanation of my geography teacher at school that, in the early days of the world's history, Africa was joined to South America as one continent. So perhaps certain species or even families are common to both continents. Anyway, these were the thoughts running through my head as I sat one evening in front of my community tank.

Although classified by Boulenger in 1951, it was only in 1962 that Herr Roloff captured some *P. thomasi* in the Sierra Leone region of Africa and brought them back. My fish were obtained from a friend and soon took over the aquarium. After only a few days, a pair of them were guarding the tubifex worm container and woe betide

By RUDOLPH ZUKAL

Photographs by the author

Translated by F. MARSH

In the photograph on the facing page the male fish is the right-hand member of the pair. Here the flat stone selected as a spawning surface is seen being thoroughly cleaned

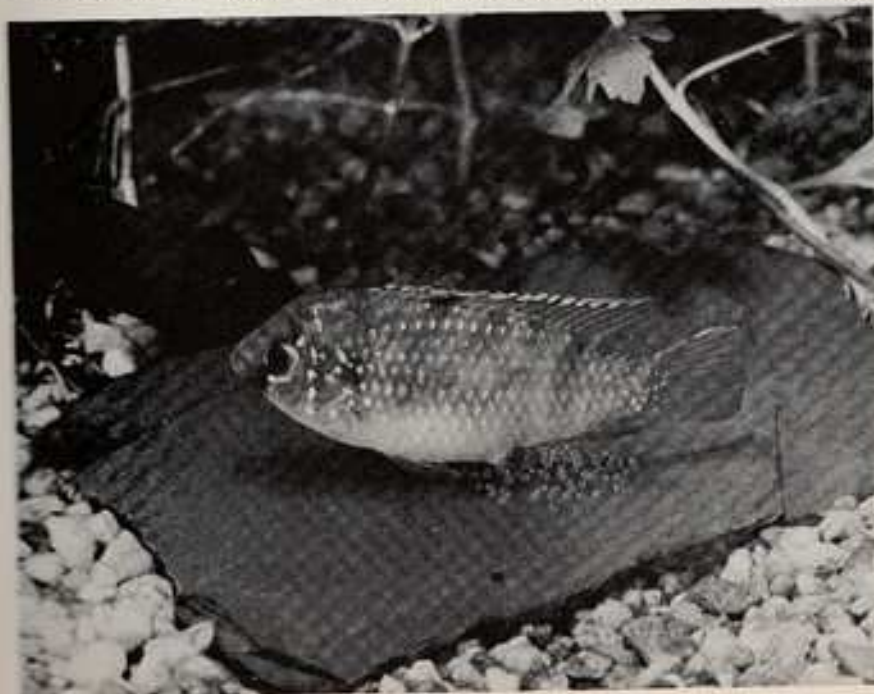


anything (or anyone, since they even attacked my hand) that came near. Grown *Cichlasoma spilurum*, *C. meeki* and *C. festivum* were prevented from feeding. This behaviour reminded me strongly of *Nannacara anomala*.

The female *P. thomasi* also showed threat behaviour, with a darkening of colour and with the diagonal stripes showing up clearly with excitement. Again I compared this with the behaviour of other

Pelmatochromis. This is something that the *Pelmatochromis* do not do. As far as I have had experience of them, *Pelmatochromis* are shy and seek hiding places: *P. thomasi* do not. Their behaviour resembles the genus *Aequidens*, or indeed many other cichlid species, but not *Pelmatochromis*!

Whether in a flowerpot or on a leaf or stone, the eggs were always laid downwards—that is to say the



The female is photographed at the time of egg-laying. Her tubular ovipositor, by means of which the eggs are separately stuck to the stone, is clearly visible



After the female has deposited some eggs on the stone the male fertilizes them by swimming close to them as his milk is released.

fish never spawned on their backs. One small difference, perhaps, from the genus *Aequidens* was that the *P. thomasi* pair never spawned in a joint action—they didn't move round the stone together but the male would wait at the side while the female laid the eggs and then fertilise them when the female had moved off; this they do alternately.

Anyhow, I don't intend to dogmatise, but you will see how observing one's fish can bring about

such ideas and reflections. That is why, personally, I find our hobby so fascinating.

As I said, I kept my fish, which grew to a length of some 2½ inches (6 cm.), in a large mixed tank and here they behaved peacefully enough except at breeding time. Their care and propagation presents no particular difficulties and the photographs illustrate aspects of their breeding behaviour.



The pair could not easily be displaced from the spawning site, and here the male is seen reacting to the movement of a glass tube lowered into the tank.

A Fully Aquatic Swordplant

By KARL RATAJ

Photographs by
RUDOLPH ZUKAL



Echinodorus maior

THIS plant, belonging to the water plantain family (Alismataceae), is usually known by the synonym names *Echinodorus martii* Mich. or *Echinodorus leopoldina* Hort. It comes from tropical Brazil (Goias, Minas Gerais, and especially from Leopoldina Valley).

It is a perennial aquatic plant with upright, 8 to 12 inches (20-50 cm.) long, stems. The inflorescence is racemose, having four to six whorls containing six to 15 flowers each. In the inflorescence young plants develop. The flowers are white, about 1/2 inch (1.5 cm.) in diameter.

The submerged plants form a firm rhizome from which light-green leaves with still lighter veins



The submerge (underwater) form of *Echinodorus maior* is shown in the larger photograph and to the right is an enlarged view of the flower stalk of the plant above the water surface.

arise. Leaves are 12 to 20 inches (30-50 cm.) long, the stalk (petiole) being as a rule very short; the leaf blade is 8 to 16 inches (20-40 cm.) long, its width varying greatly, from 1 to 3 inches (2.5-7.5 cm.). The leaves are leathery, spatulate (usually widest at the tip), and the margins of the blade are undulated.

Plants of this species cultivated in half-shade have very narrow leaves and resemble some species of *Aponogeton*. When grown in good light the leaves are broader and very ornamental and make this species rank with the most valuable of aquarium plants.

E. maior is always found submerged and grows poorly above water (emersed form). From a depth of 12 to 20 inches (30-50 cm.) it sprouts an erect

floral stalk 12 to 28 inches (30-70 cm.) long, according to the depth of the water, with simple (racemose) inflorescence. Often it will flower several times a year. The plant is self-fertile; it develops seeds readily, this manner of propagation being the most frequent. Propagation from root runners or by young plants arising in the inflorescence also takes place. New plants can also be obtained from the dormant buds on the rhizome.

This species is best cultivated in spacious tanks with soft to medium-hard water at temperatures of 68° to 77° F (20-25° C), and it is indifferent to greater falls of temperature. The bottom medium may be richer because *Echinodorus maior* never grows up out of the water. This species is not suited to paludaria and terraria conditions.

Readers' Queries Answered



Water Tank as Pond

I have had a water tank given to me—the size is approximately 45 in. by 34 in. by 34 in. and it is galvanized I believe. It was put into the ground for about one foot and I painted it with some black pitch-like compound. Now I've had it taken out of the ground because I am confused, with some folk saying not to keep fish in it and others saying I can buy a solution to protect the fish against rust. Can you advise me if I can use the tank and what precautions I must take?

It is true that under some conditions the use of galvanized metal containers for fishes is inadvisable, although in our experience an old tank of this kind that has been in use with water for some time does not give trouble. Is your tank an old one? If not, or indeed if you would like to offset the chance of interior rusting starting leaks, what we would recommend is to 'paint' the inside of the tank with a sloppy mixture of cement, sand and water so as to give a cement lining. Two coats will be needed and then when all is thoroughly dried the tank must be well soaked, and scrubbed before

final use. Less work would be involved if some black polythene sheeting (about 10 ft. square per piece) were used double thickness (two pieces) to lay inside the tank as a 'liner' (the edges can be turned over the top of the tank and secured under bricks or stone slabs when the tank is buried in the ground). It is unfortunate that the tank is so deep as this will mean raising the crates or pots used for water plants so that they have not more than about 18 inches depth to grow in (less for some species).

Clearing a Culture

Is there any way I can deal with the vast numbers of minute flies that seem to infest my white worm cultures each summer? I'm not certain that they harm the white worms but they are a very great nuisance when I lift the cover on the culture to feed the worms.

Leave the culture open to the light so that the white worms themselves dive into the dark earth for shelter. After an hour or so the surface of the culture should be free of white worms. Scrape the surface clean of

decaying food and apply a lighted taper to the surface of the soil. This should clear it of unwanted insect eggs that might be hatching there and should leave the culture clean, at least for a time.

Breeding Tiger Barbs

How do I know when to remove the parent tiger barbs from the spawning tank? I have lost two batches of fry but it is difficult to know when to remove the male and female. What would happen if they were removed too soon?

If the spawning sequence was coming to an end no harm would befall the parent fish if they were removed before it had completely ended. They might possibly continue to spawn, as they most likely would do if they were removed when the spawning fever was at its height. But the fish do indicate themselves when the spawning is nearing its end. The rest pauses between bouts of egg-laying get longer until finally the female shows no further interest and will no longer join in. Then the parents can be quickly removed.

Upside Down Oranda

I have a redcap oranda swimming with three other fishes in a 36 in. by 12 in. by 15 in. tank. The fishes are fed with earthworms and fish flakes and dried foods stirred into boiled porridge. For the last 2 weeks, I have noticed that the oranda has been behaving strangely; it turns upside down and seems to be resting at the bottom of the tank or at the surface like that. I cannot see any external symptoms of disease. It does

not remain upside down all the time and is capable of swimming as usual but I am worried that the strange behaviour may persist.

Although it is exceedingly difficult to diagnose with absolute certainty the cause of a complaint without actually seeing the fish, it is sometimes possible to make an educated guess—but though educated it still remains a guess: it is rather like asking a doctor the reason for little Johnny's spots without letting the doctor see little Johnny! However, the symptoms would indicate that the redcap oranda has a malfunction of the swim bladder. In goldfish, the swim bladder is divided into two sections which are connected by a narrow neck; by means of the swim bladder the fish can adjust to the varying depths of water in which it swims. The swim bladder is also, to some extent, a means of balance. The fact that the fish turns upside down when resting suggests that it has lost the means of balance—though the fish can rectify this when swimming by the use of the fins coupled with the forward motion which would act as a temporary correction of disturbed balance.

Without knowing more of the fish's history, i.e. how long you have owned it and, if recently purchased, whether it had been kept under tropical fish conditions, it is virtually impossible to say why the fish has developed this trouble, which may have been brought about by a number of causes. If previously kept in warm water it may be that it has been insufficiently acclimatised to the water temperature of its present tank and consequently has been chilled. A disease in which the volume of the internal organs is increased may be the causative agent or again it may be due to fatty degeneration of the bladder tissue.

Whilst a definite cure cannot be indicated it is suggested that if food is withheld for about 7 days, and the water temperature slightly increased, there may be some improvement in the condition of the oranda. If such an improvement does become evident the temperature should be very slowly reduced, over a period of days, until it returns to normal. At the same time, small quantities of food should be given including, if possible, feeds of daphnia. If, and when, the fish recovers under this treatment care should be taken that

it receives a varied diet and that chilling, by sudden changes of water temperature, are avoided.

Filters

Does it matter in what order filter media are packed in a large power filter? If it does, what order gives the best results?

Unless the manufacturers state otherwise, media should be placed in the filter so that the flow of water first meets a medium that will remove coarser particles of suspended matter and then media that deals with unseen (dissolved) waste substances. The water to be filtered must therefore first pass through a fibrous material such as nylon floss or glass wool, whose sieve-like action will remove the suspended matter. This sieve-like action will produce clear water, though this may yet be impure, just as a crystal-clear solution of salts of arsenic is lethal! It will still contain dissolved waste substances produced by the fishes in their urine that are harmful in too high a concentration and so the water must be passed over a material, usually granules of carbon, that will absorb these dissolved substances. Another reason why the water flowing over the carbon or carbon substitute should already have been passed over the 'sieving' material is that carbon granules themselves have some sieving action for fine matter although this restricts their effectiveness to absorb. Finally, if required, the water can be passed through the special resins that are available to remove specific dissolved solids in the water, or to stabilise water reaction (pH).

Hygrophila

Although ordinary hygrophila seems to grow quite well in my aquarium I have no success with the red variety. The leaves gradually fall off and I have never managed to keep it for long.

The plant often called 'red hygrophila' is in fact not a variety of hygrophila at all. The 'red hygrophila' you have is very likely to be *Alternanthera sessilis*, which does bear superficial resemblance to *Hygrophila polysperma* although its leaves are more lanceolate and longer. Like many so-called aquarium plants *A. sessilis* is not suited to permanent submerged growth and it

will also shed its leaves if water conditions are not to its liking. It will not thrive in alkaline water but must have soft, preferably acid, conditions.

Catfish at the Top

I have two Corydoras neneus which have taken to spending most of their time near the top of the tank. I cannot see that the bottom of the tank is polluted, which was my first thought. Is this just a passing phase or must there be something wrong with the bottom of the tank?

There are two possibilities here—the first is that conditions at the bottom of the tank have become, in some way, offensive to the catfish, or, secondly, that the fish themselves are sick. Although these catfish are able to utilize the hind-gut as an auxiliary air-breathing apparatus, they still require very clean tank conditions. In Nature they come, not from static water, but from slowly running streams. Poke the gravel at the bottom of your tank to make certain that it has not become polluted beneath the surface (if it has, it will have to be siphoned out) and thoroughly siphon over its surface, at the same time renewing about one-third of the tank water. Check for obvious diseases such as white spot or velvet, and if neither of these diseases is indicated, remove the fish to a small quarantine tank and place them in a shallow, light methylene blue solution to see if they return to their more usual behaviour.

Catfish Eggs

Over the last couple of days my catfish (tropical) has laid eggs on the side of the aquarium. Is there any way I can save these from the fate of being eaten by the other fishes such as the angel etc. I have placed a sheet of perspex in front for the time being but realise this will be no good if they do happen to hatch. Have you any suggestions?

There are two methods of dealing with the catfish eggs that you now have (we are assuming that your 'tropical catfish' is a *Corydoras* species). You do not state the size of the aquarium or the number of other fishes living in it, but perhaps the easiest way of dealing with the situation would be to protect the eggs where they are by using pers-

2. Mr K. Adams (SLADAS, 71); 3. Mr W. S. Clarke (Bury St Edmunds, 72). P: 1 & 2, Mr C. Kinslingbury (Runnymede); 3. Mr & Mrs Cooper (Corringham); Q: 1. Mr J. H. Preston (78); 2. Mr P. O'Bryan (89); 3. Mr J. Farber (Thurrock, 67). R: 1. Mr Reilly (74); 2. Mr W. Mason (Rochampton, 72); 3. Mr L. J. Brazier (69). S: 1. Mrs M. Nethersell (75); 2. Mr R. Sparling (Thurrock, 74); 3. Mr J. M. London (70). T: 1 & 2, Mr D. M. Chewright (75 & 72); 3. Mr R. Onslow (71). U: 1, 2 & 3, Mr J. Wylie. V: 1 & 2, Mr A. Lawman (Associated Goldfish, 74 & 72); 3. Mr G. A. Fleming (Associated Goldfish, 72). W: 1. Mr B. Peacock (78); 2 & 3, Mr & Mrs E. Fry (North Kent, 71 & 68). Xb-M: 1. Mr & Mrs Hubert (83); 2. Mr V. C. Green (Baffins, 82); 3. Mr P. Moye (81). Xo-t: 1. Mr D. Chewright (76); 2. Mr R. Onslow (75); 3. Mrs S. Jordan (Harlow, 73). Y: 1. Mr T. Taylor (76); 2. Mr E. Wooley (72); 3. Mr D. Chewright (71). Za: 1. Mr P. P. Brown (77); 2. Mr D. M. Chewright (76); 3. Mr T. Wooley (75). Zb-c: 1. Mr H. Junon (Thurrock, 76); 2. Mr J. Emptage (74); 3. Mr S. Molino (SLADAS, 72). B-M: 1. Miss R. Coyle (Independent, 85); 2. Mr D. V. Wylie (81); 3. Mr C. Chewright (79). C-W: 1 & 2, Mr T. Reilly; 3. Mr D. V. Wylie.

MR. K. S. Priest, P.R.O. of EAST LONDON A & PS reports that at recent meetings lectures from various interesting speakers have been enjoyed: 'One lecture of particular interest was given on water life. Also held was our monthly table show, with Mr R. Dodkins winning the coldwater class and Mrs P. Harris winning the Raz-Dax & Min class. I'm sure that members are looking forward to future meetings, and especially to our annual Open Breeders Show'.

A REPORT from the P.R.O. of BETHNAL GREEN AS, Miss F. Rogers, has reached us of summer activities at the Society. She writes, 'On 7th May, a club visit was made to Mr L. Smith of Highgate Tropicals, a former BGAS member. We were entertained with tea and sandwiches whilst viewing the fish. A most enjoyable way of doing business! For the first time in several years, Bethnal Green has decided to display a tableau in The Aquarium Show. Plans were drawn up and a final decision on the design was made by the members. The work on the tableau has been keeping members busily occupied and all will be revealed at the end of this month.'

June meetings were started with the Points Cup competition for classes M, K and X. Judging was carried out by Mr W. R. Dale of Leytonstone & Stratford AS. Whilst judging was in progress Mrs S. Hedges and club members had an interesting discussion on showing fish, Mrs Hedges giving us the benefit of her past experience and success. Also in June an eight-club

FEDERATION



NEWS

Distinguished Vice-presidents Join the Federation

AT the Federation's September Assembly chairman Mr Frank Tomkins announced that, in response to the Federation Council's invitation to Mr Alec Fraser-Brunner and Dr John F. Wilkinson, both of these distinguished men had consented to be vice-presidents of the FBAS. Mr Fraser-Brunner, professional ichthyologist, has been associated with the Federation since its foundation and served as chairman. Dr Wilkinson is a medical specialist with many zoological interests and a deep interest in fish-keeping who has done a great deal for the advancement of the organised side of the hobby in the north of England. A vote of thanks was passed at the Assembly to the Mid-Sussex AS, and to Mr Jim Burtles in particular, who have sent entries on behalf of the FBAS to an exhibition in Poland. It was announced that the current number of affiliated societies was 171. A preliminary report was given of the Council's consideration of plans to improve on the advantages of the Federation Championship Class scheme.

At the opening of the Assembly, delegates stood for a minute's silence in memory of Mr B. ('Pop') Meadows, for many years an active FBAS judge, who died on 20th June last, aged 81.

Forthcoming Championship Class Shows

5th October	Cardiff AS	J	Rasboras
6th October	Ealing & DAS	Bz	Barbs
6th October	Newcastle Guppy & Livebearer Society	T	aos Livebearer
12th October	Runnymede AS	Ma	Labeos
27th October	Ilfracombe AS	S	Mollies
10th November	Walthamstow & DAS	Xu-w	Breeders (coldwater)

Results

Southend, Leigh & DAS	Cz	Mr P. Coyle (Independent)
Riverside AS	Dc	Mrs M. Nethersell (Riverside)
Catfish Association	H	Mr & Mrs J. Murphy (Ealing)
Thurrock AS	L	Mr T. A. King (N. Kent)
Mid-Kent AS	Xb-m	Mr T. B. Adams
Corringham AS	C	Mr P. Coyle (Independent)
Gosport AS	Dz	Mr K. Bissoon (Basingstoke)
Brighton & Southern AS	G	Mr D. Lambourne (Rochampton)
Sudbury AS	K	Mr T. Cruickshank (Ealing)
Corby & DAS	NB-M	Mr D. Bitchenor (Wellingborough)
Llantwit Major	Q	Mr K. Williams (Rhondda)
Fort Talbot & DAS	XO-T	Mr C. Turner (Cardiff)
Havant	Yb	Mr K. Whiting (Havant)
Half Moon AS	Ca	Mr T. Richardson
Salisbury AS	Da	Mr T. Winter (Southampton)
High Wycombe AS	Mz	Mrs S. Hedges (Bethnal Green)
Basingstoke AS	Db	Mr T. Winter (Southampton)
Tonbridge AS	T	Mr K. Dryden (Croydon)
Bethnal Green AS	W	Mr D. Stokes (Havant)
Wellingborough AS	U	Mr A. Crew (Wellingborough)

table show was held at Leytonstone, and Bethal Green were awarded the following: class Db: 3, Miss F. Rogers; Ca: 3, Miss F. Rogers. Whilst judging was in progress a very interesting talk and slideshow on catfish was given by Mr D. Lambourne, one of the founder members of the Catfish Association of Great Britain.

At the Dagenham Town show held in July, Mrs Sybil and Trudy Hedges exhibited 17 fish. They managed to take home 14 cards, including 6 firsts, and were also awarded Best Fish in Show. Well done the Hedges family and well done BGAS lady members!

RESULTS of the ROMFORD & BECONTREE AS Open Show, held as part of the Dagenham Town Show are:

A: 1, Mr G. Tolboday; 2, Mr D. Byfield; 3, Mr A. Waknell; B: 1, Mr & Mrs B. Fry; 2, Mr D. Byfield; 3, Mr P. Coyle; C: 1, Mr F. Jacobs; 2, Mr P. Coyle; 3, Mr R. A. Jones; D: 1 & 3, Mr D. Byfield; 2, Mr P. Coyle; D1: 1, Mrs S. Hodges; 2, Mr J. London; 3, Mr F. A. Pimm; E: 1 & 3, Mr G. Tolboday; 2, Mr D. Byfield; F: 1 & 2, Mr R. C. South; 3, Mr J. London; G: 1, Mrs S. Hodges; 2, Mr T. F. Jones; 3, Mr C. C. Oiler; H: 1, Mr A. Waknell; 2 & 3, Mrs S. Hodges; J: 1, Mr J. London; 2, Mr W. J. Baker; 3, Mr B. F. Victory; K: 1 & 2, Mr R. A. Jones; 3, Mr G. Tolboday; M: 1, Mrs S. Hodges; 2, Mr W. J. Baker; 3, Mr R. A. Jones; NH-M: 1, Mr R. H. Wrighton; 2, Mr J. London; 3, Mr M. Shadlock; NO-T: 1, Mr F. Jacobs; 2, Mr J. London; 3, Mr R. L. Baker; Q: 1 & 3, Mr F. Jacobs; 2, Mr A. Waknell; R: 1, Mr D. Byfield; 2, Mr J. London; 3, Mr F. Jacobs; S: 1 & 2, Mr J. London; 3, Mr T. F. Jones; T: 1, Mr J. London; 2 & 3, Mr F. Jacobs; U: 1 & 2, Mrs S. Hodges; 3, Mr B. Brent; V: 1 & 2, Mr B. Brent; W: 1 & 3, Mrs S. Hodges; 2, Mr B. Penrock; XB-M: 1, Mr L. B. Baker; 2, Mr G. Keating; 3, Mr R. A. Jones; XC-T: 1, Mr & Mrs B. Fry; 2, Mr W. F. Woodward; 3, Mr A. Waknell; Z: 1 & 3, Mr D. Byfield; 2, Mr A. Waknell; Junior Tropical: 1, Miss P. Waknell; 2, Master T. Coyle; 3, Miss T. Hodges; Junior Coldwater: 1 & 2, Miss T. Hodges; 3, Miss F. Glegg.

The Annual General Meeting and Autumn meeting of the BRITISH AQUARIST STUDY SOCIETY (BASS) will be held at the Zoological Society, London Zoo, on 5th October 1974. A symposium on Anabantids will be held and the main speaker will be Professor McNeill Alexander. A panel of experts will answer questions on this subject during the second part of the meeting. Mr A. F. Kent, Highcliffe, Old Hill, Woking, Surrey will be pleased to supply further details. Tickets are obtainable at the door, price £1.00 (this does not include tea).

THE talk given by Mr R. Marley to **BOURNEMOUTH AS** on 'The Furnished Aquarium' was nicely timed as the Society was holding its own Home Furnished Aquarium competition soon afterwards. The talk gave members a lot of valid points on setting up a furnished aquarium for competition, with pointers of what not to do, such as not including artificial objects, not making a bad choice of fish (i.e. small fish with large ones, or fish that are not fully mature, since they will be down-pointed against fully mature fish), and faults such as cloudy water, dirty glass (i.e. a thick growth of algae on the front glass), untidy rock work, bad planting, too many fish and also too few of them. Sharp edges and points on rock work were to be avoided, and no roots should be visible when planting plants. Table show results: *av Guppy*: 1, Mr K. Gibbs; 2, Mrs I. Bebb; 3, Mr Chatfield; *av Danio-rasbora & minnows*: 1 & 2, Mr Middleton; 3, Mr Bebb; *av Labyrinth*: 1, Mr Chatfield; 2, Mrs Bebb; 3, Mr Middleton; *av Pairs (livebearers)*: 1 & 2, Mrs Bebb; 3, Mr Middleton.

BEST fish in the show at the LYTHAM AS Open Show was exhibited by Mr K. B. Walsh (Lytham) where the total number of entries was 371. Results were as follows:

Guppy: 1, Mrs D. Barber (Blackpool); 2, Mrs Whitcombe (Accrington); 3, Miss S. Clarke (Aldbrough); *Mollies*: 1, Master M. & N. Rimmer (Sandgrounders); 2, Mr A. Ashurst (Greenwood); 3, Mr P. Whelan (Blackburn); *Swordtails*: 1, Mr P. Whelan; 2, Miss S. Clarke; 3, Mr & Mrs G. Harvey (Marsyas); *Platy*: 1, Mr G. Waterhouse (Sandgrounders); 2, Mr & Mrs P. Bam (Lytham); 3, Mr C. Norton (Sandgrounders); *av Livebearers*: 1 & section winner, Mr P. Whelan (Blackburn); 2, Mr & Mrs Fisker (Sandgrounders); 3, Mr G. Waterhouse (Sandgrounders).

Characins up to 2 in: 1, Mr W. Barber (Sandgrounders); 2, Mr & Mrs B. Mason (Worsley); 3, Mr A. Valente (Marsyas); *Characins over 2 in*: 1 & section winner, Mr. K. South (Middletown); 2, Mr. P. Whelan; 3, Mr & Mrs G. Bond (Sandgrounders); *Burbs up to 1 in*: 1, Mr & Mrs Smith (Dunton); 2, Mrs J. Eise (Sandgrounders); 3, Miss S. Clarke; *Burbs over 1 in*: 1 & section winner, Mr P. H. Batcher (Lerew); 2, Mr A. Valente (Marsyas); 3, Mr G. Waterhouse; *Rasbora*: 1 & section winner, Mr & Mrs Smith; 2, Mr & Mrs G. Mickle (Ind.); 3, Mr C. Norton; *Danios*: 1, Mr W. Ashurst (Greenwood); 2, Mr & Mrs South; 3, Mr W. Barber; *Minnows*: 1, Mr P. Whelan (Blackburn); 2, Mr M. Kasher (Lytham); 3, Master D. Dent (Middletown).

Cichlids (large): 1, Mr S. Harvey; 2, Miss N. Howorth (Ind.); 3, Mr D. Gregson (Blackburn); *Cichlids (small)*: 1 & 2, Mr C. Norton; 3, Mr A. Jenkinson (Marsyas); *Cichlids (large)*: 1 & section winner, Mr K. B. Walsh; 2, Master G. Wilkinson (Heddy);

3, Mr J. Booth (Hyde); *Anabantids (fishery)*: 1 & section winner, Mr & Mrs Smith; 2, Mr J. Bam (Sandgrounders); 3, Mrs Whitcombe (Accrington); *av Anabantids*: 1, Mr C. Norton; 2, Mr K. B. Walsh; 3, Mr A. Jenkinson; *av Catfish*: 1 & 3, Mr P. H. Batcher; 2, Mr & Mrs G. Bond; *av Loach*: 1 & section winner, Mr P. Whelan; 2, Master G. Wilkinson; 3, Mr G. Waterhouse; *Labro & shark*: 1, Miss S. Clarke; 2, Mrs Whitcombe (Accrington); 3, Mr & Mrs J. K. Hinkley; *av Corydoras*: 1, Mr J. H. Batcher; 2 & 3, Mr & Mrs G. Harvey; *Flying fishes*: 1, Miss J. Waterhouse; 2, Miss S. Clarke; 3, Mr & Mrs G. Mickle; *av Applying livebearers*: 1 & section winner, Mr R. L. Payne (Marsyas); 2, Miss P. Lamm and (DKA); 3, Mr A. Valente; *av Tropical*: 1 & section winner, Mr & Mrs G. Bond; 2 & 3, Mr P. H. Batcher.

Breeders, tropical egg-layers: 1 & section winner, Mr A. Valente; 2, Mrs M. Armstrong; 3, Mr P. Armstrong; *Breeder, livebearers*: 1, Mr K. Harvey; 2, Mr J. Hooton (Sandgrounders); 3, Mr & Mrs R. J. Welby (Blackpool); *Pairs, tropical egg-layers*: 1, Mr A. Valente; 2, Miss S. Clarke; 3, Miss P. Townsend; *Pairs, tropical livebearers*: 1 & section winner, Mr P. Armstrong (Hoywood); 2, Mr R. L. Payne; 3, Mr & Mrs G. Bond.

Common goldfish & comets: 1, Mr D. Woltonshaw (Blackburn); 2 & 3, Mr G. B. Whitely (Accrington); *Shubunkins (Blackburn)*: 1 & 3, Mr C. H. Whitty; 2, Mr & Mrs Cobb (Old Hill); *Voltas, Guppies & mosos*: 1 & section winner, Mr C. B. Whitty; 2 & 3, Mr S. Walsh; *av Coldwater*: 1, 2 & 3, Mr S. Walsh; *Junior, English*: 1, Master C. Hodge (Sandgrounders); 2, Miss J. Johnson (Blackburn); 3, Master G. Hauler (Lerew); *Livebearers*: 1, Master G. Wilkinson (Hyde); 2, Master P. Bam; *av Italian*: 1, Master J. Haugh (Blackburn); *Coldwater*: 1 & section winner, Miss S. Clarke; 2, Master A. Hinkley; 3, Master D. Harvey (Marsyas); *Marine*: 1 & section winner, Mrs D. Armstrong (Hoywood).

WEYMOUTH AS were hosts to Yeovil AS at a recent inter-club table show when nine tropical and three coldwater fish from each club were judged by Mr J. Jeffery from Bournemouth AS. Weymouth narrowly defeated Yeovil by 837 to 834 points. Whilst the fish judging was taking place, Mr J. Walker of Bournemouth gave a very informative talk on live food culture. The Club are indebted to Mr Walker as he volunteered to give a talk when the expected speaker failed to arrive. Weymouth's own table show results: *Pairs (livebearers)*: 1, Mr A. Billington; 2, Mr K. Hodder; 3, Mr D. Mullen; *Breeders (livebearers)*: 1 & 3, Mr D. Mullen; 2, Mr B. Mansel; *Twintails*: 1 & 2, Mr J. Hodder.

AT the BISHOPS CLEEVE AS Open Show, Best Fish in the Show was one benched by Mr & Mrs Dodson, and Mrs J. Bishop won the award for the Best Club member. Results were as follows:

Guppy, male: 1 & 3, Mr J. Ferguson; 2, Ferguson; 2, Mr P. J. Greenwood; *Guppy, female*: 1, Mr D. Richards; 2 & 3, Mr & Mrs K. Hodges; *Platy*: 1, Mrs J. Bishop; 2, Mr G. V. Ludlow; 3, Mr C. Pyle; *Swordtail*: 1, Mr J. Ferguson; 2, Mr T. Rafter; 3, Mr

Over 1000 Entries at BASINGSTOKE'S Show

BASINGSTOKE AS achieved the target entry they have aimed at, and worked for, for several years when a total of 1074 entries were benched and judged at their recent Open Show. Judges were: Mr A. Deakin, Nottingham (marines), Mr R. Esson (coldwater), and the twelve FBAS judges for the tropical section—Mr F. Tomkins, Mr B. Baker, Mrs P. Bayntum, Mr C. Brown, Mr M. Carter, Mr D. Durrant, Mr A. Ibbotson, Mr P. Greenwood, Mr Fox, Mr J. Jeffrey, Mr E. Nicoll and Mr J. Stillwell. The competitors were drawn from a wider area this year, coming from Cardiff AS, Rhondda AS, Loughborough AS, Banbury AS, Wellinborough AS, Sheffield AS, Bishops Cleeve AS, Yate AS, Bath AS, Ashington AS and South Shields AS. Twelve South Shields members were in attendance to take part in a 'twinning' ceremony of the two clubs; this consisted of an exchange of scrolls to mark the existence of the deep friendships that have built up between the members of both societies since they started to correspond with each other in an attempt to dissipate any misunderstanding that may exist between north and south in the hobby. Since visiting each other's shows this year they find they have a great deal in common. After the official speeches,

Mr F. Tomkins, chairman of the FBAS, congratulated the 'twin' clubs and expressed the view that this sort of interchange between societies in the Federation can only improve the organisation.

The Best Fish in Show award was won by Mr P. Brown of Southampton in the Dz (cichlid) class; Master S. Hamm of Torquay won the Junior trophy, Mrs. P. Lambourne of Rochampton won the Best Ladies Exhibit trophy and Mrs M. Nethersell of Riverside won the Best Ladies 'Cat' trophy. The trophy for Best Shark was won by Mr M. Reilly of Runnymede. The highest pointed Society trophy was won by Runnymede with 30, Gosport and Sudbury being second with 26 points each. The competitor with most points was Mr K. Usher and the largest society entry, of over 80 exhibits, came from Gosport. The rest of the results were:

Ag: 1 & 2, Mr K. Lewis (Rochampton); 3, Mrs Doubleday (BMAA). Ba: 1 & 2, Mr K. Smith (Runnymede); 3, Mr J. Jackson (Basingstoke). Bz: 1, Mrs D. Cruickshank (Ealing); 2, Mr M. Strange (Basingstoke); 3, Mr M. Bishop (Bishops Cleeve). Ca: 1, Mr R. Cox (High Wycombe); 2, Mr C. Turner (Cardiff); 3, Mr K. Usher. Ch: 1, Mr K. Smith; 2, Mr E. Fantham (Salisbury); 3, Mr K. Hillier (Newbury). Cz: 1, Mr P. Lambourne (Rochampton); 2, Mr A. P. Taylor (Sudbury); 3, Mrs I. Strange. Da: 1, Mr F. Willis (Havant); 2, Mr T. Winter (Southampton); 3, Mr K. Usher. Db: 1, Mr T. Winter; 2, Mr T. Frazer; 3, Mr D. Sheridan. Dc: 1, Mrs M. Nethersell (River-

side); 2, Mr A. Ciddle (Ashington); 3, Mr K. Ross (Gosport). Dd: 1, Mr P. Brown (Southampton); 2, Mr R. Adams (Salisbury); 3, Mr B. Freemantle (Gosport). Ea: 1, Mr B. Bissoon (Basingstoke); 2, Mr P. Shepherd (Reading); 3, Mr D. Phippen (Bath). E: 1, Mr S. Parrish (Hemel Hempstead); 2, Mr A. Weaire (Southampton); 3, Mr D. Phippen. Fc: 1, Mr L. Derrick (Croydon); 2, Mr J. Jackson (Basingstoke); 3, Mr F. Anken (South Shields). F: 1, Mr A. Weaire; 2, Mr M. Cott (Gosport); 3, Mr D. Russo (Southampton). G: 1, Mr E. Fantham (Salisbury); 2, Mr J. Jackson (Basingstoke); 3, Mr D. Childs (Bracknell). H: 1, Mr T. Frazer (Basingstoke); 2 & 3, Mr K. Taylor. Snails: 1, Mr & Mrs W. Scott (South Shields); 2, Rudland & Green (Reading); 3, Mr J. Vogelajar. J: 1, Mr A. Harmsworth (Basingstoke); 2, Mr S. Rigby (Gosport); 3, Mr J. Garrard (Runnymede). K: 1, Mr T. Cruickshank; 2, Mr T. Frazer; 3, Mr C. Kinsbury (Runnymede). L: 1, Mr J. Burtles (Mid Sussex); 2, Mr A. Tall (Salisbury); 3, Mr R. Leslie (High Wycombe). M: 1 & 3, Mr I. Clarke; 2, Mr F. Willis. Nb-m: 1, Mr C. Kinsbury; 2, Mr M. C. Turner; 3, Mr J. Lewis. No-1: 1, Mr K. Usher; 2, Mr P. Walker (Severn Valley); 3, Mr K. Dryden (Croydon).

O: 1, Mr J. Valley; 2, Mr A. Hall; 3, Mr B. Webb (Bath). P: 1, Mr P. Groveron (Runnymede); 2, Mr C. Kinsbury; 3, Mr D. Kerr. Q: 1, Mr E. Fantham (Sudbury); 2 & 3, Mr N. Bissoon. R: 1, Mr A. Cripps (Basingstoke); 2, Mr B. Mason; 3, Mr R. Davis. S: 1, Mr J. Adams (S. Ind); 2, Mr L. Little (Bracknell); 3, Mr C. Kinsbury. T: 1, Mr K. Usher; 2, Mr B. Bissoon; 3, Mr D. Cruickshank.

Uad: 1, Mr F. Pinder; 2, Mr D. Haines; 3, Mr V. Noyses. Ub: 1 & 2, Mr E. Binstead (Poole); 3, Mr T. Chick. Uc: 1, Mr W. Crookford (Petersfield); 2, Mr T. Chick; 3, Rudland & Green. V: 1, 2 & 3, Rudland & Green. W: 1, Mr E. Binstead; 2 & 3, Mr M. Bishop. Xb-m: 1, Mr F. Willis; 2, Mr D. Sheridan; 3, Mr J. Robertson (Mount Pleasant). Xo-s: 1, Mr B. Bissoon; 2, Mr & Mrs Newbury (Gosport); 3, Mr A. E. Novhara (Orpington). Xs: 1 & 2, Mr K. Usher; 3, Mr P. Walker. Yb: 1, Mrs Doubleday; 2, Mr S. Ham (BMAA); 3, Mr L. Wilkins (BMAA). Ya: Mr J. Mears (Basingstoke); 2, Mr T. Taylor; 3, Mr M. Biggane (Basingstoke).

K. A. Poos, Mollies (*velifera* & *latipinna*): 1, Mr R. A. Poos; 2, Mr C. Pratt; 3, Mr & Mrs B. Guy. Mollies aov: 1, Mr E. Curton; 2 & 3, Mr C. Pratt.

Barbs under 3 in: 1 & 2, Mr & Mrs K. Hodges; 3, Mr M. Bishop. Barbs over 3 in: 1, Master M. Thomas; 2, Mr & Mrs K. Hodges; 3, Mr & Mrs Higgs. Dantios, tetras & rasboras: 1, Mr R. Onslow; 2, Mr G. Hayes; 3, Mr R. A. Poos. Boita, loaches, sharks & flying fox: 1, Mr C. Russell; 2, Mr J. Salisbury; 3, Mr B. Baker. *A. H. Christodou*: 1, Mr K. Owen; 2, Mr G. Mearns; 3, Mr K. Taylor. Characins aov: 1 & 3, Mr & Mrs Dodson; 2, Mr M. Strang.

Dwarf cichlids: 1, Mr & Mrs Ward; 2, Mr R. A. Poos. Large cichlids: 1, B. & S. Warren; 2, Mr B. Shell; 3, Mr R. A. Poos. Angles: 1, Mr & Mrs B. Guy; 2, Mr G. V. Lawlor; 3, Mr P. J. Greenwood. Siamese fighting: 1, Mr C. Pratt; 2, Mr D. Parry; 3, Mr T. Redfern. Anabantids aov: 1, Mr J. Southby; 2, Mr & Mrs R. Dodson; 3, Mr C. Pratt. Corydoraz: 1, Mr P. J. Greenwood; 2, Mr L. W. Poole; 3, Mr J. Ferguson. Catfish aov: 1, Mr K. R. Baker; 2, Mr A. Rednal; 3, Mr R. J. Slater. Tropical fish aov (coldwater): 1, Mr R. Onslow; 2 & 3, Mr B. R. Gull. Killifish: 1, Mr M. Strange; 2 & 3, Mr G. Hayes.

Seed pairs, livebearers: 1, Mr & Mrs R. Dodson; 2, Mr R. Onslow; 3, Mr C. Pratt. Seed pairs, egglayers: 1, Mr K. Taylor; 2, Mr & Mrs Ward; 3, Mr D. A. Smith. Breeder livebearers—team of 4: 1, Mr R. A.

Poos; 2, Mr & Mrs Impy; 3, Mr C. F. Scriven. Breeder egglayers—team of 4: 1, Mr G. Hayes; 2, Mr C. Russell; 3, Mr G. K. Howe. Junior av fish: 1, Master S. Owen; 2, Miss T. Russell; 3, Mr L. Ninchin. Shubunkins: 1 & 3, Mr T. Chick; 2, Mr R. Bowd. Single & twintailed goldfish: 1, Mr A. Rednal; 2, Mr B. R. Gull; 3, Mr J. Salisbury. aov Pond or river fish: 1 & 3, Mr C. Pratt; 2, Mr M. Bishop.

THERE was a total of 329 entries, an increase on last year, at the **NEWPORT AS** Open Show where Best Fish in the Show was one entered by Mr R. Onslow of Basingstoke. The King British trophy for the Newport member with the highest number of points was awarded to Mr W. Gibbon. Results were as follows:

A: 1, Mr P. Jordan; 2, Mr W. Gibbon; 3, Mr J. Hiffe. B: 1, Mrs Cruickshank; 2, Mr R. Onslow; 3, Mr R. Beale. C: 1, Mr & Mrs Harding; 2, Mr W. Gibbon; 3, Mr C. Turner. Ca: 1, Mr C. Turner; 2, Mr H. Chick; 3, Mr & Mrs Dore. D: 1, Mr R. Onslow; 2, Mr D. Warmant; 3, Mr J. Egan. Da: 1 & 2, Mr R. Purdy; 3, Mr P. S. Greenwood. Db: 1, Mr D. Warmant; 2, Mr W.

Gibbon; 3, Mr J. Egan. E: 1, Mr Cripps; 2, Mr D. Warmant; 3, Mr B. Purdy. Ea: 1, Mr & Mrs Harding; 2, Mr T. Cripps; 3, Mr M. Collings. F: 1 & 2, Mr G. Churchill; 3, Mr C. E. Morrison. G: 1, Mr D. Lambourne; 2, Mrs M. Nethersell; 3, Mr & Mrs Guthrie. H: 1 & 2, Mrs M. Nethersell; 3, Mr R. Wigg. J: 1 & 2, Mr R. Poos; 3, Mr J. Egan. K: 1, Mr R. Onslow; 2, Mr M. Guy; 3, Mr C. Harding. L: 1, Mr P. G. Thomas; 2 & 3, Mr W. Gibbon. M: 1, Mr Cripps; 2, Mr H. Chick; 3, Mr J. Edwards. N: 1, Mr C. Turner; 2, Mr C. Harding; 3, Mr D. Warmant.

O: 1 & 3, Mr R. Purdy; 2, Mr D. Richards. P: 1 & 2, Mr R. S. Wigg; 3, Mr J. Edwards. Q: 1 & 2, Mr Aslet; 3, N. & C. Bowles. R: 1, Mr Cripps; 2, Mr P. Greenfield; 3, Mr C. Turner. S: 1 & 2, Mr G. Best; 3, Mrs Guy. T: 1, Mr B. Snell; 2, Mr C. E. Morrison; 3, Mrs Cruickshank.

W: 1, Mr C. Rupert; 2, Mr D. Warmant; 3, Mr B. Snell. Xb-M: 1, Mr D. Warmant; 2, Mr E. Roms; 3, Mr & Mrs C. Harding. Xo-T: 1 & 3, Mr C. Turner; 2, Mr C. Morrison. Junior classes, as Egglayer: 1, Master S. Banton; 2 & 3, Miss C. Rupert. av Livebearer: 1, Master J. Edwards; 2, N. & C. Bowles; 3, Master S. Morrison.

AT THE **HIGH WYCOMBE AS** Open Show exactly 500 entries were benched, a record entry. The annual trophy winners were: Anne Seed

rosebowl, Best Goldfish, Mr. G. King; 67 Committee trophy, XB-M, Mr. I. R. Pierce; 68 trophy, XO-T, Miss C. Jones; 69 Bovingdon trophy, XU-W, Mr. G. King; 71 trophy, NB-M, Mr. R. G. Leslie; Claire trophy, NO-T, Mr. J. Bushby; Kelvin trophy, Q, Mr. I. R. Pierce; Lane End trophy, K, Mr. T. Cruickshank; 2 Reg's Shield, Co, Mr. R. Cox; The White Horse trophy, Best Platy, Mr. A. S. Cripps; The Chatfield trophy, C, Mr. D. E. Schramm; gold pin, Mr. R. G. Cox. Remainder of the results were:

Ag: 1, Mr. K. S. Lewis; 2, Mrs. C. Sheldon; 3, Mrs. B. D. Scates; B: 1, Mr. R. Leslie; 2, Mr. C. Killingsbury; 3, Mr. W. H. Ostler;

C: 1, Mr. D. E. Schramm; 2, Mr. C. W. Goddard; 3, Mr. A. Thacker; Co: 1 & 3, Mr. R. G. Cox; 2, Mr. C. Killingsbury; D: 1, Mr. T. Hall; 2, Mr. I. R. Pierce; 3, Mr. D. Brydan; Do: 1, Mr. C. Killingsbury; 2, Mr. T. Fraser; 3, Mr. S. Houston; E: 1, Mr. R. J. Cassing; 2, Mr. T. Cruickshank; 3, Mr. C. W. Goddard; Ea: 1, Mr. Z. J. Crow; 2, Mr. A. Thacker; 3, Mrs. M. Cross; F: 1 & 2, Mr. R. Norris; 3, Mrs. J. Gurrall; G: 1, Mrs. S. Hodges; 2, Mr. K. A. Reader; 3, Mrs. M. Nathaniel; H: 1, Mr. A. Mrs. Mearns; 2, Mr. C. W. Goddard; 3, Mr. P. Rushbrooke; J: 1, Mr. T. Hall; 2, Mr. K. A. Reader; 3, Mrs. B. D. Scates; K: 1, Mr. T. Cruickshank; 2, Mr. T. Fraser; 3, Mr. C. Killingsbury; L: 1 & 3, Mr. R. Leslie; 2, Mr. L. J. Brazier; M: 1, Mrs. S. Hodges; 2, Mr. Brazier; 3, Mrs. J. Lloyd; Ma: 1, Mrs. M. Nathaniel; 2, Mrs. M. Cross; 3, Mr. J. Hughes; NB-M: 1, Mr. R. Leslie; 2, Mr. R. Cox; 3, Mr. L. J. Brazier; NO-T: 1, Mr. J. Bushby; 2, Mr. R. J. Hask; 3, Mr. P. Greenway;

O: 1 & 3, Mr. C. P. Hodges; 2, Mr. & Mrs. Murphy; P: 1 & 2, Mr. C. Killingsbury; 3, Mr. P. Greenway; Q: 1 & 2, Mr. I. R. Pierce; 3, Mrs. B. J. Cassing; R: 1, Mr. A. S. Cripps; 2, Mr. K. A. Hillier; 3, Mr. L. G. Little; S: 1,

Mr. C. Killingsbury; 2, Mrs. M. Nathaniel; 3, Mrs. P. Chambers; T: 1, Mr. L. G. Little; 2, Mrs. D. Cruickshank; 3, Mr. M. Harris; U: 1 & 3, Mr. G. King; 2, Mrs. S. Hodges; V: 1, Mr. L. P. Clements; 2, Mr. R. Haden; 3, Mr. P. Pinder; W: 1, Mrs. S. Hodges; 2, Mr. C. Sprack; 3, Mr. P. Pinder; XB-M: 1, Mr. I. R. Pierce; 2, Mr. D. Swire; 3, Mr. P. Roberts; XO-T: Miss C. Jones; 2, Mrs. M. Cross; 3, Mr. L. G. Little; XU-W: 1, Mr. C. King; 2 & 3, Mr. P. Pinder.

HASTINGS & ST LEONARDS

AS met recently to hear Mr. G. Pryke speak on 'First principles in fishkeeping for the newcomer'.

Starting with a description of the kind of tanks to use, Mr. Pryke went on to explain about such things as rocks and gravel and ended with the types of fish suitable for a community tank. The Society have also enjoyed a lecture by Mr. Ian Sallik on fish coloration, in which the speaker described how a color-change took place when a fish was frightened and how this color-change played an important part in communication between fishes, particularly in courtship. Recent table show results have been: guppies (Judge, Mr. D. Huest), Mrs and Miss French; cichlids, Mr & Mrs Young. The results of the pond competition were announced by Mr. D. Jolliffe of Bexhill AS and the winner is Mrs Goschalk (2, Mr. Reed); 3, Mr. A. McCormick.

Successful AIREBORO' Show

606 exhibits were benched by 33 societies at the AIREBOROUGH & DAS Open Show. Best Fish in the Show and winners of an aquarium (presented by Kins-Aquatic) and a gold pin were Mr & Mrs Simpson (Workop, 78). Best Exhibit was a breeders team exhibited by Mr & Mrs Fletcher (Doncaster, 80) and the highest pointed society was Doncaster. Major prize-winners were as follows: Furnished aquaria, Mr Hamburg (Swillington); Best novice, Mr Hardscastle (Hoesforth); Best livebearer, Mrs M. Armstrong (Heywood); Best characin and Best pairs, D. & M. Laycock (Sheaf Valley); Breeders livebearer, Mr & Mrs Walker (Sheaf Valley); Breeders egglayer, Mr & Mrs Fletcher (Doncaster); Best Coldwater and exhibitor gaining most points, Mrs

Midland Aquatic Festival

THE MIDLAND AQUATIC FESTIVAL 1974 proved to be a very successful venture and the members of the Midland Aquatic Show Committee are looking forward to the 1975 Festival with great confidence.

The award for the best tropical fish in the Show was made to a flying fox entered by Mr C. T. Cobill and the necroous veiltail entered by Mr A. E. Roberts was awarded the trophy for the Best Coldwater Fish in Show. The Society with the most points, to whom went the Championship Cup, was the Midland Tropical Aquarist Society (102 points). Details of the results are given below:

Coldwater: Bristol shubunkins: 1, 2 & 3, Mr M. T. Mason (Taylor Cup); Common goldfish & comets: 1, 2 & 3, Mr C. Roberts (Raven Cup); Bristol shubunkins, bred: 74: 1, Mr F. W. Orme; 2, Mr A. E. Roberts; 3, Mr F. Cross; Bristol shubunkins, 1 in. body inch: 1, Mr F. R. Cross; 2 & 3, Mr M. T. Mason; Bristol shubunkins, 3 in. body inch: 1 & 3, Mr T. F. Sutton (Caddy Cup); 2, Mr C. H. Barrett; Bristol shubunkins, novice: 1 & 3, Julie Wiles (Webb Cup); 2, Mr C. Fellows; Veiltail necroous: 1, Mr A. E. Roberts (Everiden Cup, Graham Keys Cup, E. A. Mason trophy); 2 & 3, Mr T. G. Sutton; Orandas: 1, 2 & 3, Mr A. E. Roberts; Moors: 1 & 3, Mr M. G. Neal (Bunter Cup); 2, Mr T. G. Sutton; Fannin: 1, 2 & 3, Mr T. G. Sutton; Pearl Scale necroous: 1, 2 & 3, Mr T. G. Sutton; Lionhead: 1 & 3, Mr J. Goodall; 2, Mr L. F. Clements; Twinstail, bred by exhibitor 1974: 1 & 2, Mr T. G. Sutton (Keeble Cup); 3, Mr A. E. Roberts; Breeders, av: 1, 2 & 3, Mr F. R. Cross; Breeders, veiltail bred 1974: 1, Mr A. E. Roberts (P. Smith Cup); 2 & 3, Mr T. G. Sutton; Singetail, av: 1 & 2, Mr F. R. Cross; 3, Mr C. J. Conerill; Twinstail, av: 1, 2 & 3, Mr K. Maffin; av Pond or river fish: 1 & 2, Mr C. J. Conerill; 3, Mr S. Woods; Individual coldwater aquarium: 1, Mr C. Poyser; 2, Mr G. Puntington; 3, Mr T. Young; Society coldwater aquarium: 1 & 2, MAPS (Society Shield).

Tropical: Barbs: 1, Mr S. Wood (Harbin Cup); 2, Mr B. Faulkner; Barbs (Gilties,

alligata, novemstri): 1, 2 & 3, Mr R. Phillips (Dodge Cup); av Barbs: 1, Mr P. Jinks (L. Stokes Cup); 2, Mr T. Stone; 3, Mr D. Wilson; Danios, etc.: 1, Mr K. Hunting; 2, Atwood & Williams; 3, Mr D. Wilson; Barbora: 1, Mr B. Kirk (S & D Green Cup); 2 & 3, Mr T. Young; Characins: 1, Mr P. Jinks (W. V. Jones Cup); 2, Mr B. Phillips; 3, Mr D. Wilson; Characins: 1 & 2, Mr D. Wilson; 3, Mr B. Bailey;

Male Egglayers: 1, Mr C. Nightingale; 2, Mr K. Hunting; 3, Mr J. Newey; av Male anabantid: 1, Mr K. Payne (Mrs Gilbert Cup); 2, Mr E. T. Cobill; 3, Mr S. Wood; Cichlids: 1, Mr C. Nightingale (Interpet Cup); 2, Mr K. Hunting; 3, Mr K. Payne; av Cichlids: 1, Mr R. Phillips (Caprice Cup); 2, Mr S. Wood; 3, Mr K. Hunting; Angel fish: 1, Mr E. T. Cobill;

av Guppy: 1 & 3, Mr S. Croft (Coleman Cup, T. G. Sutton Cup); 2, Mr R. Jones; av Molliis: 1, Mr C. Bird; 2, Mr K. Hunt; av Platys: 1, Mr R. Phillips; 2, Mr K. Payne; av Swordtail: 1, Mr C. Nightingale; av Tropical fish: 1, Mr E. T. Cobill (Gilbert Cup); 2, Mr K. Hunting; 3, Mr K. Payne;

Breeders, av egglayers: 1 & 3, Mr R. Hill (Fendley Cup); 2, Mr P. Jinks; Breeders, av livebearers: 1 & 2, Mr F. Young; av Corydoras & Dorsals: 1, Mr T. Stone (S. W. Richardson Cup); 2, Mr R. Phillips; 3, Mr J. Newey; av Catfish: 1, Atwood & Williams (J. C. Froggatt Cup); av Loach: 1 & 2, Mr R. Phillips; 3, Mr B. Kirk; av Egglayer, molliis: 1, Mr C. Nightingale (Garrington Cup); 2, Mr B. Faulkner; 3, Mr P. W. Jinks; av Egglayers, novice: 1, Miss L. Napper; 2, Mr D. Pinock; av livebearers, novice: 1, 2 & 3, Mr B. Stevens (J. & R. Wills Cup); av male Anabantid, novice: 1, Mr K. Mears; Individual tropical aquarium: 1, Mr T. Davies; 2, Mr T. Young; 3, Mr D. Buchanan; Soc. Society tropical aquarium: 1, SAVS (Society Shield); 2 & 3, MFA (Society Tableaux); 1, MTN; 2, FGA; 3, Lucas;

av Plants, cuttings: 1 & 3, Mr C. J. Conerill; 2, Mr S. Wood; av Plants, rooted: 1, Mr B. Faulkner (P. W. Jinks Cup); 2 & 3, Mr P. Jinks; av Plants, floating: 1 & 3, Mr S. Wood; 2, Mr C. J. Conerill;

av Reptiles: 1, 2 & 3, Mr M. H. Delingpole; av Amphibians: 1, Mr J. Fisher; 2 & 3, Mr M. H. Delingpole; Venomous snakes: 1, Mr J. Foden; 2, Mr L. Edwards; 3, Mr B. Truam; Non-venomous snakes: 1, Mr J. Foden; 2, Mr D. Reid; 3, Mr R. Butler;

Juniors: Livebearers: 1, 2 & 3, Susan Odawa; Egglayers: 1, D. Young (Novus Tankard); 2, C. Young; 3, S. Odawa; Marine aquaria, society: British Marine Aquarists' Association; Marine aquaria, individual: Mr P. Binsley; Junior decorated vivarium or terrarium: 1, D. & L. Conerill; 2 & 3, James Delingpole.

Alan Lawman will be talking about his recent trip to Japan.

... **SCUNTHORPE & DAS** are holding their first open show on Sunday, 6th October at St Paul's Church Hall, Ashby High Street, Scunthorpe.

... **AT** the recent meeting of the **ASSOCIATION OF GOLDFISH BREEDERS** new members were welcomed to the club. Mr Clement gave an interesting talk on the filtration he used first on marine fish and is now using on coldwater fish. Result of the monthly table show: any variety: 1, Mr L. Clements; 2 & 3, Mr G. Fleming.

... **SOUTH PARK AQUATIC (STUDY) SOCIETY** are pleased to announce that they are holding their annual Buffet and Dance on Saturday, 16th November—the theme being 'The Lady and the Tramp'—fancy dress optional, to be held again at the Supporters Club, Wimbledon F.C. Tickets are limited; further details from Mrs M. Dudley, 163 South Park Road, Wimbledon, S.W.19; phone: 01-540-5662.

... **AT** a recent meeting of **BRIGHTON & SOUTHERN AS**, Miss P. Comber took her first trophy with a pearl danio that gained 74 points. Mr C. West judged the table show and then, together with Mr P. Todd from Hove Aquatics, gave an informative talk, which was appreciated by all members.

... **ALTHOUGH** official meetings of the **ISLE OF WIGHT AS** are held over during the height of the summer months, members have been kept very busy planning and executing their tableau for this month's Aquarium Show '74' in London, and making arrangements for an inter-club show on the mainland in November.

... **A BUSY** month lies ahead for **RUNNYMEDE AS** members. Not only have they all the excitement and hard work of their own show on 12th October (at St Ann's Middle School, Clare Road, Stanwell, Middlesex) but they are also entering a tableau in the Society Tableaux Competition at The Aquarium Show '74 in London this month. Schedules for the Society's own show are available from Mrs J. Garrad, Le Rivage, Long Lane, Stanwell, Middlesex, or further details can be obtained by phoning Mr K. Smith at Ashford, Middlesex, 59309.

Meetings and Changes of Officers

BOURNEMOUTH AS, Secretary, Mr R. Mayley (16 Black Dune Road, Parkstone, Poole).

BRADFORD & DAS, New venue and meeting times. The Fostle Hall, Westgate, Bradford on second Thursday and fourth Thursday of each month.

BRITISH CICHLID ASSOCIATION, Acting secretary, Mr T. Green (12 Greenwood Meadow, Chisney, Oxford).

ISLE OF WIGHT AS, Chairman, Mr 2. Cole; vice-chairman, Mr D. Crisp; secretary, Mr E. Y. Davison (89 High Street, Shanklin,

Isle of Wight); assistant, Miss P. Merritt; treasurer, Mr R. Stevens, show secretary, Mr P. Whitbourne; assistant, Mr B. McEligh, P.R.O., Mrs E. Ford (28a High Street, Shanklin).

SUFFOLK AQUARISTS & POND-KEEPERS ASSOCIATION, New venue. The Sporting Farm, Ipswich.

WYMOUTH AS, Meetings 2nd Tuesday of month, 7.30 p.m., Ranciff Hall, Queens Road, Radpole Spa, Weymouth, Dorset. New members and visitors are very welcome.

Dates for Your Diary

5th October. **CARDIFF AS** Open Show. St. Margaret's Church Hall, Roath, Cardiff. Details: Mr C. Turner, 146 Arran Street, Roath, Cardiff.

5th October. **BRITISH AQUARIST STUDY SOCIETY** Symposium on Anabantids. The Meeting Room of the Zoological Society of London, Regent's Park, London, NW1. Admission at door, £1.00. Details: Mr A. J. Kenny, Highfields, Old Hill, Woking, Surrey.

6th October. **SCUNTHORPE & DAS** first Open Show. St Paul's Church Hall, Ashby High Street, Scunthorpe, South Humberside. Details: Mr G. White, 26 Ainslie Road, Botsford, Scunthorpe.

6th October. **EALING & DAS** Open Show. Greenford Community Centre, Oldfield Lane, Greenford, Middlesex. Details: Mr T. A. Crutchank, 82 Stanley Avenue, Greenford, Middlesex; phone 01-570 0104.

6th October. **NEWCASTLE GUPPY & LIVEREAPER SOCIETY** All-Liverbearer Open Show. Civil Hall, Gosforth, Newcastle-upon-Tyne. Schedules: Mrs J. Rennie, 128 Roman Terrace, Garsin B., Killingworth, Newcastle-upon-Tyne, NE12 0TX.

6th October. **Vauxhall Motors Recreation Club Aquarist Section** Open Show. Details: Mr A. D. Pells, 15 Hellybush Road, Luton, Beds, LU2 8HG.

12th October. **RUNNYMEDE AS** Open Show. St Ann's Middle School, Clare Road, Stanwell, Middlesex. Details: Mr K. Smith (Ashford 59309) or Mrs J. Garrad, Le Rivage, Long Lane, Stanwell, Middlesex.

12th-13th October. **BRITISH AQUARIST FESTIVAL**, Belle Vue, Manchester. Enquiries: Mr G. W. Cooke, 33 Field Hill, Birstley, Yorks.

20th October. **SHERWOOD AS** Open Show. Thorsby Miners Welfare Hall,

Edwinstowe, Olkerton, or Mansfield, Notts. Schedules: Mr J. Apoc, 23 Marple Avenue, Mansfield Woodhouse, Notts.; phone Mansfield 32249.

25th-27th October. **THE AQUARIUM SHOW '74** at the Royal Horticultural Society's Old Hall, Vincent Square, London SW1. Presented by the Federation of British Aquatic Societies. Aquarist society table-keeping exhibits invited. Details from the organiser, PFM, 554 Garratt Lane, London SW17 0NY; phone 01-947 2805.

26th-27th October. **THE IRISH TROPICAL FISH SOCIETY** 3rd Open Show. The Maritime House, Dawson Street, Dublin 2, Ireland. Details: Mr J. P. Nainith, Kildangan, Sandycroft, Co. Dublin.

27th October. **DONCASTER & DAS** Open Show. Broadworth Miners Welfare, Welfare Road, Woodlands, Doncaster. 2nd November. **GSGB** General Meeting. Conway Hall, Red Lion Square, Holborn, London WC1, 2.00 p.m.

19th November. **HALIFAX AS** Open Show. The Forest Cottage Community Centre, Crossin Lane, Dingworth, Halifax. Details: Mr D. Stobbs, Cobblestone, Gossett, Kings Cross, Halifax; phone Halifax 60116.

18th November. **WALTHAMSTOW & DAS** Open Show. Details as follows.

3rd November. **BLACKBURN AQUARIST WATERLIFE SOCIETY** Open Show. Winsor Hall, Blackburn. Details: Mr B. Marshall, 10 Hawthorn Crescent, Fitter Hill, Oldham, Lancs.

14th-16th November. **LOUGHBOROUGH & DAS** Furnished Aquaria Exhibition (members' tanks). John Short House, Wards End, Loughborough (in aid of the John Short House Foundation).

17th November. **BRADFORD & DAS** 2nd Open Show. East Bowling Unity Club, Leicester Street, Wakefield Road, Bradford. Details: Mr E. J. Brown, 8 Garden Field, Wyke, Bradford; phone Bradford 47777.

1st December. **HORSFORTH AS** Open Show. New Civic Hall, Stanningley Road, Pudsey.

7th December. **FRAS ASSEMBLY**, Conway Hall, Red Lion Square, Holborn, London WC1, 2.30 p.m.

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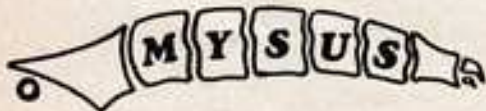
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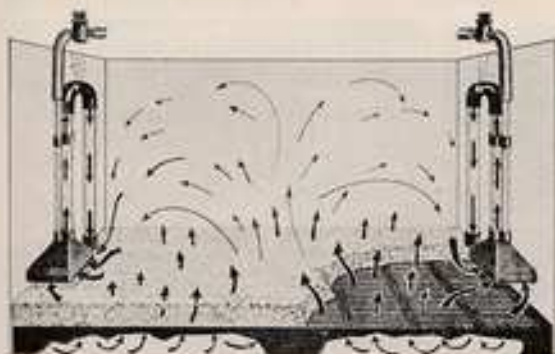
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