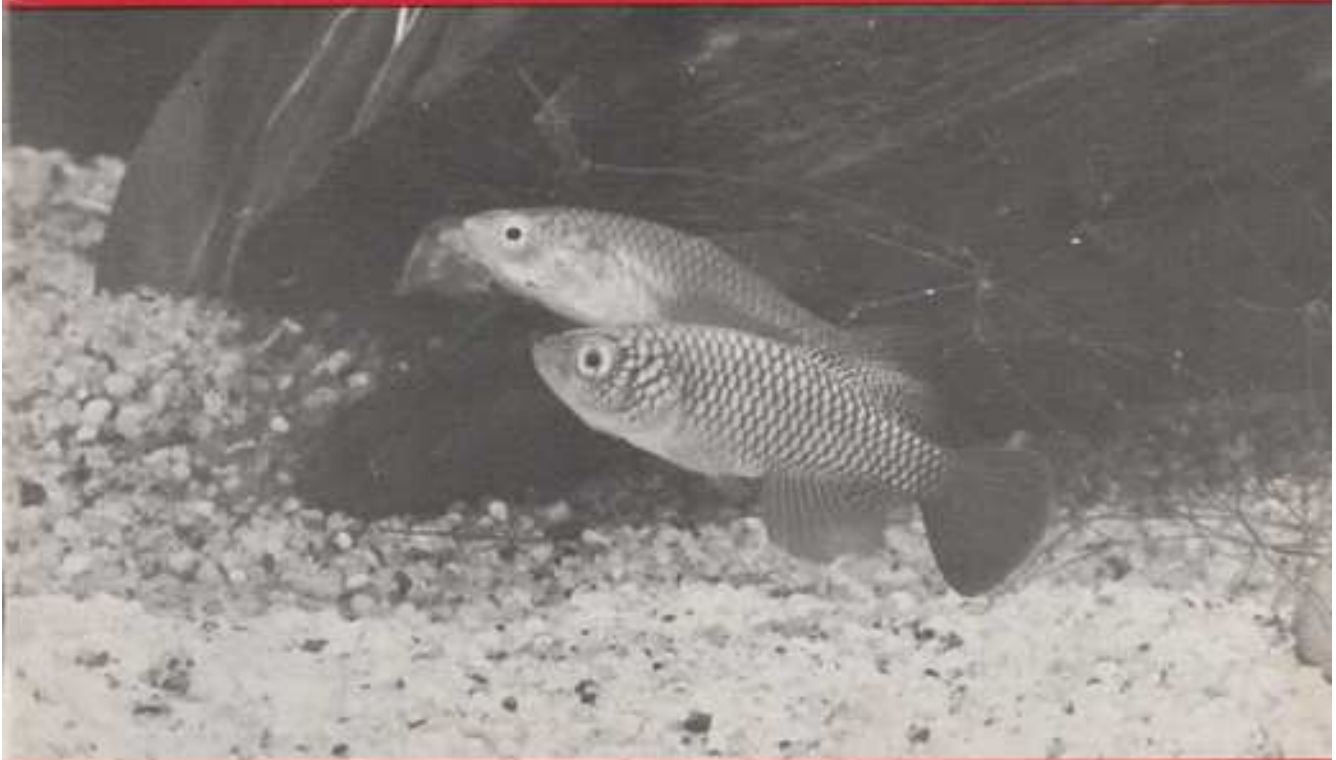


FEBRUARY 1976

25p

Pet **Fish**

# PRACTICAL FISHKEEPING MONTHLY



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**Aquarium Filtration — Types of Filters on the Market**

**Coldwater Scene**

**Improving on Life-Spans**

**The Humble Minnow**

**Mouthbrooder Egg-rearing**

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**PetFish Monthly 25p**

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February 1976

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## Comments and Quotes

- Safety approval for aquarium heaters
- How to choose a filter

### Safe in Use

A FEW issues back we expressed disquiet about the subject of safety in electrical aquarium equipment, largely because this was being called in doubt by authorities whose opinions could be influential. It is both pleasurable and right to give equal prominence to some good news on this matter, which involves official approval of the safety features of one make of earthed heater. Mr Conrad Ellson of UNO (Aquatic) Products has advised us that their earthed type heaters have received approval from H.M. Factory Inspectorate (Health and Safety at Work Executive) to be used for industrial applications, particularly in plating.

A quotation from a report by H.M. Factory Inspectorate reads: "the use of the spirally wound earth conductor should be quite effective in cutting off the supply in case of a broken envelope (particularly in plating, of course) and I would see no objection to the use of this method of protection."

Mr Ellson also tells us that Greater London Council have recommended this safer type of heater/thermostat (Patent no. 1374093) for use in schools. The ban on aquarium heaters by some school authorities was a particularly worrying aspect since this meant that some of the valuable educational applications of tropical aquaria were being denied some children, and it is to be hoped that others will follow the GLC with their approval of aquarium equipment.

Incidentally, we aquarists with our noses so often close to the aquarium glass are not always aware that the aquarium

heating apparatus we know so well also finds application in other fields — both industrially for warm bath processes and in another hobby's sphere — that of home brewing and wine-making. Cheers!

### The Filter Maze

PROMINENTLY featured in this issue is Cliff Harrison's review of types of aquarium filters at present available. This sets out to provide help for aquarists (not always beginners, either!) who experience bewilderment from the variety and range of types of filters when they attempt to suit their own requirements. Having a clear idea of what the filter is going to be asked to do for the individual's aquarium is the first step; with this requirement established the range of suitable types may at once become narrowed. If it is not, because only a rather generalised filter function is required, other considerations such as cost of the equipment, the amount of time that can be spent on maintenance of the filter, ease of use or running costs may simplify the choice. As our author notes, there is no overall 'best' filter, but this review article will help to ensure that what you have or get is closest to the best for your particular set of circumstances.

**Don't miss the coming issues of PFM—important changes will be coming soon**



PETFISH  
MONTHLY

# LETTERS

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

### Malawi Cichlid Name

FOR the benefit of your readers, I feel that it is necessary to clear up partly the problem of Malawi cichlid taxonomy raised by Barbara P. Mayers' article, and Steve Wolstenholme's reply (PFM, August 1975, November 1975, January 1976) with regard to *Labidochromis*.

It was hoped that this nomenclatural confusion would have been sorted out by Oliver<sup>1</sup>, who described a fish similar to that on p. 163 (lower) of Mrs. Mayers' article, as *Labidochromis textilis*. The upper photograph he said was possibly *L. caeruleus*. However, for these two fish illustrated, it has been found by Burgess<sup>2</sup> that they have bicuspid teeth (*Labidochromis* teeth are unicuspid) and should thus be referred to the genus *Pseudotropheus*, or an undescribed species, which he designates *Pseudotropheus* U-1. However, in the 3rd edition of Axelrod's book<sup>3</sup>, he gives it the name *Pseudotropheus joanjohnsonae* without a formal accompanying description, and this name cannot be accepted either until someone publishes a proper description according to the rules of the International Code of Zoological Nomenclature.

Although the above leaves the fish in question without a name at present, it is better so than called one of a variety of erroneous pseudo-scientific names. To quote Oliver<sup>1</sup>: "Collectors of aquarium fishes would serve the best interests of aquarist and ichthyologist alike if they proposed a simple common name such as 'brocade cichlid' for each unidentified species or form, instead of a troublesome and deceptive pseudo-scientific term."

This is an opinion I fully agree with, and feel that the hobbyist should take note, and leave the field of fish taxonomy well alone to those qualified to name fish properly.

In this connection, I would like to point out that the British Cichlid Association is officially adopting a policy in line with these sentiments by referring any undes-

cribed or dubiously named fish to a unique code number system by which each fish will be known until a proper name is assigned.

IAN C. SELICK

Department of Zoology,  
University of Bristol

<sup>1</sup>Oliver, M.K. (1975) *Labidochromis textilis*, a new cichlid fish (Teleostei-Cichlidae) from Lake Malawi. *Proceedings of the Biological Society of Washington*, vol. 88 (no. 29), pages 319-330.

<sup>2</sup>Burgess, W. E. (1975) Studies on the family Cichlidae. 2. New developments in the Malawi genus *Labidochromis*. *Tropical Fish Hobbyist*, 24 (4), 44-48.

<sup>3</sup>Axelrod, H. R. (1975) AFRICAN CICHLIDS OF LAKES MALAWI AND TANGANYIKA, 3rd edn., pp. 224, 236. TFH Publications Inc., Hong Kong.

### Calling Australia

I am hoping that you can help me through the pages of PFM. Last year, Mr C. H. Powell wrote to me from Australia. I answered his letter in July but it has been returned to me, marked: "insufficiently addressed". As the address below is the one on his letter, I'm at a loss to go further, so if anyone down-under knows of Mr C. H. Powell, Paddock Street, Victoria, Australia, please ask him to send his full address and I'll have another go.

R. ESSON

FBAS Council Member

22 Flamsted Avenue  
Wembley, Middlesex, HA9 6DL

### Hendon Congress 1976

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Continued on page 463



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# LETTERS

continued from page 458

Road, London, N.W.2, commencing at 6 p.m.

As many of you will know, we have been fortunate to obtain the services of the most eminent speakers the Continent has to offer. Previously we have acted as hosts to D. Vogt of Germany, H. C. De Witt, Arend Van den Neuwenhuizen and W. Tomey, all of Holland, Colonel Jorgen Scheel and Lief Christensen of Denmark to name but a few.

This year we have been fortunate enough to obtain the services of one of the most notable personalities of France, namely Professor B. Condé. To many aquarists he will need no introduction as

you may remember he presented the trophies at The Aquarium Show '74. Professor Condé is associated with both the University and Aquarium at Nancy.

The Congress will take the accepted form of previous years. Professor Condé's subjects, synchronised with colour slides, will be keeping and breeding of freshwater and marine fishes, and of course the general hobby of fish and plants. Thus there will be an evening that will appeal to all. Professor Condé's English is excellent and we can promise no language barrier.

Refreshments are available for early arrivals and once again during the long intervals, so there is every excuse to make this occasion a day out in London. We are confident that for 1976 our standards will be as high as they have been since we first began the Congress in the 1950s. The occasion also serves the opportunity to renew friendship with some of the other 300 aquarists who regularly attend this important occasion.

H. WHITE

Chairman, Hendon & District  
Aquatic Society

## PFM Breeders' Directory

Entries are made without charge as a service for breeders and readers. No responsibility for inaccuracies or dealings can be accepted by PFM. Readers are reminded that (for coldwater fishes in particular) stock will not be available at all times of the year. Enquiries by letter should contain stamps for replies.

**G. Bell** (10 Arch Grove, Long Ashton, nr. Bristol BS18 9BW. Phone Long Ashton 2135): Bristol shubunkins and lionheads.

**R. J. Bennett** (1 Heath Walk, Downend, Bristol BS16 6EY): lionhead, veiltail and Bristol shubunkin.

**D. Easingwood** (7 Cardale Croft, Binley, Coventry CV3 2ET. Phone Coventry 457555): fancy goldfish, especially Bristol shubunkins and lionheads.

**Mrs. J. F. Farmer** (Flat C, Longstone, Under

Minnow Road, Pilton, Barnstaple, N. Devon):  
*Aequidens curviceps*, *Apistogramma borelli*,  
*Apistogramma steindachneri*.

**D. Hanns** (57 Fraser Street, Burnley, Lancs. BB10 1UL): Livebearers-*Heterandria formosa*, *Phallichthys amates amates*, *Gambusia affinis affinis*, *Girardinus metallicus*, *Xiphophorus rhipidium*, *Heterandria (Pseudoxiphophorus) bimaculata*, *Poecilia (Limia) vittata*.

**Miss Yvette Long** (35 Meyer Road, Erith, Kent DA8 3SJ): guppy varieties — red delta, green king cobra, flame gold and gold.

**A. G. Mullins** (Woodlands, South Avenue, Langdon Hills, Basildon, Essex. Phone Basildon 411733): koi.

**F. W. Orme** (94 Newman Way, Rubery, Birmingham B45 9LZ): lionheads and veiltails.

**A. E. Roberts** (596 Queslett Road, Great Barr, Birmingham): Bristol shubunkins, calico veiltails and metallic orandas.

**T. G. Sutton** (2 Willaston Road, Marston Green, Birmingham 33): broadtail moors, calico veiltails, shubunkins, fantails, orandas, scaled veiltails.

## FILTRATION REVIEW—2

---

# Filter Types and Functions

---

By CLIFF HARRISON

**T**HERE are so many types and makes of filter on the market today that there can be no such thing as the 'best' model for all circumstances. Quite apart from the more practical considerations, such as the amount one is prepared to spend, the choice will depend very much on personal taste, perhaps influenced by reports from friends or the suggestions of your local aquatic dealer. However, there are two principal criteria, which must be examined before any decision is made to purchase.

The first criterion is tank size. If you will be stocking the aquarium with fish up to, or approaching, its maximum safe capacity, then a filter will have to work hard to keep the water clear. And for any aquarium 24 inches in length or over, the sheer volume of waste matter and debris will be considerable.

The second criterion is the size and type of the individual fish kept. A community aquarium of the smaller rasboras, tetras,

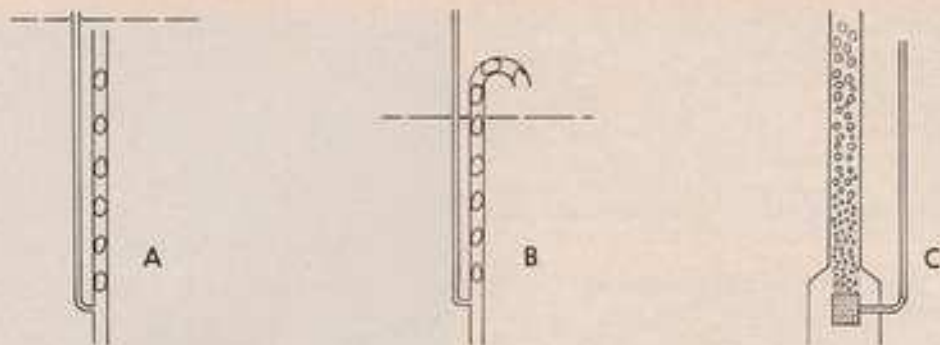
barbs, etc. is no problem: such fishes will consume fairly small quantities of proprietary dried/flake foods, and there is little chance of pollution except through gross carelessness. Certain larger members of the catfish, barb and cichlid families (along with many other 'oddies'), create problems by virtue of the nature of the foods they demand, and their behaviour. They tend to be very messy eaters, much of the food falling uneaten to the bottom; they often disturb the gravel, either in their search for food or as a behaviour pattern, which means that sub-gravel filters are unsuitable. They usually take exception to loose items in the aquarium, so the box-type filters are out. (The only satisfactory answer here is a good quality air-powered outside filter or, ideally, a power filter.)

The combination of results of considering these two criteria — size of the aquarium and type of fish — will govern the



Water clarity is usually the first demand by aquarists of aquarium filters, although often the action of a filter achieves much more than this. In this marine aquarium (photographed by the author at Tachbrook Tropicals Ltd) the inhabitants are dependent on the undergravel filter (Newflo) in use to maintain safe water conditions





Types of air-lifts: A, simplest type; B, air-lift to serve an external filter; C, fast-flow air-lift with air supply connected to an airstone

choice of filter (or, more precisely, may exclude certain types or models from consideration).

### Effective Filtration

The effectiveness of a particular filter will depend on at least four inter-related factors, detailed as follows:

(1) **Optimum water flow rate.** The water flow may be created either directly by a motorised pump (incorporated in what are termed 'power filters'), or alternatively by means of an air-lift, which is dependent on a supply of air from an air-pump. Motorised water pumps are very efficient, the manufacturers claiming 60 gallons an hour under ideal conditions from even the smaller models. Air-lifts are rather less efficient; my own experiments suggest that a simple air-lift, as commonly used in undergravel or box-type bottom filters, where the water does not have to be lifted above its own level, can move between 15 and 20 gallons an hour, and those 'fast-flow' models that incorporate an airstone can improve this figure to at least 30 gallons an hour. Naturally enough, those outside filters that are air-powered, where the water has to be lifted over the top frame of the aquarium, are likely to achieve figures substantially lower than this. Even so, you should not worry unduly about this aspect of a filter's performance in isolation: there is no reason to think that the water flow is ever less than adequate *when related to the overall performance of the filter*. In fact, the next three points can have a far more telling effect on actual performance.

(2) **Choice of filter medium.** Although

undergravel filters work in a way totally different from mechanical filters, it is just as important to select the right medium; if sand is used, as is often done in marine aquaria for decoration, then the clogging effect it has on the water flow prevents the bacterial colony from forming properly. Similarly, in mechanical filters, too fine a filter medium — such as cotton wool — reduces the flow to a trickle. Glass wool used to be popular, but had the disadvantage of packing down rather too tightly when wet, and proved a hazard to fish and owner alike from the small glass splinters. More recently, man-made fibres such as nylon and terylene have been used in wool or 'floss' form with excellent results. However, most of these materials are produced for general use with an anti-static agent added during manufacture. This can, and has, proved toxic to fish in the past, so ensure that you use only the proper aquatic grade. **Cagex Suresynth** is one well-known make and widely available. One manufacturer claims to have improved on these man-made fibres by 're-shaping' his product: **Interpet Polymer Wool** is formed, not as straight threads, but as minute spirals to give superior performance in water flow and particle retention. And, like the other man-made fibres, the 'wool' can be washed out and used again several times before it needs replacing.

(3) **Filter area.** It is obvious that the greater the filter area, the greater will be its capacity to hold and retain unsightly waste matter without unduly slowing the flow of water. It is probably only in the context of outside filters, where there is a very wide range of filter-box sizes available, that this has any direct bearing. With bottom filters, for instance, there is little

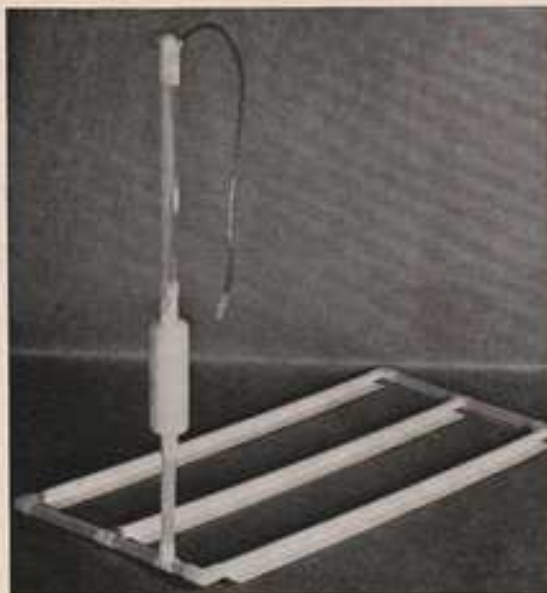
variation in size: to improve their capacity simply means purchasing additional units. A quick visual comparison of the various outside filters should indicate which ones may or may not be suitable for your particular requirements, but in any event be guided by your dealer's advice — he has probably used most of them himself, and so knows their relative performance.

(4) **Regularity of filter cleaning.** Unlike the undergravel filters which will continue without attention almost indefinitely, mechanical filters must be regularly cleaned out to ensure their continuing efficiency. A visual check every few days is all that is needed: the filter and medium should be thoroughly cleaned out in clear, cold water as soon as a distinct layer of sediment is established on the surface. This must be done at least once every 10 days, for this is about the length of time it takes for a jelly-like bacterial film to form over the sediment and cut-off the flow: this 'film' is, in fact, the same type of bacterial colony as is actually made use of in undergravel filters.

### Types of Filters

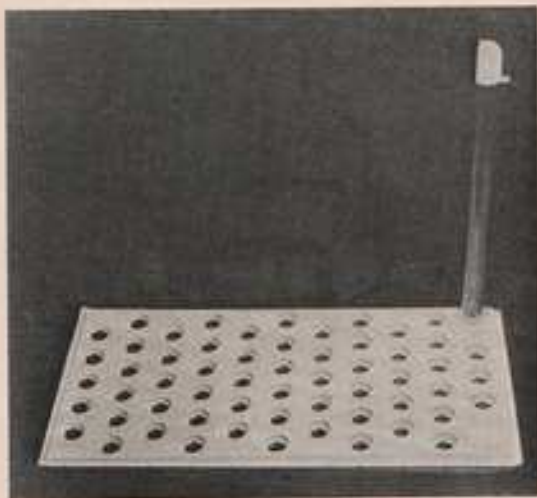
We will now examine in more detail the many types of filter available, their method of operation and their relative advantages and limitations.

**Undergravel (biological) filters.** These filters (the principles of their action were discussed in detail in part 1 of this series, last month) rely on the establishment of bacterial colonies in the aquarium gravel, by means of a steady and continuous flow of water through the full depth of perforated plastic plates or tubes, connected to one or more air-lifts, and placed on the base of the aquarium before the gravel is tipped in. Some models have a simple air-lift, and are very economical in their air requirements; others, often with a larger diameter lift-tube, include an air stone to give a faster flow of water — making them particularly popular for marine fishes. Undergravel filtration is also one of the few forms of filtration suit-



Undergravel filters: top, Newflo (Windmill Products); centre, Hykro Aqualift (Peterama Ltd); bottom, Algarde incorporating water treatment capsule





Interpet CV undergravel filter

able for use in a breeding tank, harmless even for newly hatched fry of most species; the principal exception would be for labyrinth species forming bubble-nests which are likely to be damaged by any form of aeration or water disturbance.

I must admit to a great personal liking for undergravel filtration: it is certainly very efficient, virtually trouble-free, and can be used in quite shallow tanks (by cutting the lift-tubes down so that they are at least 1 inch below the water surface). It is also about the least obtrusive filter in the aquarium, and operation is virtually unaffected by rocks etc., used in moderation. It is common practice to ensure that the greater part of the aquarium base area is covered by the filter. Undergravel filters are generally supplied in standard lengths of approximately 18 inches and 24 inches, and so it is a simple matter to use a combination of units to suit larger aquaria. A rumour has persisted for many years that plant growth is restricted with the use of undergravel filtration; I think that enough knowledgeable people have found this not to be the case for this story to have ceased long ago. However, I suppose that the filter is the easiest thing to blame if someone has no success with plants, even though it is innocent.

The original British design, the **Windmill Premier** biological filter, is formed by undergravel perforated tubes; it is still very popular, having established itself over many years with both coldwater and tropical enthusiasts. Available in sizes to suit

18 inch and 24 inch aquaria at £0.86 and £1.02 respectively, they may be used in multiples for larger aquaria. Recently introduced, and of particular interest to the marine enthusiast, is the **Windmill Newflo** filter, an improved design featuring stabilising plates on the tubes, and a new air-lift with a higher flow-rate. Sizes are as for the Premier filter (prices £1.80 and £2.05).

The **Algarde** undergravel filter is of the plate type, being the first of the vacuum-formed designs to be manufactured. It can accommodate a wide-bore air-lift at either or both ends of the filter plate, giving exceptionally high water flow for marine aquaria; alternatively one of the air-lifts can incorporate a 'water-treatment capsule', a plastic drum which will hold activated carbon, peat etc., to adjust the chemistry of the water.

Interesting news from Hillside Aquatics is that they are about to release their **Aqualonic Filta-Bed**, which has no air-lift tube, but I have no further details of this new undergravel filter.

The **Hykro** undergravel filter has an air-lift tube wide enough to accommodate a round air stone (which is supplied as standard) and an additional air-lift can be fitted if required at the opposite end of the plate to give maximum flow-rate. The filter plate has a large number of narrow slits — over 300 of them on the 24 inch size; the weight of the gravel over the plate is supported in the central area by rows of inverted pyramids which rest on the aquarium base. Available in three sizes.



The Aqualonic Filta-Bed undergravel filter is air-operated but does not have an air-lift tube



A recent introduction is the **Interpet CV** sub-gravel filter, a flat plate, tapering in depth, with rows of cylindrical 'pillars' beneath it to support the gravel on top. The bottom edge of each pillar has six 'notches' to permit the flow of water into the cavity below the filter plate. Although its design means that the filter is not quite as rigid as some of its competitors — and the manufacturer has informed us that a heavier gauge of plastic is to be used in future — there is certainly no doubt about the strength of those pillars, which supported my full 13 stones weight with ease. Another innovation is the diameter of the air-lift, which is sufficiently large to accommodate a slim (Minimatic) heater if desired for reasons of neatness or protection of the aquarium's occupants from direct contact with a heater. Prices £1.41 (17 in. by 11 in.) and £1.52 (23 in. by 11 in.).

An undergravel filter that is constructed to operate with a power filter is the one marketed by **Eheim**, and this will be considered with the power filter group.

**Sponge filters.** The sponge filter is one of the most basic and cheapest of mechanical aquarium filters. It comprises a simple plastic air-lift, the lower end of which is turned up to form a U shape; a cylinder of plastic sponge material can be fitted over this end, which is perforated to allow water to flow in. Two suckers attach the complete filter to the aquarium glass, keeping it upright. In operation, the air-lift draws water in through the sponge, which must be periodically removed and cleaned by squeezing under a cold tap; a replacement sponge may eventually be required. The only example of this type of filter regularly seen is the **Polyfilter** (price 37p), made of moulded plastic. It is very useful for aquaria containing young fish, as there is nothing to trap or harm them. It is also, within its limitations, a very efficient filter. However, its overall length will normally preclude its use in tanks shallower than about 12 inches — and then only with the water level fairly high. It also has a fairly limited filtering capacity, and will trap only fairly small particles of debris — not pieces of dead leaves, for instance. But at the price, it is well worth having one around for occasional or emergency use.

**Top corner filters.** One of the oldest styles of mechanical filter for the aquarium, comprising a simple air-lift fitted below a quarter-circle shaped filter box, which fits, as the name suggests, in a top corner of the aquarium. The box is filled with nylon floss or a similar medium, and perforations in the bottom of the box return the filtered water to the aquarium. Not often seen these days, its use is limited by the small area and depth of filtering medium. The unprotected water inlet of the air-lift tube means that it cannot be used with very small fish. However, it is easy to clean out and inexpensive to purchase, and many people prefer it to the ordinary bottom filter. The **Uno** corner filter is the model usually seen, and costs 40p.



A circular bottom filter — the Interpet Airstream model.

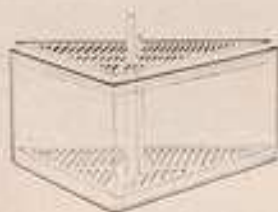
**Bottom filters.** Also known as box-filters, these are one of the least expensive and most efficient (for their size) filters on the market. Since they have to be located within the aquarium itself, some care has to be taken to camouflage them behind rocks or clumps of plants if the decorative effect is not to be spoiled. Some disturbance will also occur when, every week or so, they are removed for cleaning. Perhaps the greatest value of bottom filters is for use in fish houses, for tanks containing young fish which are being grown on (but are beyond the fry stage), where the simplicity of the filters and economy of air score strongly in their favour.

The typical bottom filter consists of three parts: the outer casing; the perforated lid; the inner air-lift and filter tray. The perforated lid is removed, and a few clean pebbles or glass marbles are placed on the perforated filter tray to give the



filter some weight when under water. A small mass of filter medium, such as nylon floss, is placed on the pebbles, care being taken to ensure that there are no gaps at the side for unfiltered water to pass by. With the lid placed securely on the box, the filter may be connected to the air-line and then carefully lowered into the aquarium, with gentle shaking of the filter to dislodge air bubbles trapped within the filter medium. When the filter is in place, the air supply should be adjusted to give a steady, slow stream of bubbles from the air-lift tube. If the aquarium is large or heavily stocked, a second or third box-filter may be added if the first becomes blocked with sediment too quickly. The filter must be cleaned out regularly if it is to work efficiently.

There are many examples of bottom filters currently available, many of them imported cheaply under unfamiliar names. However, there are several well-made models from established companies: the **Hykro Babies-out**, costing 50p, features a



Adjustment of size of water-flow slots is possible in this Hykro Babies-out Baby Saver bottom filter.

sliding grid on the top to reduce the size of the inlet slots for use with very young fish (though it is always unwise to use the filter with egg-layer fry present until they are a couple of weeks old). The grid can be slid back to the normal position when the filter is being used with older or adult fish. **Hykro** also have a standard aquarium bottom filter, with an angled top for efficiency and an air stone for high flow rate. Like the previous model, it is triangular in shape to fit unobtrusively into a corner of the aquarium.

The **K.B.** bottom filter (price 82p) is a circular model, with an inlet grid around the whole circumference, located low down so as to draw in the sediment more easily. Its 'double-chamber' construction prevents this sediment falling back into the tank as the filter is being removed for cleaning, and an air stone is fitted as standard.

In the **Armitage Aquarium Products**

Two horizontal plates make three compartments within the large (3000 c.c.) filter chamber of the **Nuova II** outside filter.



range there is both a circular bottom filter (with air stone) and a quadrant-shaped corner bottom filter.

An interesting (and versatile) variation of the bottom filter is the **Nuova Multiplus** filter (£1.30) which comprises separate filter and air-lift units; they can be arranged in several different ways to allow for various depths of water, and to enable the filter to be hidden behind rocks or other features in the tank. The length of the filter unit can be increased if desired by purchasing additional sections (28p each).

**Outside filters** (attached to the aquarium). These are probably the most popular filters, partly because they require only a minimum of parts actually in the aquarium, and partly because they are undoubtedly very effective filters — though many of the air-powered models do use considerable quantities of air, and the smallest air pumps may prove to be inadequate. The principal disadvantage of outside filters is that they have to be fitted on the outside of the top frame of the aquarium, either at the side or back of the tank; that generally means that the hood or cover will have to be modified to accept the siphon and air-lift tubes, and if the filter is located behind the aquarium (where the hood is easiest to alter), there may be difficulties over removing it for cleaning. Further disadvantages are that, for air-powered models, the water level in the aquarium must be kept within 1 inch or so of the top if it is to operate at maximum efficiency, and the air-lift tends to be rather noisy.

However, these filters cause practically no disfigurement to the arrangement inside

the aquarium, the sole requirements being one, two or sometimes three transparent siphon tubes of about  $\frac{1}{4}$  inch diameter. The external boxes are usually sufficiently deep to allow a very loose packing of the medium in them; alternatively to allow the use of several different filter media or materials. The only difficulty that might occur is in starting the siphon; the knack here is to fill the filter box with water from a clean cup or jug, and then to submerge the siphon tube in the aquarium. With a finger over the top end, carefully raise the tube up and over the top aquarium frame and dip it under the water level in the filter box before removing the finger. After that, start the air pump or filter motor. Before purchasing this type ensure that the plastic or metal hanger for the filter box will actually fit over the top frame of your aquarium — some are unsuited to the wide angle iron used in larger tanks.

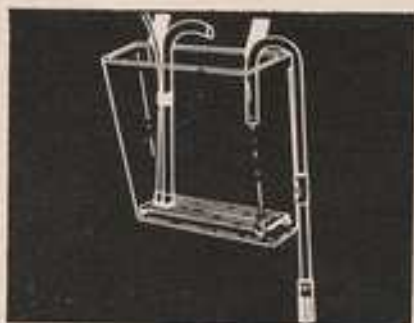
Although all working on the same principle, different manufacturers have developed so many designs that there are a number of quite different products.

An inexpensive filter for the smaller aquarium (I would suggest 24 inch maximum), is the **Interpet Airstream Slimline**, a basic single-siphon filter suitable for use with the smallest of air pumps, and priced at £1.25. At the other end of this company's range is the **Airstream Super Twin**, a quite massive filter box giving an area of 22 square inches, and featuring two siphons and twin air-lifts (£2.86).

The **K.B. Superslim** (£1.26) is another model that is ideal for the smaller aquarium; fitting neatly between the tank and the wall, as its name implies, and attached to the aquarium by means of a pair of metal clips that will adjust to suit any width of top frame.

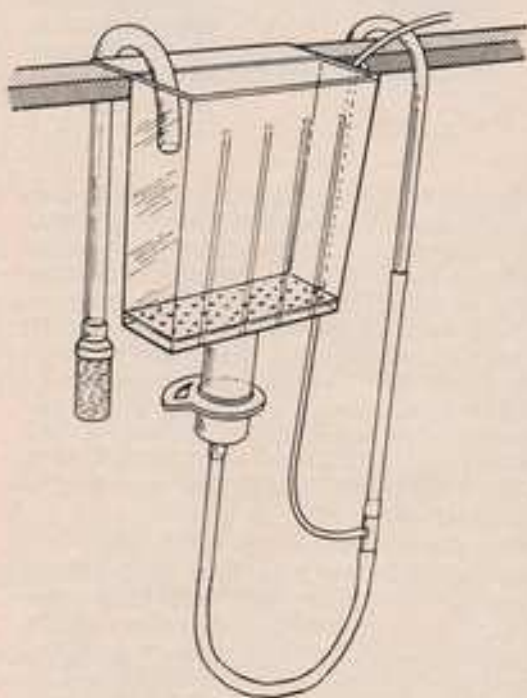
A well-made external filter featuring three horizontal compartments, to allow several different filter media/water conditioners to be kept quite separate in use, comes from **Nuova** (£4.97).

The **Hykro Power Filter**, though not the motorised unit that we have come to associate with the term 'power filter', has a special design which ensures a very high



Above, the Interpet Airstream Slimline external filter

Below, the Nuova Multiplus bottom filter (additional units extend the length and capacity of the filter)



Hykro Power Filter. A non-motorised external filter with high water flow





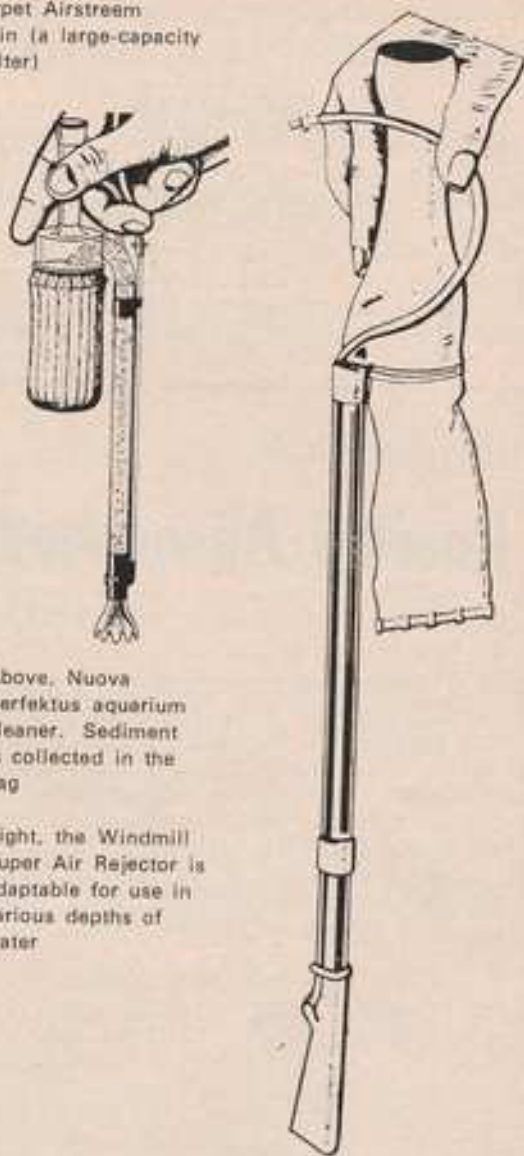
Left, Interpet Airstream Super Twin (a large-capacity outside filter)

water flow. A length of flexible plastic water tubing, approximately  $\frac{3}{8}$  inch in diameter, is attached to the lowest part of the filter box; this tubing forms a deep U, and ends in a rigid plastic hook-shaped tube to hang over the edge of the aquarium. A special fitting allows air to be introduced about 12 inches below the hooked tube, thus creating what is in effect an extra-deep air-lift. A normal siphon transfers water from the aquarium to the filter box. With this design it is absolutely vital either to site the air pump above the aquarium, or alternatively to loop the air-line supplying the lift at least 6 inches above the water level. By the way, the dangling plastic tube is a great temptation to young children!

### 'Vacuum' Cleaners

These are not strictly comparable with other filters in as much as they are intended only for occasional use, to remove sediment etc. that has built up on the surface of the gravel. Provided that the task is approached carefully, to avoid stirring everything up, these cleaners can be very effective. Some models are air-powered (little more than a small nylon bag attached to the end of an air-lift) and others have motor-driven pumps.

The **Windmill Air Rejector** (86p), is the simplest design of all, but is unsuitable for deep tanks; here the **Windmill Super Air Rejector** (£1.06) takes over, since it features a telescopic air-lift which will extend the unit to approximately 20 inches. Alternative air-operated designs include the **Algarde Aquarius Power Cleaner**, also with an adjustable tube for various water depths, and the **Nuova Perfektus** (£1.84), for which extension tubes are available as an extra.



Above, Nuova Perfektus aquarium cleaner. Sediment is collected in the bag

Right, the Windmill Super Air Rejector is adaptable for use in various depths of water

The principal motor-driven cleaner is the **Metaframe Aqua Vac**, priced at around £6, and this is the only model I have ever seen that will actually draw gravel into its wide-bore tube to thoroughly clean it (no - for some reason it doesn't go all the way up into the filter bag!). It is battery-driven, so quite safe, but care should be taken not to get the electric wet. There is also a vacuum cleaner manufactured by **Eheim** which I have not yet had a chance to try, but I would expect it to be as effec-

tive as their other products; however, it is very expensive.

### Filter Maintenance

Having spent all that money on a filter, you should keep it in proper working condition the whole time. The easiest way to do this is to invest in a set of three filter brushes (approx.  $\frac{1}{4}$ ,  $\frac{1}{2}$  and 1 inch diameter on long wire handles), to remove algae and other clogging deposits from the filter tubes. Quite inexpensive (35p under the

Interpet label), there are several types marketed by various manufacturers.

Although prices have been shown, these should be taken as a guide only; they may or may not include VAT. Imported items in particular are subject to change as new stock becomes available.

*The author is grateful for helpful co-operation from the staff of Tachbrook Tropicals Ltd, where he was able to examine a range of filter equipment.*

Next month: Power Filters

## An Experiment in

# Rearing Abandoned Mouthbrooder Eggs

By LES WOOLLER

LAST November I purchased a pair of *Pseudotropheus livingstonii* from Liphook Tropicals. When I arrived home with them, about 2 hours later, the female had ejected the eggs she was carrying in her mouth; these had already started to develop and had little tails on them. The fish were floated in my quarantine tank, containing hard tap water at 81°F. The tank was devoid of rocks, plants and gravel.

When the fish had acclimatised they were emptied, along with the eggs, of which there were six, into the tank. I decided to leave four fry with the parents, to see if the female would pick them up, and two were put into a jar containing water from the tank, and this jar was floated in the tank. The object of this was that I would have two eggs with which to experiment if the adults ate the others. On returning to my fish room, the eggs had neither been picked up nor eaten, so I decided to go ahead with the experiment, using all six eggs.

A 7 in. by 5 in. by 5 in. tank was filled with filtered water from the tank which the fish were already in. This small tank was then placed inside a 24 in. by 12 in. by 8 in. breeding tank, filled with water of the same conditions, to a depth of 6 in., which was 1 in. below the height of the inner tank. An inside box filter was set

up, inside the outer tank, with an outlet returning filtered water to the inner tank. This gave a constant flow of filtered water around the eggs, simulating, as near as possible, the effect of the female passing water through her gills.

The next day (2nd November) the eggs had developed into tadpole-like fry; by 3rd November one of the fry was missing and one was dead in the bottom. The remaining four were swimming about the bottom, and were carrying a large yolk sac. A small amount of freshly hatched brine shrimp was introduced into the tank and was eaten quite readily.

By 6th November the yolk sac had completely gone and the fry were free-swimming, although they did not venture far from the bottom of the tank. It was also noticed that the fry stayed at the less-bright end of the tank.

The fry that was missing was discovered, on the seventh day hiding under the filter; it had obviously swam out of the inner tank with the overflow of water. All the fry have now greatly increased in size (1½ cm.) and are eating six hearty meals of brine shrimp a day, and have been released from the inner tank and allowed to swim in the outer tank.

It would seem that this method makes it possible to raise eggs of mouth-brooding species away from the parents.



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**COLDWATER SCENE**


By **FRANK W. ORME**

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- **Coping with the awakening season**
- **Coming events**
- **Why show goldfish?**

With spring not so far away, the first green buds soon to be breaking through and tentative mating calls to be heard from birds responding to the quickening life of the awakening life cycle, fishkeepers too, no doubt, will become infected by these changing conditions. More and more often trips will be made to inspect their coldwater fish in both pool and fish house. Eagerly the first signs of renewed activity, below the water surface, will be noted and, with anticipation, the coming season will be contemplated. Those who breed their fish will make plans for the crossing of that male to the nice-looking female and, ah yes! that pair are even better! Every year, at the beginning of the season, the same story is repeated throughout the country; for surely this annual revival of interest is one of the joys of being an enthusiast of the coldwater fish.

Many newcomers to the hobby, in their eagerness to encourage the fish to become more active, make the mistake of over-feeding. This will neither accelerate the return of the fish from a semi-dormant state nor assist the fish to reach that degree of health that will bring them into breeding condition. In Nature, with the approach of cold weather, supplies of food are gradually reduced until it becomes almost non-existent and the semi-dormant fish are forced to live off their reserves of body fat. With the advent of spring the trend is reversed. Slowly different forms of food are made available in gradually increasing quantities. Spawning occurs when food is at full flush and the minute life, required by the newly hatching fry, abounds in plenty.

Obviously, the ideal is to copy Nature. When the fish are seen to be truly active, and pecking at the base and sides of their quarters, offer just a little food. Start with feeding every other day and slowly increase the amount whilst reducing the period between meals. Where possible,

provide live food. There is less chance of this type of food causing pollution, in the event that it is not all eaten.

Do not feed more than is eaten in a few minutes; if any is left withdraw further food until the first feed has been cleared up by the fish. More problems arise from overfeeding than from underfeeding! If the intention is to spawn the fish there is no finer food than earthworm as a conditioning food. Cleaned, and chopped into suitable sizes, the earthworm can become the major item in the diet and this, coupled with increasing temperature and hours of daylight, will bring the breeders into that state of health and well-being that leads to a spawning.



At the suggestion of their new chairman, Mr Roland Seal, the British Koi-Keepers Society has arranged an event that should interest all koi-keepers. This is a seminar, to be held at the Post Hotel, Leicester, on 14th March. Commencing at 11 a.m., the meeting will run until around 7 p.m. During this time such subjects will be discussed as Pond Construction, Fish Diet and Fish Diseases. It is also expected that films and slides will be shown of Japanese fish and pools. This is the ideal time of the year for the seminar to be held, being at the start of the 'Coldwater season', and should prove very successful and benefit all who are able to attend. Certainly I hope to be able to pay a visit to the meeting and give a report, in these columns, later in the year. Membership secretary of the Society is Mr D. C. Davies, 137 Gayfield Avenue, Brierley Hill, West Midlands.

Whilst on the subject of coming events, readers may be interested in the Open Show to be held at Coventry, on Sunday, 11th April, at The Templars School (see 'Dates for Your Diary' in this issue). Last



year the Coventry P. & A.S. and the Association of Midland Goldfish Keepers collaborated to stage the event. The result surpassed their expectations, both in the number and quality of fish, and attendance figures — throughout the day the public queue, outside the venue, did not appear to diminish as people passed through the exhibition. This has encouraged the two groups to again combine in the staging of the April Show. Coventry P. & A.S. will be responsible for the tropical fish classes; the coldwater section will be under the jurisdiction of the A.M.G.K.

From the coldwater point of view, this Show will be possibly one of the most comprehensive in number of classes among one day shows to be staged by provincial societies. Perhaps it will set an example to other groups — especially if they could see the interest displayed by the public. In all, the schedule comprises 18 classes, of which 16 are for the various Fancy Goldfish Varieties. These classes have been arranged in the following sections: Singletail Goldfish; Twintail Goldfish; Dorsal-less Goldfish; plus a section of three classes for any variety of goldfish not catered for in the previous section classes. The final section is divided into two classes for Koi and Any Other Variety of Pond Fish or River Fish. Another interesting point is that the tropical and coldwater exhibits will be staged in separate halls, adjacent to each other. Trade and other stands will be accommodated, also in an adjoining room. This arrangement allows easy, unjostled, viewing of those sections which are of particular interest to the visitor.

★ ★ ★

Upon occasion, recently, I have been critical of those shows which stage 'tableaux' to the exclusion of the more usual form of single display tanks containing the fish in an unobstructed way that allows easy viewing. 'Tableaux' are acceptable if they do not get the upper hand and overpower the show; they must not be allowed to become anything more than an ingenious novelty. Show committees who feel that the introduction of 'tableaux' would make their life easier, and be an added attraction, should take a leaf out of the PFM and FBAS Aquarium Show book. Visitors to this premier event

in London will know that in addition to 'tableaux' there are also classes for the individual; these cater for coldwater and tropical fish exhibits together with furnished aquaria etc. This is the ideal arrangement because it satisfies two essentials — the visiting public is both entertained and, one hopes, educated, and equally the enthusiast, who goes to see fish, is able to admire quality specimens. Therefore, everybody is happy and little ground is left to criticise! (The Aquarium Show dates this year are 29th-31st October).

★ ★ ★

How many novices, I wonder, are led astray by statements which they read in books? Not so long ago a well-known Midland breeder and exhibitor was in conversation with me when we were approached by a novice. "Where", he enquired, "can I obtain Crucian carp?" Somewhat surprised by the unexpected question, we replied to the effect that we had no idea. "Oh, then I won't be able to experiment!" was his despondent reaction. "Experiment?"; this interested me: "What experiment?" His look implied that he was going to teach me something, but his answer was something else. "I have been reading a book", he said, "and it says that if I cross a Crucian carp with a good, black, moor goldfish the young will be Bristol shubunkins".

For a moment the breeder and I were stunned into silence, then, trying hard to hide our laughter, we dissuaded him from the project. The novice thanked us and departed, after saying, "Why do people write books if they give wrong facts? I'll do as you say and buy a pair of shubunkins". If the breeder reads this I know that he will start laughing again; if the novice reads this I hope he will forgive our, hardly disguised, amusement and realise the reason why. At least he was saved a lot of wasted effort!

★ ★ ★

From reports I have received from breeders that I know, the PFM Breeders' Directory has brought a number of enquiries, and this, they feel, has proved the argument that there is a need for this sort of information. From my own exper-



ience I can confirm the enquiries. In fact, shortly after the Directory appeared in the November issue of PFM, I arrived home one lunch-time to find a young couple waiting. They had motored from London in the hope of obtaining fish! Although I had nothing available at that time, I did manage to find a small veiltail and a couple of little uncoloured lionheads which I gave to them. I felt that it would be a pity if, after the long journey, they had to return empty-handed. I also gave them directions to another breeder. Whether he was able to help them I haven't heard. However, it would have been safer to write, before making the journey — it could so easily have been a wasted time!



The ever-increasing cost of fuel, and electricity, is aiding the coldwater fish in its efforts to make a come-back, having for so long been displaced by the tropical fish. Have readers noticed that the offer of fancy goldfish is appearing more often in dealers' advertisements? The time was when the advertisements of certain dealers always listed a number of different types of coldwater fishes, other than goldfish. Will those days return? Perhaps they will, slowly, if costs continue to rise.

I recall that it was the vivid breeding colours of the lowly stickleback that first sowed the seeds of my interest. Like most 10 year olds I used to catch these fish, but, instead of keeping them in jam jars, I used to keep them in containers made from the old-fashioned square tin boxes in which retailers received their biscuits. The box was turned into a small tank by cutting out one of the sides and glazing with glass; the remaining internal surfaces were given two or three coats of bitumastic paint to protect them.

Slowly I built up a battery of these 'aquaria', which were given a base of mud and stones obtained from a local stream, which also supplied the plants and fish. How I did it I cannot remember, but I not only induced the sticklebacks to spawn but also managed to rear some of the young to adults! The result was that my father made my first 'real aquarium' for me and also took me on a shopping expedition to buy my first 'exotic' fish — a pair of fantails!

The point is that, before buying the fish,

we were able to look at various sorts of coldwater fishes, in the tanks of different city pet-shops! Incidentally it was only due to the war that my interest ceased — to be revived when I returned to 'civvy street', but that is another story.



Why do exhibitors show their fish? The question is prompted by two conversations that I had recently. The first boiled down to the fact that the exhibitor was disappointed not to be presented with a cup, despite his fish gaining a first award. The second man was pleased because his fish had taken first and third place but he bemoaned the fact that he had been told he must accept a cup. "Look at the cost of returning it, the responsibility of keeping it safe, not to mention the job of keeping it clean," he grumbled. Two different points of view and yet perhaps the second man had some valid points. My own reasons for entering fish in shows is that it allows me to get a second opinion as to their quality. I can judge for myself the difference between the competing fish and it provides purpose to my visits to the shows, where much animated discussion of the exhibits takes place. A cup is really not necessary. Of more importance is the award card — which states the points gained and the number of entries in the class. With the present high cost it does, in any event, become rather difficult to present a cup for every class — the trophies, which usually accompany a first award, are quite an expense to a show committee without the added cost of extra cups — which may not always be returned. Perhaps it should be borne in mind that most cups are presented by individuals to the show committee and that the show itself is to test the standard of the fish!

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WHEN the U.S.A. magazine SALT WATER AQUARIUM ceased publication its loss was mourned by many marine aquarists. Editor and publisher, Robert P. L. Straughan, the doyen of saltwater aquarists, has now been prevailed upon to publish an annual issue. The first, 1976, edition is available from January onwards at a cost of \$3.95 and dealer and jobber inquiries are especially invited. Letters should be addressed to: Robert P. L. Straughan, P.O. Box 567, Silver Springs, Florida 32688, U.S.A.



## MARINIST'S NOTEBOOK

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# Improving on the Life-Spans

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By ROY PINKS

EVERYONE who is keeping tropical marine fishes comes to the point at which failures and rising costs make him consider very carefully whether he is trying to achieve the impossible. Only the aquarist with ready access to fresh seawater or with enough money to maintain a near-open system (by implementing frequent and thorough-going water changes) can hope to provide anything like the necessary basis for keeping the fish alive in captivity for periods even approaching those which apply to freshwater species.

This is a point which nearly all the books and all the enthusiasts gloss over: nor would one expect the trade to shout the message from the rooftops. If you are going in for marines you must certainly accept that you overcome the initial trials, enjoy some modest success, and then probably fail disastrously. If this pattern is ignored or not understood, there can be all sorts of recriminations, but this column has so consistently made the point that it is a risky business that we are unlikely to be charged with firing readers with misplaced optimism.

It may be asked, therefore, whether it is right to pursue what is a proven expensive and sometimes death-dealing course, and I have no doubt that through and through conservationists would have us give up the whole mad process in deference to some other pastime which we could follow with happier results. I believe that it was Bob Straughan, noted for his skill in collecting fish as well as for his respect for them as creatures, who underlined the proposition that the under-gravel filter is the only significant contribution to marine fishkeeping over many years, and few would disagree with this. As this very simple and effective device bridged the first big gap, it does seem

possible that we might progress just as drastically at some time in the future by invoking some comparable technique. For the home aquarist to be in the least interested, whatever form this may take must be reasonably simple and cheap.

It is highly likely that laboratory resources applied to marines would lengthen the life span of marine fishes indefinitely, but the amateur just cannot envisage this scale of effort for the very obvious objections of complexity, size and cost. For this reason alone, there is an incentive to thoughtful aquarists to keep pegging away in an effort to improve the longevity prospects of their charges, and there are several lines of action which fairly readily suggest themselves.

The furtherance of any programme of this sort must depend on a firm sense of responsibility on the part of marinists everywhere, and they must resist the many temptations to create marine replicas of freshwater counterparts. The marine community tank is about as meaningless as balanced conditions in a freshwater tank, and considered thought should be given to the purpose of every saltwater tank set up in future. The total content of a marine tank is not what is important: because if this is what the owner considers to be important, it is likely that he will cram it so full that it will fail, and this is the sort of thing which has bedevilled us so much in the past.

I reached the point last year when I had to take stock of all these things. My first marine project was unsuccessful, measured in terms such as those which I have just rejected. I began to look at each main factor in the culture, to try and find out which was more important than another, and in ensuing 'Notebooks' I will give my own reactions.





by  
ARPEE

## Personal COMMENT

**I**N the notes given on scheduled tank maintenance the stage has been reached at which we should consider the necessary features of our servicing programme to be undertaken at 6-monthly intervals. After the quarterly stage has been passed, the matters we should be looking at tend to become less detailed and more political, so it is unlikely that, if you miss them out, disasters will be as great as they would have been if some of the daily and weekly chores already discussed had been overlooked.

Nevertheless, there are some details worth looking at. Although a temperature check features in most of the earlier routines, it is worth checking the accuracy of the thermometers themselves. It may be found that the odd one is several degrees out, and whichever way this may happen to be, it bodes no good for the health of the fish or for the lining of your pocket.

*Externals:* Another minor point is that, as time goes on, the build-up of dust and cobwebs in those inaccessible parts of the rear and lower portions of aquarium stands becomes quite considerable, and as they grow with us we tend not to notice them. A really thorough clean, possibly aided by a feather duster or a vacuum cleaner, will make the whole appearance much more acceptable. Tanks which are unadorned by external potted plants are easiest to clean, but as many of us incorporate house plants into our schemes, it should not be forgotten that the leaves of these get very dusty, and deserve a cleaning, too. If the weather is suitably mild, many of these plants will benefit greatly if they are stood outside during steady light rain. Before they are replaced by the tankside they should be examined for dead leaves and flower heads etc.

*Lighting.* On the whole we tend to be rather conservative about the amount of

light we allow into our aquaria. Because we are terrified about the growth of algae if we put our tank in a sunny place we tend to relegate it to a dark corner and then fail completely to provide the optimum level of light for the plants we have chosen. It is therefore worthwhile to analyse the performance of the plants in each tank at the 6-months stage, to determine whether corrective action needs to be taken. It is not too difficult to double the intensity of overhead lighting, though in so doing you may need to redesign your tank cover. Give consideration to the merits of filament lighting to supplement fluorescent sources, and take into account that there are different grades of the latter. A new graduation, marketed as True Lite, looks very interesting, but its very high cost (albeit allied with longer life) puts it at the bottom of my shopping list until it becomes cheaper. The lamp manufacturers have never explained why small tubes are so expensive, and until they do, I shall resist all expensive innovations.

*Tank scrapers.* One of the most ill-used tools in my house is the tank scraper. This is partly because it is inefficient (I have yet to discover a good one), and partly because I am forgetful enough to omit to change the blade at regular intervals. The result is a rusty, wretch of a thing which, if it does not disintegrate when the least pressure is applied, tends to scrawl rude words and drawings on my tank front as I ineffectually drag it around. The insertion of a new blade brings about the most astonishing transformation in performance, and it could be argued that a new blade each time is worth the sheer pleasure it brings.

*Fish population.* In a large tank, especially if large and small species are kept together, losses are not always noticed, and it is sometimes quite a shock to come to terms with what turns out to be a series of insidious losses. It is important to take heed of the species which have failed, as it could well be that the conditions in your tank just do not suit them. There may be a bullying fish which treats all newcomers alike and which eventually kills them off, or the water quality may be unsuitable. There is no doubt that if you find certain fish doing well, encourage them for all you are worth, as you should then finish up with really good specimens. Those



which only just get by are best left alone, as it is seldom that you can persuade animals to go against the run of Nature. In considering the population of your tank, therefore, do not just try to fill in the gaps, but positively aim to reject certain species, and to buy in more of a smaller range. The collection will then take on a more cohesive appearance — the bittiness of some tanks is very much their undoing.

*Contours.* It should now be possible to take a further appreciation of the inner contours of the tank. The initial layout (or the latest one!) will have had time to settle (or disintegrate), and notes should be made of points which could form part of a major re-organisation at about the year mark. It is important that patience should be exercised in tank layout — it is possible to achieve dozens of possible combinations in the course of a week or so. This, however, is absurd, because nothing ever gets a real chance to prove itself. To take stock at the suggested long intervals enables slow starter plants to get their roots down and to start revealing their full stature, at which point subordinate features can be arranged around them.



If you read through some of the aquarium magazines of the 'twenties you will see constant references to the need to incorporate snails in almost every tank, though breeding tanks were specifically excluded. It took a very long time, somehow, for aquarists to tumble to some of the lowly tricks these creatures played, and when it was established (but hardly a profound discovery!) that they damaged certain plants, there was quite a backlash, and they were virtually banished. Pool suppliers have pressed the claims of snail populations for garden ponds, and to some extent they have made a comeback — unexpectedly, sometimes, when aquarists have moved pond plants to indoor tanks without de-snailing them.

On the whole I feel that water snails are over-maligned. There are some quite beautiful varieties and certain of them are distinctly useful. Whilst others are disreputable in every way, they all share the one characteristic that they multiply

very easily under certain conditions, and the real danger to the plants is when the stage of over-population is reached. There are only two ways I know of controlling the growth rate: one is by using one's fingers to rub out the eggs as soon as they are seen, and the other is to employ larger species of fish to feed on the young snails before their shells harden. Many would argue otherwise, but I believe that if you only have one or two tanks and are determined to include some snails, you can keep them under control by including egg destruction on your weekly routine sheet. Some will certainly evade you because the adult snails find some pretty original places in which to conceal their spawn, but even if a few young do manage to survive, they can be picked off rather more easily as they become larger.

There are probably only two snails which meet with even qualified approval, but if you are determined, try other species and use more stringent disciplines. The first is the red planorbis, and the other is the Malayan burrowing snail. The red planorbis or ramshorn is flattened, with a shell varying from black to light brown, and it is easily the most beautiful of them all. The body colour varies somewhat from deep to light red, and it will be realised quite readily how this will come across under Gro-Lux lighting.

The original form of black planorbis may be used as contrast — the two varieties in the same tank can prove very striking. These are really more suitable for the coldwater tank than for the tropical because the reproduction rate is that much slower, and because coldwater fishes are more likely to browse on the young snails than are the majority of tropicals. If some of the harder, tougher plants, like *Potamogeton* and *Elodea canadensis* are used, the damage done will be minimal, and may in many cases be eclipsed by the ravages of the fish themselves. Somehow the whole nature of this snail — its looks and its locomotion — suggests the more leisurely tempo of the coldwater than of the exotic tank.

For the warm-water enthusiast the tiny Malayan snail is well worth inclusion. It is a nocturnal creature — or nearly so — and takes a little time to settle down. Once it has done so you will be astonished at the extent of its productive powers, and if you switch on the tank light after dark,



many hundreds of these snails may be seen at work.

The value of snails in a tank is difficult to assess. They tend to dispose of waste food, and they may feed off some of the softer, deteriorating vegetation, including algae. But in all honesty I cannot commend snails as positively good factors because we all know how well tanks will do without them. They do add a point of interest, and in the case of the red planorbis they provide a glorious splash of colour at very low cost. The Malayan snail burrows into the substratum and could be regarded as useful in the sense that this action often helps to keep the granules open and less prone to pollution (much depends, of course, on whether you have a subgravel filter in operation). Try these two species, therefore, because they are safer than most.

There is only one other species worthy of our attention, namely the Ampullaria or Infusoria Snail, and I will discuss this in the future.



Although these notes are mainly concerned with fish shapes, it should be mentioned that species posture is also a variation which should be taken into account when planning a tankful of species which display unusual form. For example, the spotted headstander (*Chilodus punctatus*) is a fairly normally shaped fish, yet its head-down stance marks it as something of an oddity.

In this discussion (see PFM, December, 1975) we have regarded the zebra danio as the norm, against which we have compared a number of other species in terms of size and shape. A species which is rather larger than the zebra, but shaped something like a billhook, is the penguin (*Thayeria sanctaemariae*). Like the headstander, it has a slanting posture, but in this case the head is carried high and the tail low. The bold black horizontal stripe, which bends sharply down into the tail, is a very strong accent in the aquarium, and this is indeed a striking fish. The penguin seems to be 'revving up' all the time, ready to leap away when disturbed, and could be described as something of a jumpy fish. Many fishkeepers will have had no trouble

with them — and they are not at all fussy from the management point of view — but there are aggressive traits in some specimens, leading to fin-nipping and intimidation, and it is therefore suggested that they should be associated with species fully capable of looking after themselves.

Another mid-water swimmer, about twice the size of the zebra, but built on finer and more flowing lines, is the splash tetra (*Copeina arnoldi*). This is a buff coloured fish, not particularly arresting at first sight, especially where immature specimens are concerned. However, adults are a fine sight, notably the male, with his trailing dorsal and tail fins, and a pair should be included in every collection if only on account of the possibility that it will indulge in its unusual method of spawning.

By comparison with the zebra the gouramies are more oblong in general shape, and in most cases they are many times larger. For the average collection, the dwarf (*Colisa lalia*) and the lace (*Trichogaster leeri*) are probably as good recommendations as you will ever get, though there are other undeniably excellent species which you could run with them, and the moonlight (*T. microlepis*) would act as a splendid foil. The fact must be faced that some specimens get temperamental and that some species are delicate, but the group is well worth persevering with, as the visual impact of in-form individuals is something out of the ordinary.

If you tip a square on to one corner you have something like the shape of an angel, and similar in bulk, though rounder, is the discus. I am never very confident of recommending cichlids for mixed collections, though, of course, if it is shape which appeals to you, there is no reason why you should not set up aquaria for angels, discus or other cichlids on the 'separate rooms' principle. Cichlids are very individual, they are very regal and they can be the most shocking bullies, so they should be treated in isolation if the best results are to be achieved. The discus, in particular, is so very worthy of special study that it is unfair and unwise, all round, to mix it. The specialist societies dealing with this fine fish are well worth joining, in order that a full understanding of its requirements and possibilities can be reached.

In the lower waters of your tank of



unusual shapes, some kuhli loaches (*Acanthophtalmus semicinctus*) will surely find a place. They are long, thin snake-like creatures, several times as long as the zebra, and only as solid in cross-section when fully grown. They are flat on the underside, have an amazing turn of speed, and are almost indestructible. Don't always expect to see them, though. They are often tucked away and only come out when it suits them.

The large family of corydoras catfish — most are twice as long as the zebra and very much bulkier — will grace the floor of your tank, and it is entirely a matter of individual taste as to which species are most attractive. I like the spotted ones most of all, but all the cats, together with the botias, comprise a group whose body shape — rather squat and flattened — contrasts well with the other general attractions which have been listed.

## What's New?

### Aquarium Without Angles

FOR those who enjoy the unexpected vista as they watch their fish, the **Powquip Aquarium** should fulfill their requirements. The aquarium consists of two shaped clear domes joined together by a stainless steel trim and mounted horizontally on a bright plated pedestal with a cruciform base with hard rubber feet. The 22 in. spread of the base ensures stability. It has a capacity of 5 gallons (22.7 litres) and is the product of the Power Equipment Company Limited, Kingsbury Works, Kingsbury Road, London, NW9 8UU.

### Purified Water on Tap

FISHKEEPERS who require a readily available supply of purified water (of interest more perhaps to the commercial breeder than to the owner of the sitting room tank), the Permutit Standard Plant Division, Houseman Hegro Limited, have brought out the **Ionmiser Model 2C**, the 'baby' of the portable range. It is compact in design yet allows for a full 2 litres of resin. In use, it merely connects to the nearest water supply outlet and will provide up to 300 litres (limited only by flow insert) (66 gallons) per hour. The water supply connection is by flexible hose and

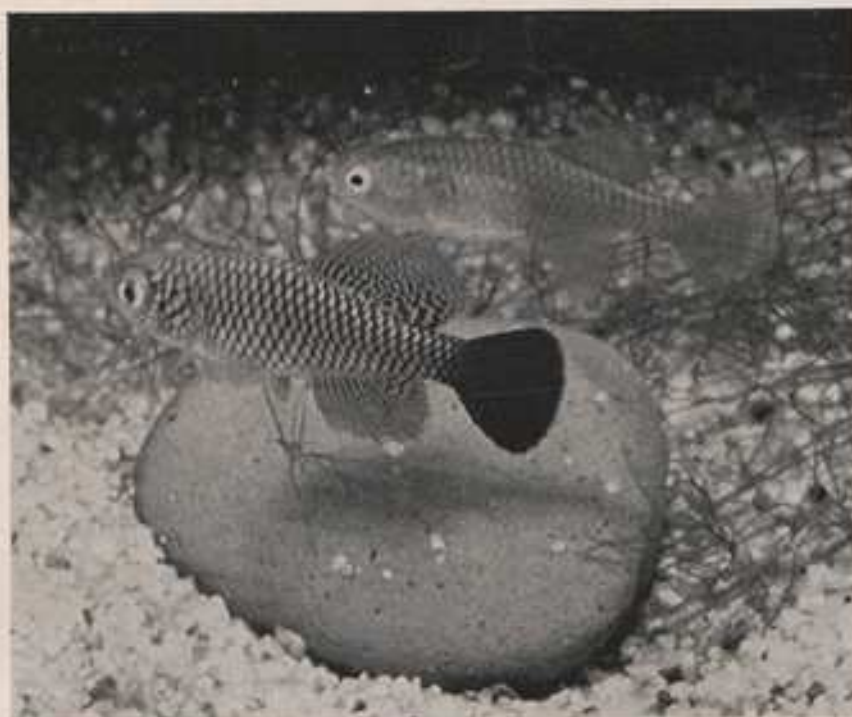
adaptor for fitting to a 13mm (1½ in.) diameter water supply pipe or spout fitting. The problem of display of water purity has been solved by the use of just one green indicator light and two test buttons, one for battery condition and the other for water. The green light indicates that the battery and water conditions are correct. To recharge, the throwaway cartridge is simply unscrewed and replaced with new. Details regarding stockists will be supplied by Mr Tony McDonald, Houseman Hegro Limited, The Priory, Burnham, Slough, SL1 7LS (phone 062 86 4488).

### Handyman's Trimming Knives

AQUARISTS are frequently to be found in the ranks of Do-It-Yourselfers and have need of a sharp, general-purpose cutting tool (particularly those who are already building tableaux for this year's Aquarium Show) and Eric Woods (Rosewood) Ltd. are planning to supply the need. They are introducing a range of high-quality multi-purpose trimming knives in two sizes — a small pocket-sized cutter ideal for intricate work and a larger, robust trimming knife. The knives have fully retractable, multi-position blades for safety and are supplied complete with spare blades. They are manufactured in die cast aluminium with a choice of red, blue or grey, epoxy-coated finished, and retail at 50p and 90p respectively.



## Bottom-Spawning Toothcarps



*Nothobranchius palmquisti*

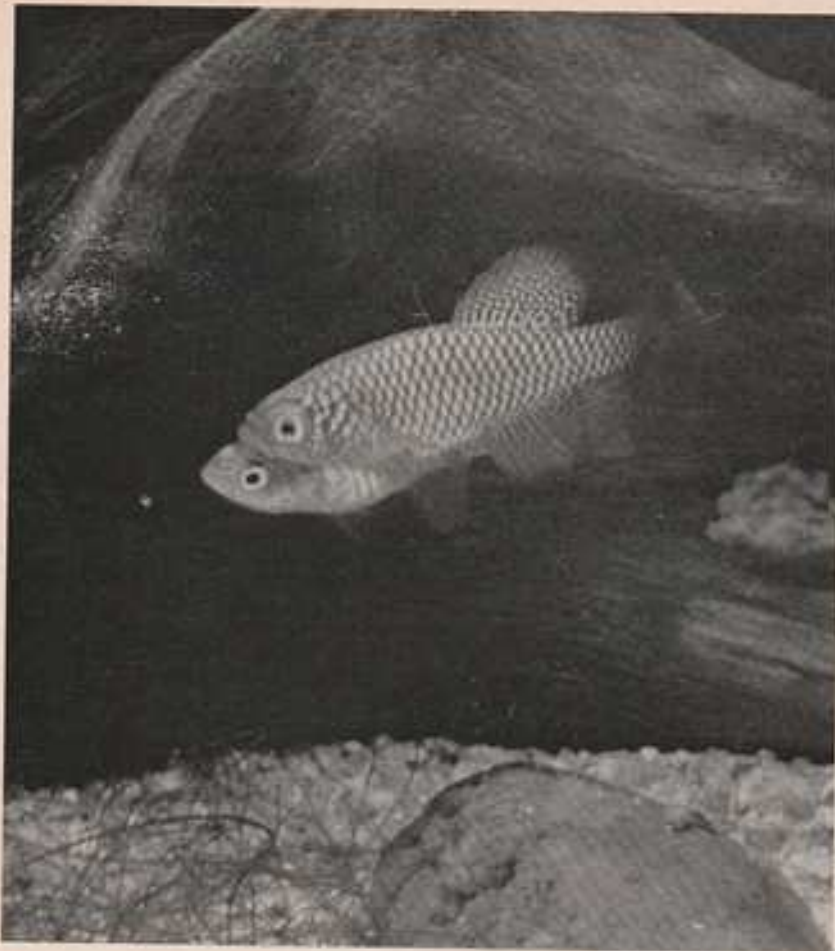
By RUDOLPH ZUKAL

Photographs by the author

Translated by F. MARSH

THESE beautiful toothcarps live in shallow waters in south Kenya and Tanzania in east Africa, and were first imported into Europe in 1957. The males grow to about 2 inches (5 cm) — the females are smaller and, of course, much less brightly coloured. *Nothobranchius palmquisti* very closely resembles the more familiar *N. guentheri*. In fact there has been some question as to whether these two species are identical and whether one is only a sub-species or colour variant of the other; however, I propose to leave this aside and just examine the fish known as *N. palmquisti* more closely. So, as I have said, it resembles *N. guentheri* but is somewhat smaller, lacks the black border to the caudal fin and has blueish eyes. Its belly is yellowish and the scales are clearly outlined in red to give the impression of a net. In the rear part of the body, green predominates. Pectoral and ventral fins are bordered in bright blue; dorsal and anal fins are spotted and striped in brownish red. The caudal fin is red (without a black border). The female is inconspicuously coloured, grey to brownish, with the underpart of the body a silvery green.

The fish do well at a temperature of 68-70°F (20°C)



Pictures on this page show phases in the pre-breeding behaviour pattern. Here the male presses against the female's side as she is chased to the bottom in the plants



Shortly before spawning commences the male appears to 'ride' above the female's back.



in not too large a tank (a higher water temperature shortens their already limited life span). They like a well-planted tank and soft bottom medium (immaculate cleanliness or specific water conditions are not at all critical factors in their maintenance). The adult fish often contract tuberculosis, however, and they are more susceptible to parasites of the *Oodinium* species if they are kept in dirty, soft, slightly acid water.

For breeding purposes a small all-glass tank is sufficient, and ordinary tap water, at a temperature of 72-75°F. Several pairs can be put in to breed at the same time. On the bottom of the spawning tank I lay about  $\frac{1}{2}$  inch (5 cm) of peat. The fish are typical bottom-spawners and the eggs

(which are laid individually by the female in the soft bottom. The spawning itself takes place at intervals over several days and is similar to that of *Aphyosemion arnoldi*. Once the spawning is completed, I remove the fish and the tank water is drained off. The peat containing the eggs is carefully preserved in a damp condition, and 4-6 weeks later, can be covered with soft water, when the eggs will hatch. Rearing the fry is not difficult.

If spawning takes place in a tank with sand on the bottom the eggs can be removed from the tank by means of a glass dip-tube and placed, as before, in damp peat. This 'resting' period corresponds to the 'dry season' in Nature when the eggs lie dormant.



Left: The fish commence the spawning and attempt to dive into the bottom medium. As this is gravel they do not succeed and with bodies pressed together they spawn on the top. Right: While spawning both fish have their anal fins vertical to the bottom

A Freshwater Fish Known to All:

## The Humble MINNOW

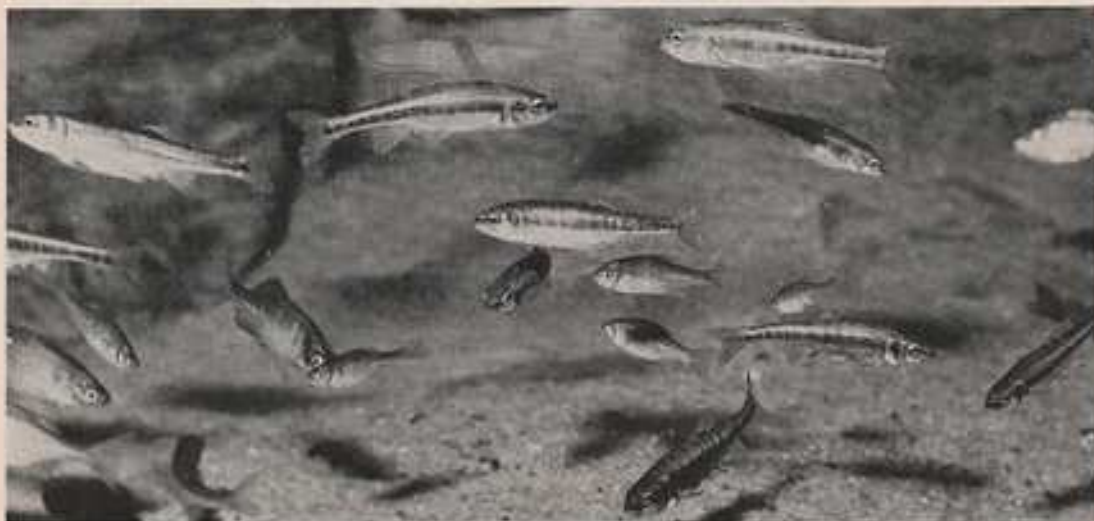


Photo :

W. J. HOWES

A shoal of minnows in a coldwater community aquarium with bitterling

By FRANK ORME

ONE of the commonest of our native freshwater fishes, the minnow rejoices in the scientific name of *Phoxinus phoxinus*. A member of the largest known fish family, that of the carps, it has around a thousand relatives distributed in practically every area of the world. The minnow has made its home from Western Europe to as far afield as Lake Bajkal and some of the Siberian Rivers.

The minnow is easily recognised by its cylindrical body, and short bluntish head, which is covered in tiny scales (there are from 80 to 100 along the lateral line), that give a silver-grey background to the irregular dark bars that are placed vertically on the sides of the fish. The back is

a dark green or brown, bordered on the sides with a golden stripe. Rarely does the minnow exceed 4 inches in length, although the occasional specimen of up to 6 inches has been found. Although it may resemble other small species of the carp family it can be singled out by the lack of barbels and the golden band on dappled sides, which makes it a much more handsome fellow than his uniform and drab in colour relatives.

Minnows can be found in most clear sandy or gravel bottom streams, rivers, ponds and lakes (with the exception of Western Ireland and Northern Scotland), swimming in sometimes large shoals along the border between shallow and deep



water in alert procession. If alarmed they dart into the greater safety of deep water until the danger passes. Being inquisitive they will examine bright or unusual objects and this can often lead to their downfall — if the object happens to be a glass or plastic 'minnow trap'.

Under natural conditions this active little fish feeds upon small live foods, vegetable matter, small worms and the eggs of fishes; in other words it has a true carp-like appetite!

During May to July, the minnow is in breeding condition; it assumes a scarlet flush to the belly and, again in the carp fashion, develops small whitish nuptial tubercles on the head and the thickened ray of the pectoral fin. The fish do not pair off with individual partners but spawn haphazardly in a 'flock'; thus a single male may fertilise the eggs of many females. The spawning fish congregate in large shoals near sand or gravel banks in shallow water, and during the hectic activity of the spawning chase the fish are oblivious to danger and can be caught very easily. Each female is capable of laying up to a thousand eggs, which are very small and adhesive, sinking through the water to stick to the gravel of the breeding site. It is at this stage, whilst the eggs are hatching, that many are lost to various prowlers — as are a good many of the newly hatched fry and young fish. Underwater life is cruel and survival of the species is ensured by the vast quantity of spawn that is laid. Later only the fastest and strongest (or very lucky) minnows will escape the jaws of predators, to grow on and produce further generations of minnows.

Although the angler is interested in this fish only as bait to catch larger fishes, the aquarist will find that minnows make very suitable, hardy and lively occupants for either the garden pool or a large tank. In the pool they will shoal near the surface, twisting and darting in flashes of silver — occasionally leaping to capture a fly or some other small insect.

As has already been mentioned, they have an inquisitive nature and, like most fishes of this type, will soon lose all fear and become quite tame. It must be remembered, however, that they do require space and clean living conditions if they are to remain healthy. They are fish from the wild and common sense dictates that

caution must be exercised. They are more than possibly carrying some pests, for few fish in their native unrestricted state can avoid the attention of some form of parasite such as fluke or fish louse. Always bear this in mind when dealing with fishes from wild sources, no matter what type of fish; it could be harbouring trouble for you if released into quarters containing other healthy fish, without first quarantining it.

Place the newly acquired fish into a clean tank and allow it to settle down for 24 hours. As a precaution it can then be given a disinfectant treatment such as Sterazin, according to the manufacturers' instructions. Keep the fish in quarantine for at least 2-3 weeks, during which time it can be fed upon daphnia, chopped earthworm and whiteworm. It can also be given an occasional feed of a proprietary food, in order to accustom the newcomer to the normal diet upon which you feed your other fish.

Being a member of the same family as the goldfish, the minnow is quite safe to keep with other fish of a harmless character. In the pool minnows will add movement to contrast with the lazy swimming of goldfish, whilst in the glass-sided tank they will provide continuous activity as they indulge in spells of torpedoing through the water. To prevent accidental losses through jumping keep the tank covered.

Although in Nature the minnow indulges in mass spawning it is quite possible, if the right conditioning and conditions are provided, to spawn with a single pair. After spawning remove the fish and hatch the eggs in the same way that goldfish spawn is hatched out; minnow fry are also raised in the normal goldfish manner.

For the coldwater fishkeeper the minnow is an ideal fish, hardy, active, easily satisfied with the usual foods, without vicious habits and easily tameable. Either ask an angler or some youngsters to catch a few for you, or go out and catch some yourself. Whichever method you use to obtain your fish let me make the plea that you take no more than you can look after. Whenever specimens are taken from the wild, no matter whether plants, fish, or some other animal form, never take more than are required and can be cared for. Nature can be denuded all too easily by the avaricious or unthinking collector.

# Red Plants for Contrast



A group of submerged *Alternanthera sessilis* var. *rubra* plants

By KARL RATAJ

Photographs by RUDOLPH ZUKAL



**W**ATER plants from this genus (*Alternanthera*) appeared first in our home tanks some 8 or so years ago via the agents of South American exporters. The genus belongs in the Amaranthaceae family, which is mainly represented by tropical plants, and has only a few members distributed in the temperate zones of the world. Plants of the family may be annual or perennial, take the form of bushes or even trees, with alternate or opposite leaf stems.

The genus *Alternanthera* has many species distributed throughout tropical and non-tropical America — though a few species are to be found in Asia and Africa. None of the species has very noticeable blooms, but on the other hand the leaf colouring is often very attractive. Indeed, quantities of *Alternanthera* are used in parks for their decorative value and perhaps the best known of these is *Alternanthera variegata*, which grows 4-6 inches (10-15 cm.) high, is very brightly coloured and can often be found in gardens in southern Europe.

Another very well-known species is *A. philoxeroides*. This is a water plant and is to be found in a zone stretching from north Carolina to Florida. It is, in fact, regarded as a very dangerous and much feared weed. Its growth causes such problems that special methods to fight it had to be found. In recent years, for instance, a tiny butterfly (*Vogtia malloi*), was imported into the U.S.A. from Argen-

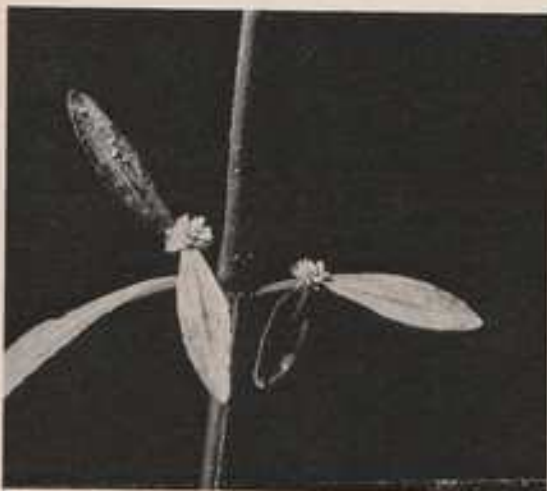


*Alternanthera sessilis* var. *lilacina* not only has beautifully coloured leaves but also rich root formations at the internodes

tina; the caterpillars of which feed on *A. philoxeroides*. As a result, in 1972 and 1973 emergent stems of the plant were reduced from 52 to five per square foot. So far, this species has not been imported into Europe.

In recent years three species have been introduced for use by aquarists under the commercial names, *Telanthera osiris*, *T. rubra* and *T. lilacina*. All flower easily and so it was quickly established that *T. osiris* is properly *Alternanthera rein-eckii* Briq, and the other two (*T. lilacina* and *T. rubra*) are in all probability two varieties of the same species — *Alternanthera sessilis* (L.)R.Br. This species, which is cosmopolitan and distributed in all the warm zones of the world, is typical in that its stems divide numerously just above the base surface and these stems, in the forms of the plant on dry land, are almost always flatly spread out. The fruits are heart-shaped, with 'wings'.

*Alternanthera sessilis* var. *lilacina* is fairly adaptable and can live as well emerged as submerged. It has leaves that



Flowers of *Alternanthera sessilis* var. *rubra*



are olive-green on the upper side and dark red to violet on the underside, but it is very variable and in certain conditions will produce leaves that are red on both sides, thus resembling the variety *rubra*. In its emerged form, *A. sessilis* var. *lilacina* is best cultivated in glass houses or terraria at a temperature of 68–86°F (20–30°C) and 85–96% humidity. It flourishes in summer in temperate zones. Plants cultivated in the garden will adapt easily to the lower humidity, but they are not suitable for transplanting into an aquarium. A sudden and acute change of conditions will generally cause a leaf-fall.

For use in the aquarium tank the plant must be cultivated exclusively in damp tropical greenhouses. The stems, without flowers, are planted under water very easily and losses are slight. The plant is not sensitive to hard water, survives in half light as well as full light and in water of a pH value around neutral. Many aquarists have grown this species well under a variety of conditions, although with others it just does not thrive. It seems that the basic condition for good development lies in 'old', crystal-clear and algae-free water.

In its emerged form, *A. sessilis* var. *rubra* has divided stems above the soil, two-thirds of which lie flat with only about one-third upright, and these are prolifically branched. The stems are anything up to 22–24 inches (50–60 cm.) in length, but the upright parts are no longer than 8–10 inches (20–25 cm.). The leaves are in opposite pairs, 1½–2 inches (3–5 cm.) long and ¼–½ inch (0.8–1.4 cm.) broad, and about half the size of the preceding variety (*lilacina*). The stem, and both sides of the leaves, are ruby red. The plant will root easily from the point where the pairs of leaves sprout. When plant thickets are well established, red or pink flowers appear in the axils of a pair of leaves. In Nature, flowering takes place mostly at the end of the summer and in autumn — short days for tropical plants; they bloom for us when the periods of light are of a similar length, i.e. about 12 hours long.

The plant will propagate itself only emerged, chiefly in a damp terrarium. It grows very fast and will be about 6–8 inches long (15–20 cm.) within 3–4 weeks. At this stage we can cut off pieces of well-leaved stems 4–6 inches long (10–15 cm.) and plant them in groups of three to five

pieces in our home tanks. They look best amongst tall, green or yellow-green, plants. They root under water in about 10 days but they don't often grow much at all and just keep in the same decorative condition for up to 6 months. Then the lower leaves begin to fall and it is necessary to renew the plants. It therefore cannot really be called a true aquarium plant although it need not be rejected for this reason. It is, in fact, the only plant with ruby-red leaves that will survive underwater for any length of time and so it has become a great favourite, with its extraordinarily attractive red colour, as a contrast in our tanks with their mostly green plants.

*A. sessilis* var. *rubra* will last longer submerged if cuttings from old plants with strong, stable, stems are used. The emerged plants chosen to be used for submerged cuttings must be grown in the highest possible humidity (at best in covered terraria) under diffused light. Do not plant plants with flowers under water. Once submerged, the cuttings should be cultivated in slightly acid water, with enough light, and best of all in a tank with a South American biotope.

*Alternanthera reineckii* (*T. osiris*) comes from southern Brazil and from Paraguay, where it has adapted to a permanently submerged life as a marsh plant. Of all the species and varieties mentioned, it lives under water the longest, grows most easily and, because of this, it is, and remains, a permanent embellishment to the home aquarium. In Nature it is associated with zones that are regularly flooded for long periods. In emerge conditions it lies flat, with peaks standing up from the internodular-rooted stems. On the green or reddish stems are the pairs of opposite leaves, 1–1½ inches (2.5–3.5 cm.) long and ¼–½ inch (0.5–1.5 cm.) broad. The upper side of the leaf is green, the underside pink or reddish. From July to September yellowish green or pink flowers appear in the leaf axils.

In the plant's submerged form, the stems spread, grow perpendicularly up to the water surface and, in shallow tanks (up to 8–10 inches (20–25 cm.)), will grow above the water. If they do this, the plants will make use, first of all, of the leaves above the water surface for assimilation, and the underwater leaves, because they are superfluous to the plant's growth, will fall off.

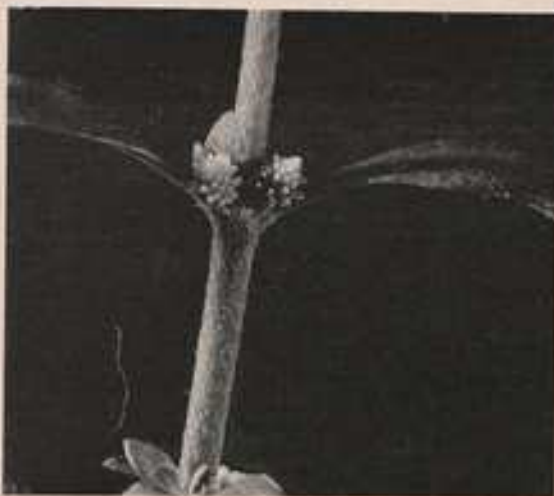


So for this reason we nip the tips off the stems as soon as they reach the surface of the water. In this way we prevent the submerged leaves from falling and at the same time help to form thickets of decorative plants that change their colours according to the conditions prevailing in the tank. With enough light the upper sides of the leaves are a deep green, and bright green or pink underneath. In half shade the upper leaves are olive brown, with violet-red undersides.

Of the imported species, *A. reineckii* is the least demanding (though it is also, unfortunately, the least beautiful). It grows well in half-shade or under direct light, in either slightly acid or in slightly alkaline surroundings. It can be grown with other plants of an Indo-Malaysian biotope such as cryptocorynes, or equally well as part of a South American biotope with *Echinodorus* as neighbours. Perhaps its ideal position is in the half-shade, where its coloration is brighter than in intense light.



*Alternanthera reineckii* is a smaller and less colourful plant than *A. sessilis* although it is easy to grow



The greenish, inconspicuous flower of *A. reineckii*

It is the only species of the genus that can be propagated effectively under water. Pieces bearing at least four pairs of leaves can be planted and will divide freely, so we are not dependent upon emergent cultivation for propagation. *A. reineckii* is really only attractive when planted in large groups of, say, 10-15 stems. In small tanks it is suitable as a back plant; in large aquaria it is valuable as a centre-piece, or it can be divided up into small clumps about 1 square inch in area. It resembles some species of *Ludwigia*, but it has the advantage over them of being undemanding as regards light intensity, and grows more quickly and winters better than other species of its genus.

THE BRITISH CICHLID ASSOCIATION announce that 1st July is now their year-end. Subscriptions will run from that date (£3.50 annually; half price from January 1st). As well as the quarterly journal and monthly Newsletter, there is now a monthly information sheet (for sample copy please

send s.a.e. to Mr I. Sellick, 88 King's Drive, Bishopston, Bristol, BS7 8JH). For membership enquiries, please contact treasurer Mr H. Parrish, 18 The Barons, Twickenham, Middlesex, TW1 2AP.

The first issue of volume 2 of the Association's journal

'Cichlidae' will be entirely devoted to discus, and contains much useful material including a literature review of the genus *Symphysodon*. Non-members may purchase this, price 65p incl. p & p., from Mr I. Sellick, 88 King's Drive, Bishopston, Bristol, BS7 8JH, from beginning of February.



WHEN the secretary of the **ASSOCIATION OF MIDLAND GOLDFISH KEEPERS**, Mr F. Orme, announced at the AGM that he would not be available to serve further in the same capacity, members decided not to let him escape so easily. The retiring chairman, Mr T. Roberts, paid tribute to the work Mr Orme had put into the AMGK since he founded the Association two years previously, and these sentiments were echoed by the members who gave him a round of applause. In order, as one member put it, "to make sure that neither Tony nor Frank ran away", the positions of president and vice-president were created. Mr Orme was elected president and Mr Roberts, vice-president, both to serve on the committee. Members were elected to the committee; Mr Orme, Mr Giles and Mr D. Hancox were elected as delegates to the Associated

Goldfish Societies (the national body). Annual subscriptions remain at £1.50 for adults, £1.75 for husband and wife only, and 25p for juniors up to 16 years. At the auction sale that followed some nice young Bristol shubunkins, moors and nacreous veiltails, together with some useful tanks, found new owners. New members and visitors will be welcomed at meetings; details from the secretary, Mr D. Denny, 71 The Moorfield, Stoke Alderman, Coventry.

#### 1975 Trophy winners of HULL AS are:

Furnished Aquaria, Mr Drinkall; Table breeders, Master A. Young; Most points table shows, Master A. Young; Home breeders, T. & K. Douglas; Fish of the year (snakehead), Mr I. Ballard; Junior Aquarist of the year, Master D. Frisby; Senior Aquarist of the year, Mrs G. Frisby; Statesman League 1975 (Hull winners); Adv livebearers, T. & K. Douglas; Pairs livebearers, Mr G. Andrews; adv, Mr I. Ballard; toothcarps, Mr R. Willerton; Breeders livebearers, Mr G. Andrews; Bridlington were the Statesman League Champions for 1975.

MR L. SANDFIELD, P.R.O. of **EALING & DAS** reports: "In the last few months we have enjoyed table shows in classes **M, Q, R, S, T** and a two-way friendly with Roehampton AS, which excellent club is warmly

thanked for their attendance. That evening there was a Dutch auction. Classes **H, J, X** and **W** were competed for at a later date, following which a Bring-and-Buy sale was held. Members of Reigate & Redhill, Caterham Nomads, Sudbury, Riverside, BKA & Hounslow have our thanks for their attendance. Auctioneer Mr T. Taylor is particularly thanked for making the evening a success. In the same period, Mr J. Hughes gave a chat (his words) on plants, giving us the benefit of his penetrating observation and long experience. The last meeting of 1975 saw the Irving and Mills Trophies Finals, judged by Mr H. Towell, and an FBAS tape slide show Aquatalk no 11, "The Birth of Aquarian" by Dr D. M. Ford, who is a leading BMAA member. This was an informative and enlightening talk, particularly interesting to the engineers among us, and especially to those working on special purpose machinery".

ANOTHER good attendance is reported at the last meeting of 1975 for the Fish of the Year

## Meetings and Changes of Officers

**ALFRETON & DAS**, President, Mr S. Hill; chairman, Mr M. Merry; secretary, Mr S. Hill; treasurer, Mr G. Hicking (Parkview, 13 Coppice Drive, Eastwood); show secretary, Mr K. Dean (22 Fletchers Row, Nottingham Road, Ripley, Derby, NE9 3BA); assistant, Mr P. Bonser.

**BRADFORD & DAS**, Meetings: 2nd & 4th Thursday of month, 7.30 p.m., Room 5, The Textile Hall, Westgate, Bradford.

**BRITISH CICHLID ASSOCIATION**, **BRISTOL AREA CICHLID GROUP**, Secretary, Mrs J. Redcliff (67 Westward Drive, Pill, nr. Bristol). Meetings: 2nd Wednesday of month, 8.00 p.m., 86 King's Drive, Bishopston, Bristol, BS7 8JH. All welcome.

**BRITISH KILLIFISH ASSOCIATION**, **SOUTH YORKSHIRE GROUP**, Chairman, Mr M. Horsfield; secretary, Mr G. A. Hayland (36 Haggstones Road, Dugthorpe, Sheffield). Meetings: 1st Monday in month, Ball Inn, Crookes, Sheffield.

**DUNLOP AKS**, New secretary, Mr T. Griffiths (c/o 19 Balber Street, Garston, Liverpool, L19 1BG; phone: 427 6852).

**EALING & DAS**, Chairman, Mr T. A. Cruickshank; vice-chairman, Mr J. Healey; secretary, Mr J. Myrtilis; show secretary, Mr C. Chesney; assistant, Mrs D. Cruickshank; treasurer, Mr R.

Scrace; social secretary, Mr J. Irvine; P.O., Mr L. Sandfield (25 Leighton Road, London, W13 9EU); FBAS delegate, Mr T. A. Cruickshank.

**GREAT YARMOUTH & DAS**, Chairman, Mr A. Kirby; vice-chairman, Mr H. Brundish; secretary, Mr E. Weakley (22 Arundel Road, Newtown, Gr. Yarmouth, NR30 4JY); treasurer, Mr D. Lacey; P.R.O., Mr R. A. Andrews; show secretary, Mrs J. Rumsby; assistant, Mr R. Stearns; editor, Mrs L. Durrant; junior committee member, Miss C. Durrant.

**HIGH WYCOMBE AS**, Chairman, Mr R. Leslie; vice-chairman, Mr I. Pierce; treasurer, Mr T. Wilkinson; secretary, Mr J. Bushby (3 Hawthorne Walk, Hazlemere, Bucks; Penn 3825); 3-Counties delegate, Mr R. Cox; table show secretary, Mr M. Lancaster; librarian, Mr D. Schramm; equipment officer, Mr R. Cox; P.O., Mr S. Friend (55 Cambridge Crescent, High Wycombe, Bucks, HP13 7NE).

**KILLINGWORTH AS**, President, Mr D. Renton; chairman, Mr D. B. Hickman; secretary, Mr W. Kidd (75 Hartlands, Bedlington, Northumberland); assistant, Mrs J. Renton; treasurer, Mr J. Askell; show secretary, Mr S. Davidson, and Mr T. Wynn (21 Hardy Grove, Wallsend, Northumberland); trophy secretary, Mr H. Scerham; librarian, Mrs J. Wynn; TTAS represen-

tative, Mr Chadband. **LINCOLN & DAS**, New show secretary, Mr D. Driver (16 Hawthorn Chase, Bunders Hill, Lincoln).

**LONG EATON AS**, Secretary, Mrs C. A. Simpkins (47 Pinfold Lane, Stapleford, Notts.); treasurer, Mr D. Reynolds. Meetings: Lace Webb Centre, Sandiacre.

**MEDWAY AS**, Chairman, Mr C. Elliott; secretary, Mr H. Woodcock (42 Tonnes Road, Gillingham; Medway SE824). Meetings: 2nd & 4th Wednesday of month, Darn Court School, Watling Street, Gillingham.

**MIDLAND GOLDFISH KEEPERS**, President, Mr F. Orme; vice-president, Mr A. Roberts; chairman, Mr M. Masoth; vice-chairman, Mr D. Eastwood; secretary, Mr D. Denny (71 The Moorfield, Stoke Alderman, Coventry); treasurer, Mr R. Hancox.

**OLDHAM & DAS**, Chairman, Mr J. Brankin; vice-chairman, Mr C. Beckenham; secretary, Mr E. Birchwood (14 Hill Top, Heald Green, Chadderton, Oldham, Lancs.); treasurer, Mr E. J. Brunt; show secretary, Mr A. Chadwick (341 Broadway, Chadderton, Oldham; 061-657-0809); funds raiser, Mr R. Colley; P.O., Mr M. Hay.

**WELWYN GARDEN CITY AS**, Chairman, Mr P. Bulgin; secretary, Mr E. Swift (8 Millwards, Hatfield, AL10 8UX); P.O., Mr E. F. Vidsen. Meetings: 1st & 3rd Monday of month, Scout Hut, Great Dell, Welwyn Garden City. All visitors welcome.



table show of **BRIGHTON & SOUTHERN AS**; results were: 1. Mr & Mrs Houghton (81 points); 2. Mr & Mrs Rooney (79); 3. Mr P. Chapman (78). Mr P. Ginger, vice-president of Brighton & SAS, who was judging the table show for the last time, was presented with a tankard from members and a bouquet of flowers was presented to his wife. Mr Ginger, in turn, gave the Society a rose bowl trophy (for a class to be decided later). Many thanks go to Mr Ginger for a fine trophy.

**DUNLOP AQUARIUM KEEPERS' SOCIETY** have held their first Champion Fish Show 'The All Winners Show' consisting of class and section winners from table shows and the Open Show in 1975. Standards were, of course, high. 44 entries competed for a Best Fish trophy plus plaque, 2nd best plaque, 3rd best plaque, highest pointed junior plaque and a watch for the highest pointed ladies exhibit. Mr P. Whelan (FNAS 'A' class) judged the show and Mr F. Mulla, chairman FNAS, Management committee, and also chairman MAS, presented certificates to all exhibitors for reaching this particular show as well as trophies and plaques. A small gift was accepted by Mrs F. Mulla in appreciation of help given by Mr F. Mulla to this Society. Results were:

Best Fish in Show (checker barb, 76); Mr T. Hampton; 2nd Best Fish in Show (cichlid, 75); Mr A. Roche; 3rd Best Fish in Show (rainbow shark, 75) Mr T. Clavey. Highest pointed junior (catfish, 72), Master D. Shaw. Highest pointed lady (goach, 74); Mrs J. Roche.

**BRADFORD & DAS** would like to thank everyone who supported their Open Show. The Best Fish in Show was a climbing perch entered by Mr & Mrs Newton of Blackburn. The Highest Pointed Society was Castleford. Remainder of results:

Section A, Class 1: 1. Stansell & Ramsay (Castleford); 2. Poulton Brothers (Southport); 3. Mr G. Emlen (Stanley). Class 2: 1. Mr J. Buckley (Northwich); 2. Mr & Mrs Roberts (Doncaster); 3. Mr & Mrs Tyson (S. Humberside). Class 3: 1. J and section winner, Mr & Mrs Muckle (Sandgrounders); 2. Mr D. Sugden (Bridlington); 3. Master S. Green (Castleford); 3. Mr K. Horton (Southport). Class 5: 1. Mr & Mrs Richard-



## FEDERATION NEWS

THE Federation's popular AquaTalk series of recorded talks, accompanied by slides, after a very successful 1975 season has now been expanded to include the following new titles.

**No. 13: Fish Features** by Bernard Pye. A fascinating look at some of the peculiar characteristics of fishes, which will entertain and intrigue. 100 slides.

**No. 14: Beachcombing** with Cliff Harrison. Home-grown marine fish and invertebrate keeping. How to collect specimens from our beaches and rock pools. Something for the saltwater types.

**No. 15: Devilish Angels** by Dick Mills. Personal experiences with this popular cichlid, with several how not to do it tips.

For those wishing to update their list of AquaTalks, the titles issued in late '75 were:

**No. 10: Filters** by Dick Mills

**No. 11: Birth of Aquarian** by Dr D. M. Ford of Pedigree Petfoods Ltd.

**No. 12: Aquaria International** by Dr D. M. Ford.

The Federation intend to keep the hiring fee for the AquaTalks fixed during 1976 to £2.50 per programme for affiliated Societies and £3.50 per programme for non-affiliated U.K. Societies. Overseas hiring rates can be supplied upon request.

Other titles planned for near future production include Labyrinths, A.O.S. Livebearers, Koi, Fish Diseases and Native Fishes. Availability of these titles will be announced in these columns, although at this moment no particular order of production can be given — it all depends upon the 'volunteers'!

**DICK MILLS**

son (Scarborough); 2. Mr L. Gatenby (Bradford); 3. Mr N. Blenkins. **Section B, Class 6:** 1. Master G. Parkin (Keighley); 2. Mr & Mrs Emerson (Castleford); 3. Mr & Mrs Roberts. **Class 7:** 1 and section winner, Mr & Mrs Holmes (Castleford); 2. Mr S. White (Southport); 3. Mr & Mrs Tyson. **Section C, Class 8:** 1 and section winner, Mr A. Chadwick (Oldham); 2. Mr & Mrs Newton (Blackburn); 3. Mr & Mrs Muckle. **Class 9:** 1. Poulton Bros.; 2. Mr A. Friaby (Hull); 3. Mr L. Gatenby (Bradford). **Section D, Class 10:** 1. Mr Waits (S. Humberside); 2. Master D. Fisher (Bradford); 3. Mr R. J. Stephens (Blackburn). **Class 11:** 1 and section winner, Mr & Mrs Dawson (Haywood); 2. Mr & Mrs Horton; 3. Mr & Mrs Feasey (Doncaster). **Section E, Class 12:** 1 and section winner, Mr Howgate (Stanley); 2. Mr & Mrs Richardson; 3. Mr N. Lynch. **Section F, Class 13:** 1. Poulton Bros.; 2. Masters G. Wild & P. Topley (Aireborough); 3. Mr & Mrs Richardson. **Class 14:** 1. Mr M. Lister (junior); 2. Mr & Mrs Newton; 3. Mr T. Holmes. **Class 15:** 1. 3 and section winner, Mr & Mrs Holmes; 2. Mr & Mrs Roberts. **Section G, Class 16:** 1. Mr J. Middlemast (Stanley); 2. Master A. Shepherd (Bradford); 3.

Mr W. Lynch. **Class 17:** 1 and section winner, Mr Crabtree (Sandgrounders); 2. Mr A. Friaby; 3. Mr & Mrs Tyson. **Class 18:** 1 & 3. Mr N. Blenkins; 2. Mr & Mrs Muckle. **Section H, Class 19:** 1. Mr W. Blundel; 2. Mr & Mrs Holmes; 3. Mr & Mrs J. Taylor (Merseyside). **Class 20:** 1. Mr J. Robertson (Northumbria); 2. Mr & Mrs Holmes; 3. Mr S. White. **Class 21:** 1 and section winner, Mr J. Cornforth; 2. Master J. Emerson; 3. Mr J. Irwin (Stanley). **Section I, Class 22:** 1 and section winner, Mr & Mrs Newton (Blackburn); 2. Master J. Emerson; 3. Mr T. Holmes. **Section J, Class 23:** 1. Mr Hamsworth (Bradford); 2. Mr P. Northrop (Bridlington); 3. Mr J. Abbott (Aireborough). **Class 24:** 1. Mr M. Walker (Swilington); 2. Mr & Mrs Richardson; 3. Mr J. Abbott. **Class 25:** 1. Mr J. Buckley; 2. Mr G. Brown (ind); 3. Mr Northrop. **Class 26:** 1 and section winner, Master I. Parkin (Keighley); 2. Mr & Mrs Taylor; 3. Poulton Bros. **Section K, Class 27:** 1. Mr J. Robertson; 2. Mr J. Wood; 3. Mr L. Barrett (Castleford). **Class 28:** 1 and section winner, Mr M. Hay (Oldham); 2. Mr A. Chadwick (Oldham); 3. Mr & Mrs J. Taylor. **Section L, Class 29:** 1. Miss M. Houghton (Southport); 2 & 3. Mr



**NOTICE to all hobbyists in the north from HUDDERSFIELD TFS:** "We are once again scheduled (on 7th February) to hold one of our now famous auctions. It will again be held in the Invalid Car Club, Mill Street, Crosland Moor and will start at 2.00 p.m. with booking in from 12.30. There will be raffles, and refreshments on sale. So bring along surplus fish, plants and equipment and you will probably find just the thing you have been looking for to take back with you."

2. Mrs. Wolstenholme (Blackburn), Class 30; 1, 2, and section winner, Mr J. S. Hall (Aireborough); 3. Mr & Mrs Wolstenholme, Class 31; 1, Mr W. Blundel; 2, Mr & Mrs Newton; 3, Mr B. Dawson (Heywood). Novice section, Class 32; 1 and section winner, Mr D. Woodcock (Bradford); 2, Mr A. Cranshaw (Soundgrounders); 3, Master L. Colley (Oldham).

NEWS reaches us of activities of **HIGH WYCOMBE AS** over the past few months. Some very interesting talks have been given and enjoyed and these have included lectures on South American cichlids by Mr B. Mould and on marines by Mr Tony Harmsworth, the latter with slides of invertebrates, anemones, plants and fish. Club discussions have ranged widely and covered sizes of fish, aquaria shops and the pros and cons of changing to the living system for marines; a quiz arranged by Mr J. Bushby was very popular. Two eight-a-side matches were won by the Society, that against Uxbridge by 76 to 75, and that against Amersham by 81 points to 55 (judge, Mr A. Gibson of Reading AS). The match with Aylesbury was lost by 776½

points to 725 (judge, Mr P. Moye of Dunstable).

New members are invited to attend the club's meetings — 8.00 p.m. at The White Horse, West Wycombe Road, High Wycombe. Further details from secretary Mr J. Bushby, 3 Hawthorne Walk, Hazlemere, Bucks; phone Penn 3825.

**MID-SUSSEX AS** are holding their Buffet Dance on 14th February and tickets can be obtained from Mrs S. Corbin (Burgess Hill 41632). Awards for the Home Aquaria and Furnished Aquaria competitions were presented at the Society's AGM. The Home Aquaria competition produced some encouraging comments from the judges and also one of the most popular decisions of the year in the award of the senior class to Mr N. Short. (2, Mrs Ancombe; 3, Mr D. Soper. D. Isted was first and second in the junior class and D. Ancombe third). Results of the Furnished Aquaria competition were: 1, J. & B. Burtles; 2, D. Isted. Meetings are held at the Fox and Hounds, Haywards Heath and details are available from secretary Mr B. Slade, Sandown, Bolney Road, Anstye (Haywards Heath 53747).

THE annual awards/dinner-dance held by **HUDDERSFIELD TROPICAL FISH SOCIETY** was a great success, combining, as it does, both an official function and a pleasant social event. The awards are for results gained at table shows and this year there were 355 entries for the eight shows held during the year. Winners were:

Livebearers, Mrs S. Huntington; barbs, Mr R. Jenkinson; catfish and

loaches, Mr E. J. Brown; juniors, Master P. L. Gill; ladies, Mrs V. Hough; aov novice, Mr K. L. Gill; characins, Mr J. S. Gilpin; danios & rasboras, Mrs S. Huntington; pairs, Mrs S. Huntington; furnished jar, Mr K. L. Gill; cichlids, Mr K. L. Gill; aov tropical, Master P. L. Gill; anabantids, Mr F. Huntington; breeders, Mr E. J. Brown; toothcarps, Mrs C. Gill; cold-water, Mr E. J. Brown. Most points at table shows (Jonathan trophy), Mr K. L. Gill. Most points gained at Open Shows, Mr R. Jenkinson. Novices trophy for Open Shows, Mr E. Myatt. Furnished aquarium trophy, Mr F. Huntington. Junior furnished aquarium trophy, Master C. Harrop. Best plant trophy, Mr D. L. Harrop. Writer of the Year trophy, Mr D. L. Harrop. Fish of the Year trophy, Mr J. Cartwright.

All the winners received both an annual trophy and a replica to keep and these were presented by Mr D. Shields of Halifax and Mr T. S. Hall, to whom the Society express many thanks for their help during 1975.

*A reminder for all those wishing to attend the British Koi-Keepers' Society Seminar at the Post House, Leicester, on Sunday, 14th March: owing to additional films and interesting material, proceedings will now start at 11 a.m. and not noon as previously stated. Three lecturers, all acknowledged experts in their field, have accepted an invitation to attend and all pondkeepers and potential pondkeepers should find their journey well worth the trouble. Entrance by programme only—programmes 50p, children free. Programmes can be obtained at the door on the day at The Post House, or from Mr M. Waumsley, 165 Woodside Road, Amersham, Bucks, HP6 6NR, or Mr R. Seal, 7 Highlands Road, Offerton, Stockport, Cheshire, SK2 5HU.*

London's Ninth Annual Exhibition of Fshkeeping

## The AQUARIUM SHOW '76

ROYAL HORTICULTURAL SOCIETY OLD HALL

VINCENT SQUARE, LONDON, SW1

29th — 31st October



## In Brief...

... **GREAT YARMOUTH & DAS** wish all their friends in societies nationwide a very prosperous New Year. At the society's AGM, after the election of officers and committee for 1976, the tape and slide lecture by Dr D. Ford on 'The Birth of Aquarian' was shown.

... **MEMBERS of ALFRETON & DAS** record their thanks to their retiring treasurer, Mr S. Dooley, for all his hard work on behalf of the Society, and to Mrs Dooley for work on the catering side.

... 17 members attended the first meeting of the **BRISTOL AREA CICHLID GROUP**. Meetings are on the second Wednesday of month, 8.00 p.m., 88 King's Drive, Bishopston, Bristol. (Details: secretary Mrs J. Redcliffe, 67 Westward Drive, Pill, nr Bristol). Although formed under the auspices of the British Cichlid Association, anyone interested in cichlids is welcome to attend the Group's meetings.

... **MEMBERS of STROUD & DAS** made their own programme, to the enjoyment of all, when illness prevented their speaker attending recently. The Society now has its own tie (plain green with club badge in white).

... **THE BRITISH KILLIFISH ASSOCIATION** announce the formation of a new group — the **SOUTH YORKSHIRE GROUP**. Meetings are held in the Ball Inn, Crookes, Sheffield, first Monday of month. Details: Mr G. A. Hoyland, secretary, 36 Haggstones Road, Oughtibridge, Sheffield.

... **THERE** is a change of venue for the **PORT TALBOT AS Open Show** (8th May) this year to the Taibach County Youth Centre, Margum Road, Port Talbot, where ample parking space is available. Plaques are awarded for all classes and there are 20 silver cups and trophies to be won. Schedules are already available (see Dates for Your Diary).

... **FURTHER** details of the **DUNLOP AKS Open Show** on 27th June (see Dates for Your Diary) are: 40 classes, plaques for all class winners, trophies for most section winners, eight

**FNAS** judges; entries 5p each, trade stand, novelty stands etc. Benching noon to 2.00 p.m.

... Recent activities of members of **HASTINGS & ST LEONARDS AS** included a fish-and-chip supper enjoyed by all but a couple of 'purists'! There was also an informative and amusing talk given by Mr W. A. Back, the Consumer Relations Officer of the Southern Water Authority, and a new-style quiz with slides from Mr Barry Funnell that kept everyone on their toes with the occasional trick question. New P.O. of the Society is Mrs S. Tyrer.

## Mr Bill Corby

IT is with deep regret that the East London Aquarist & Pond-keepers' Association record the death of one of its leading and most respected members, Mr Bill Corby. Chairman of the Society, Mr K. Wrightson writes:

"Bill died at the age of 55, a time when he was looking forward to spending many more years in the hobby he loved so much. Besides being a member of East London for over 20 years he was also on the Federation's List of Speakers, visiting not only local societies but many farther afield where he proved a popular speaker. He entered many open shows and met with much success, but for Bill the show he always supported was the East London Annual Open Breeders' Show, where he consistently gained many awards with entries of a very high standard. Two of the fish that became synonymous with his name were the leeri

gourami and a strain of red-eyed red swordtails on which he dedicated many years' work. In addition to many other varieties of fish that he bred over the years, he always had a keen interest in the killifish side of the hobby and at the time of his death was a member of both the British Killifish Association and the German Killifish Association. During his years with East London, Bill held the positions of chairman, show secretary, show organiser and programme secretary (a position he held when he died).

Mere words can never do justice to this popular and likeable man who was always ready with words of encouragement to beginner and old-hand alike. The hobby in general, and East London in particular, can ill afford to lose the likes of Bill Corby, an extremely knowledgeable aquarist who would impart his vast experience to anyone who cared to listen. To Bill's wife Jean, and their two sons, we again through these columns express our deepest sympathy".

**FILTER WITH 'ALGARDE'**



## Dates for Your Diary

22nd February. **RETFORD & DAS** 2nd Open Show. Butter Market, Town Hall, Market Square, Retford, Notts. Schedules: Mr B. D. Chester, 7 Rose Lea, Ordsall, Retford, Notts. DN22 7SB.

6th March. **FBAS** General Assembly, 2.00 p.m. Conway Hall, Red Lion Square, Holborn, London, WC1.

14th March. **BRITISH KOI-KEEPERS' SOCIETY** Seminar, Post House, Leicester, 11 a.m. Films and Lectures. Entry by programme only (50p, children free). Obtainable on door or from Mr M. Waunsley, 165 Woodside Road, Amersham, Bucks, HP6 6NR.

14th March. **DON VALLEY AS** Open Show. Staff Dining Rooms, British Steel Corporation, Stocksbridge, Sheffield. Details: Mr C. Broomhead, 5 Broomfield Road, Stocksbridge, Sheffield.

20th March. **RIVERSIDE AS** Open Show. Details to follow.

20th March. **GOLDFISH SOCIETY OF GREAT BRITAIN** Annual General Meeting, 2.00 p.m. Conway Hall, Red Lion Square, Holborn, London, WC1.

27th March. **HENDON & DAS** 17th Annual Convention, Whitfields Secondary Modern School, Claremont Road, Hendon, London, N.W.2. Sponsors: Professor B. Coudé. Tickets: Mr H. White, 52 Ellesmere Avenue, Mill Hill, London, N.W.7; phone 01-959 5329.

3rd April. **CORRINGHAM & DAS** Open Show. Red Cross Hall, Corringham Road, Stanford-le-Hope, Essex. Schedules (March): Mr D. C. North, 198 Southend Road, Stanford-le-Hope (T7311).

4th April. **NELSON AS** Open Show, The Civic Centre, Stanley Street, Nelson, Lancs. Details: Mr J. Stokes, 3 Beckenham Court, Burnley.

10th April. **YATE & DAS** 10th Open Show. King Edmunds School, Stanshewes, Yate, nr. Bristol. Schedules (1st March): Mr C. Stickland, 20 Burgeze Close, Chipping Sodbury, nr. Bristol.

10th April. **CATFISH ASSOCIATION OF G.B.** Open Show, St. Saviour's Church Hall, Cobbold Road, London, W.12. Schedules: Mr D. Lambourne, 7 Wheeler Court, Plough Road, London, SW11; 01-223 2630.

11th April. **COVENTRY P & AS** Open Show. Templars Junior School, Tile Hill Lane, Coventry. Schedules (large size please): Mr J. Emms, 79 Edward Road, Coventry CV6 2QS.

24th April. **BRISTOL TFC** Open Show. Congregational Church Hall, Newton Street, Stapleton Road, Bristol. Tropical and coldwater classes. Schedules: Mrs M. C. Graham, 24 Romney Avenue, Lockleaze, Bristol BS7 9TW (Bristol 695898).

25th April. **YEOVIL & DAS** Open Show. School Hall, Martock, nr Yeovil, Somerset. Details: Mr P. C. New, 73 Lyde Road, Yeovil, Somerset: Yeovil 24225.

2nd May. **HULL AS** Open Show. The Blind Institute, Beverley Road, Hull. Schedules: Mr G. Andrews, 4 Church Mount, Spratley, nr. Hull, N. Humberside (phone 0482 811334).

8th May. **PORT TALBOT AS** Open Show. Taihach County Youth Centre, Margam Road, Port Talbot. Schedules: Mr A. E. B. Fouracre, 3 Cross Street, Valindra, Port Talbot, West Glamorgan, SA12 1AZ.

8th May. **SOUTHEND, LEIGH & DAS** Open Show. St Clements Hall, Leigh-on-Sea, Essex. Club & individual furnished, aquascapes, marines, tropical, coldwater and junior classes. Details: Mr D. C. M. Durrant, 172 Trinity Road, Southend-on-Sea, Essex: 0702 810578.

16th May. **GLOUCESTER AS** Open Show. Details: Mr C. Freshney, 51 Perry Orchard, Upton St Leonards, Gloucester.

22nd May. **MERTHYR AS** Open Show (CNAF/FBAS). St. Davids Hall, Church Street, Merth Tydfil, Glam., S. Wales. Schedules: Mr P. B. Stone, Jewer, 22 Vernon Close, Penyard, Merth Tydfil, Glam., S. Wales.

23rd May. **LINCOLN & DAS** Open Show. Drill Hall, Broadgate, Lincoln. Schedules: Mr D. Driver, 6 Hawthorn Chase, Bunkers Hill, Lincoln.

30th May. **BRIDLINGTON & DAS** Open Show. Hilderthorpe Junior School, Shafesbury Road, Bridlington, N. Humberside. Schedules (March): Mr P. Robson, 47 Matson Road, West Hill Estate, Bridlington, N. Humberside, YO16 45Z.

30th May. **CORBY & DAS** Open Show (FBAS Rules). Corby Civic Centre, Schedules: Mr C. McInnes, 18 Westminster Walk, Corby, Northants. NN18 8JA.

6th June. **WESTON-SUPER-MARE TFC** Open Show. St John's House, Oxford Street, Weston-super-Mare. Schedules: Mr M. E. Tanner, 6 Byron Road, Locking, nr. Weston-super-Mare.

5th June. **FBAS** General Assembly, 2.00 p.m. Conway Hall, Red Lion Square, Holborn, London, WC1.

12th June. **LLANTWIT MAJOR AS** Open Show. Town Hall, Llantwit Major (FBAS Rules). Superior plaques to every class winner, medallions to runners up. Schedules (April): Mr J. J. Edwards, Gt. Gt. Mill Park, Llaniethan, Cowbridge, Glam. CF7 7EG.

12th June. **HINCKLEY & DAS** Open Show. Westfield Community Centre, Rosemary Way (off Coventry Road A47), Hinckley. Banching 11.30 a.m. - 2.00 p.m. Schedules: Mr E. Baxter, 39 Northfield Road, Hinckley, Leics.

20th June. **ALFRETON & DAS** Open Show. Adult Education Centre, Alfreton Hall, Alfreton. Schedules: Mr K. Dean, 22 Flatfish Row, Nottingham Road, Ripley, Derby, NE5 3BA (phone: Ripley 3902).

20th June. **SWILLINGTON AS** Open Show. John Smeaton School, Barwick Road (off York Road), Leeds 15. Banching 12.30 - 2.15 p.m. Details: Mr T. Seaman, 24 Raincliffe Road, Leeds 9, S19 9ER.

20th June. **SOUTH SHIELDS AS** Open Show. Bolingbroke Hall, Bolingbroke Street, South Shields. Schedules (April): Mr B. Risbridger, 13 Chester Road, Siddick Hall Estate, South Shields, Tyne & Wear, NE34 9TW.

27th June. **DUNLOP AKS** Open Show. Dunlop Factory, Speke, Liverpool. Banching noon - 2.0 p.m. Schedules: Mr T. Hampton, 3 Madelaine Street, Liverpool 8 (phone: 051 709 5509).

3rd July. **CARDIFF AS** Open Show. St. Margaret's Church Hall, Roath, Cardiff. Details to follow.

18th July. **SANDGROUNDERS' AS** Open Show (FNAS Show League). Meols Cop Secondary School, Meols Cop Road, Southport, Merseyside. Details: Mr G. A. Waterhouse, 23 Moss Lane, Southport, Merseyside, PR9 7QR (or phone Southport 24743, Mr B. Hobson).

16th August. **STROUD AS** Open Show. Subscription Rooms, Stroud. Schedules: Mr J. Cole, 13 The Hill, Randwick, Stroud, Glos. (Stroud 4504).

22nd August. **LONG EATON AS** First Open Show. Details to follow.

28th August. **THIRD WELSH NATIONAL OPEN SHOW** and Exhibition of Tropical, Marine and Coldwater fish. Sophia Garden's Pavilion, Cardiff. Details: Mr C. Tumar, 146 Arran Street, Roath, Cardiff: Cardiff 498982.

4th September. **FBAS** General Assembly, 2.00 p.m. Conway Hall, Red Lion Square, Holborn, London, WC1.

5th September. **BETHNAL GREEN AS** Open Show. Bethnal Green Institute, 229 Bethnal Green Road, London, E.2. Schedules: Mr R. Dale, 14 Butland Road, Wanstead, London, E11 2DY (phone: 01-989 9015).

12th September. **HARLOW AS** Open Show. 23rd-24th October. **BRITISH AQUARISTS' FESTIVAL (FNAS)**, Belle Vue Zoological Gardens, Manchester.

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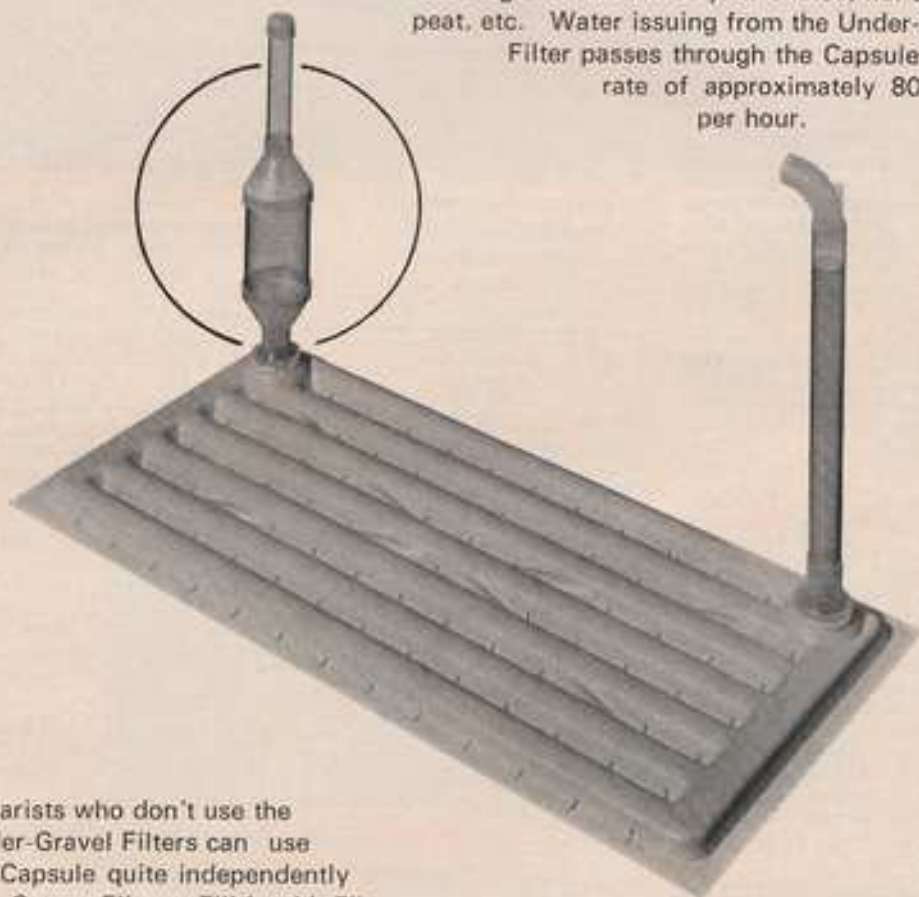
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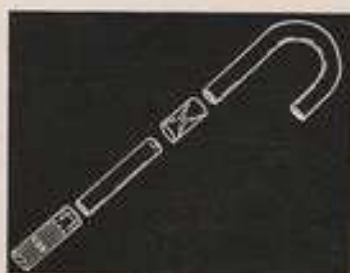
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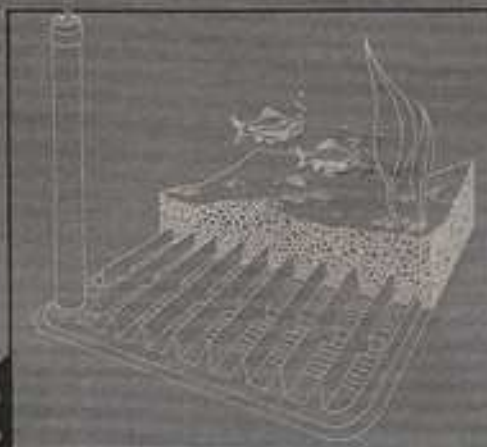
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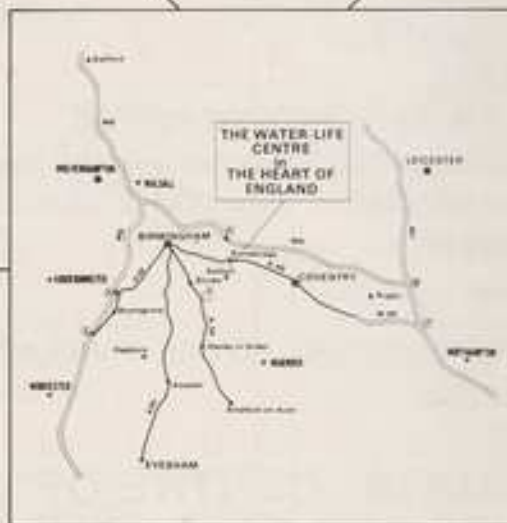
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until April)

From £1 each

**PLEASE NOTE**—All enquiries requiring a reply MUST be accompanied by S.A.E. Our premises are situated on the main Stratford-Birmingham road, 8 miles from Birmingham, Midland "Red" Bus no. 150 from Bus Station, Birmingham, passes the door, alight at "The Crown", Monkspath.

**CLOSED ALL DAY SUNDAY AND MONDAY**

**HOURS OF BUSINESS**—NOVEMBER-MARCH 10 a.m.-5 p.m., APRIL-OCTOBER 10 a.m.-6 p.m.

**TERMS OF BUSINESS**—Cash with order please. Fish sent by rail. Minimum order £20.00, insulated container and carriage £1.50 (Scotland £2.50). Plants by post (minimum order £2.50) please add 25p. post and packing on aquarium plants up to £3.00, and 50p. on orders over £3.00. Postage and packing on pond plants £1.