

NOVEMBER 1973

30p

Pet Fish

monthly

The PRACTICAL FISHKEEPING MAGAZINE



Contents include:

Unusual Larvicidal Spawning

Queries Answered

Communication in the Fish World

Marine Losses Through Disease

An Integral 'Dry Filter'

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Comments and Quotes

- Foods of fish (and others)
- Fish in the service of man
- More river pollution

One Animal's Meat

AS soon as you parcel up something edible and label it for a particular kind of consumer you can be sure that someone quite different will develop a yen for it. Certainly this is true for pet foods. It's no secret that foods sold for dogs and cats are used by some aquarists with large families of fish to support and that their fish are deeply appreciative. Last month, however, we heard of an unexpected relisher of tropical fish food, who, it was said, preferred it to budgie seed. No, naturally enough, it wasn't a budgie—it was a caged harvest mouse being 'interviewed' on BBC Radio 'The Living World'. Please don't write and tell us your dog likes catfish.

Fish at Work

EVERYONE has heard of canaries acting as indicators of air purity in mines but did you know that goldfish are given the job of sampling the purity of industrial water? 'Goldfinger' is one such sampler of waters, in the employment of a London firm who have to be sure that the water they have used to test turbines is pure enough to be returned to the river. So far the hazards of Goldfinger's employment appear to have been few, for the *London Evening News*, reporting the story, say that in 8 months or so he has trebled his size whilst swimming in the raw material of his work.

It should not be thought that fish in the (non-culinary) service of man are restricted to the kind of analysis done by Goldfinger. From the U.S.A. comes news of a proposal that catfish could be used as an early

warning system for earthquakes. Apparently a marine species of 'cat' has been found to become very agitated when there are minute changes in the earth's electrical field, such as those occurring before an earthquake. The odd behaviour of the fish in advance of natural disasters was first observed in Japan nearly 30 years ago, wrote Robert Chapman in *THE SUNDAY EXPRESS* last month, but recent work by Professor A. J. Kalmijn of the Scripps Institution of Oceanography has identified the cause and led to the suggestion for putting the 'cat's' powers to practical use.

All of which cannot fail to bring to mind the stories that used to be told of the little weather loach, kept in jars by country folk who watched them for behavioural indications of coming storms. This ability of the fish has not been verified scientifically as far as we know but it probably does as well as many human self-styled long-range weather forecasters.

Sad River

OUR burst of pleasure in the prospect of a cleaner river in our locality, which we noted in September's 1972, was all too premature. Since our note the poor old Wandie has been seriously poisoned by the dumping into it, by persons unknown, of cyanide. The effect has been so bad that one report pessimistically forecasts that up to 7 years will be required before fish can be replaced. It is disgraceful that this could happen anywhere, at any time, but for it to occur a little more than a month from the establishment of fish in the Wandie after 5 years of effort by the GLC to reach this point is particularly saddening.



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

Too High or Too Low?

WHOM or what does Cliff Harrison represent? ('Are Fish Prices too Low?', PFM, September). Over the past few years I have seen pet shop prices rocket as new owners with inflated ideas of how much customers will be prepared to pay take over. At no time have pet fish prices been frozen in the shops I have visited. I have seen male guppies priced at 24½p each one week and the same fish priced at 37½p each the following week, fire clownfish (*Amphiprion ephippium*) at £40 each and bloated goldfish, that the shopkeeper had labelled 'nymphs', at over £2 each!

Recently a well-known show judge, writer and fanciful goldfish breeder stated that pet fish are ridiculously highly priced and that prices are much higher than he would ask for a fish, and he is said to be a breeder of fish having unique characteristics. I admit that I have seen fish advertised at what appeared to me to be very fair prices, and I once saw comet-tailed goldfish at 10p for quality fish about 1½ in. long, but for the most part in this area (Clydeside) the quality of fish offered does not tempt me to pay the prices asked and the degree of care taken of stock in no way suggests difficulty in showing a profit on livestock.

Ignorance that kills creatures priced at 50p, 75p and £1 up, to mention the price tags of creatures I have seen light-heartedly thrown in the bin, could not be tolerated in a business having a tight mark-up, which, in drapers' shops used to be from two-thirds upwards to a 90% ceiling on wholesale prices. (Ignorance of the sort I witnessed in one pet shop I used to visit, where a golden hamster died every time a customer refused to buy the one he was shown, since, upon being returned to the container in which were its fellows, it was immediately set upon and killed.)

Since 1949 tradesmen's wages have increased by a multiple of five in this area. If the price of all goods had increased by the same amount many aquarist shops of the present day would never have been able to attract the price of the rent. Someone, somewhere, must have had a much less fippant interest in money values than Mr Harrison. On the value of money it is said that if all suffered equally, values would be unchanging.

From catalogues of 25 years ago I proffer the following (a sheetmetal worker tradesman had a

wage of about £6 at this time): Tanks (angle iron): 18×10×10, 12/- to 19/6 unglazed, 37/6 glazed; 24×12×12, 14/8 to 23/- unglazed, 45/- glazed; 30×12×12, 18/8 to 28/6 unglazed, 52/- glazed. Breeding pairs of coldwater fish were priced as follows: goldfish (common), 10/- for a 3-4 in. pair to 50/- for 7-8 in.; golden orfe, 20/- for 4-5 in. pair to 40/- for a 7-8 in. pair. This year I have seen £7 asked for mature line-bred shubunkins. Tropical fish prices for pairs were: Australian rainbows, 17/6; angels, 15/- to 100/-; fighters, 20/- to 40/- pair; red swordtails, 8/6, 10/- 12/6; red platys, 7/6, 8/6, 10/6; bloodfins, 20/- to 30/-; glowlight tetras, 50/-; rosy barbs, 5/-.

At the present time, as in the 1940s, tight money is encouraging homebirds, and aquaria-keeping using home-made tanks is again one of the interests to which people are turning. In the 1940s and early 1950s the absence of electricity in many homes made coldwater fish the choice. This time it appears that tropicals are popular. It would be a pity if grasping individuals cheated them of the opportunity of learning that which most of us learned early; that a fish tank need not cost the earth to stock with creatures of lasting interest and that what you can afford will absorb all the time you can spend with the hobby.

Greenock, Renfrewshire

W. F. CLARK

Plug-in Tank

AS an aquarist of many years, I read with interest your comments on Instant Fish-keeping (Comments & Quotes, PFM, September) and would like to tell you about the 'Sea Chest' that we have developed for tropical and marine use over the last 3 years, that has just become available to the trade. This is a cabinet-styled aquarium in an assortment of polished wood and melamine finishes in two standard sizes (36 in. by 18 in. by 12 and 48 in. by 24 in. by 15) both units being delivered complete with wooden stand, fluorescent lighting, power filter, electrical distributor, heater/thermostat and the other necessary incidentals (or can be supplied stripped). No pipes, tubes or wires are visible with the exception of a 20 ft. cable ending in one 13 amp

Continued on page 333



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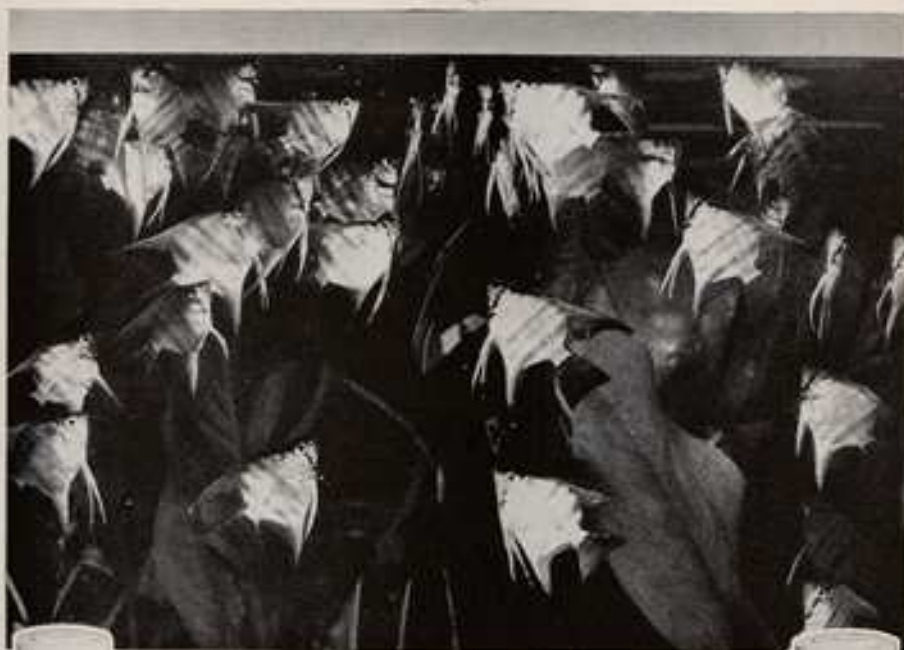
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LETTERS

continued from page 226

fused plug. The Sea Chest is itself the holding area for the water, with fitted condensation covers, and is a completely new idea that we have patented. This is not a glass tank and hood inside a finished cabinet. We realise that the form of the standard aquarium will remain with us for a long time to come, but it is obvious that evolution will lead to an improvement even in the field of aquatics with ever-better fishkeeping systems designed and manufactured.

I have always maintained that had the many thousands of ex-fishkeepers been provided with better quality equipment and fish in the first instance at respectable prices instead of the nasty rubbish pushed upon them by the far-too-many cheap-jacks of the trade, many of these numbers would still be with us. The sooner we get away from the 15p angelfish (what a degradation for such a magnificent creature) and neons at 20 for £1.00 and the 10p Hong Kong filter, the better off the hobbyist and aquatic shopkeeper alike will be.

City Pets, Newcastle-upon-Tyne LEN MCCOURT

Court the Exhibitors

I WOULD like to compliment Mr A. Jones on his letter in the September issue regarding the increasing benching fees at open shows. It has become apparent in the last 18 months that many of the shows are 'put on' with little thought for the exhibitors, and little effort is made to provide any amenities during the show itself. Any further increases in charges will only cause a dropping-off in the numbers of fishes benched unless they are counteracted by better prizes (as in the case of Sheffield), or a little more thought given to the well-being of the exhibitors.

Many societies now seem to consider the exhibitor to be a 'necessary evil' and the act of putting on an open show as a yearly fatigue. This last 18 months, a number of shows have been cancelled at little notice, causing long journeys for nothing, and societies have advertised prizes in their schedules, only to cancel them on the day of the show, and substituting nothing in their place. I

have been to shows and not seen a fish till 6.00 p.m. at night, and then not been able to see the fish that has beaten mine because of the crush when the 'closed' judging room is opened. At the last show I visited my reward for coming first in class was a small tin of fish food, but to add insult to injury it was for coldwater fish. All the above have so far been accepted, but, slowly and surely, the following at open shows will decline unless societies endeavour to stimulate interest by at least some reasonable prizes.

I do not want to 'blow the trumpet' for Derby, but if we could not put on a decent show we would not bother at all. All who have been to Derby know the appalling surroundings to our show hall (which next year should be in a new building not yet completed), but because of our efforts we have built up a vast public following of over 2000. Due to this we are able to put on what, I think, is a good show. Here are some of the details of the exhibits and costs, just to underline the expenses we are prepared to go to to give the exhibitors a fair deal: flower display, pond and cottage, eight trade stands, refreshments, milk bar, fish and chip van, ice cream van, wildlife display. First, second and third winners' prizes, goods to the value of £30; debenching prizes, goods to the value of £20; special crockery prizes, £25; tombola prizes £35; plaques for first and second £42. On top of all this, exhibitors with more than 10 fish were charged only 2½p benching fee.

I do not suggest that all societies can risk laying out this amount of money, but in our case it has been well worth while. We are now in the position of refusing trade stands, so great is the demand for a site at our show, and our Society has been invited to put on displays at most of the large horticultural shows and County shows in the area. The extra revenue and new members obtained from these make all our efforts well worth while.

But with all this success we are not content to amble along the same old path but are always on the look-out for new ideas or displays that will add interest to the show; nor have we forgotten the exhibitor—if he is expected to travel nearly 200 miles on his Sunday off it must be worthwhile. Even now it is being deliberated whether the entrance fees for all fish can be cut to 2½p. If the rental for the new show hall is reasonable this will be carried out.

So, please have a bit of thought for the exhibitor; try and get something to interest him on show day. But, above all, make him think he's wanted!

Show secretary, Derby Regent AS R. G. HARLOW

Hendon Congress 1973

WE are once again pleased to announce the highly successful Hendon Annual Congress

on Saturday 24th November, 1973 commencing at 6 p.m. As many of you will know, we have been able to obtain the services of the most eminent speakers the continent has to offer. This year we have been able to obtain the services of Mr W. A. Tomey of Holland. To most he will need no introduction as he has been contributing articles to *PETFISH MONTHLY*. His subjects will be 'Fishes of the World, Plants and their Association to Aquaria'. Thus there will be an evening that will appeal to all. Mr Tomey's English is excellent and we can promise no language barrier. As always, the programme will be synchronised with colour slides; Mr Tomey is equally renowned for his photography.

Many of the important personalities in the hobby will be in attendance and once again they will be at your disposal to discuss the various aspects of fishkeeping. Refreshments are available for early arrivals and again during the long interval, so there is every excuse to make this occasion a day out in London.

We endeavour to obtain the best brains in Europe. And we are confident that for 1973 our standard will be as high as it has been since we first began the Congress in the 1950s. The occasion will also serve the opportunity to renew friendships with some of the other 400 aquarists who regularly attend this important aquatic occasion. We welcome all members of all societies, but feel

that we ought to mention that this 'Congress' is not projected just for the expert or specialist but for all those who keep fish, whether they are one-tank aquarists or not. Our welcome also extends to any reader, whether a clubman or not.

We advise you to make early application for tickets (address below), which are priced at 40p each, juniors half price.

Secretary, Hendon & D.I.S.
90 Cotswold Gardens
Hendon, London NW2

B. MAYNARD

Catfish Enthusiast

I HAVE been raising *Synodontis* catfish for almost two years now. I have specialised in these fish exclusively over the same period and have been acquiring all the available information on them that I can. I am still searching for more data, whether written or from first-hand observation. I should very much like to communicate with other aquarists who may have either raised and kept these fish or else have an extensive library that may include articles on them. Hoping to hear from them soon.

8118 Fallow Drive
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JOHN KOWALEWSKI

What's New?

Gift Badges

UNTIL the 30th April 1974 there is an opportunity of obtaining one of seven very attractive chrome or gilt enamel badges depicting a Siamese fighting fish, tiger barb, angel fish, veil-tailed guppy, zebra, cardinal or veil-tailed goldfish. Complimentary with pen and safety clip the badges are obtainable in exchange for tokens given away in all but the smallest-

sized (12 grams) tube of **Vit-A-Min** tropical fish food (King British Aquarium Accessories Co. Ltd., Cannon Mills, Union Road, Bradford, Yorkshire, BD7 3HW). Worth 25p each, the badges should prove very popular in the hobby.

Pocketbook and Diary 1974

FOR the eighth successive year the **PetFish Aquarist's Pocketbook and Diary** is now published, with an enlarged aquatic data section. Information presented includes capacities of aquaria and weights of their contents, glass sizes and thicknesses for making framed or all-glass tanks, pond-making information, facts about heating and lighting, fish-keeping drugs and their doses, water hardness and pH, a seawater density and temperature chart and aquarium electricity consumption. Public aquaria in the U.K. and overseas are listed, as are national and international fishkeeping societies. The diary section shows one week at

an opening and at the back there are 16 pages of maps of the world in colour. A pencil is included in a spine holder. Price (including VAT), is 44p (post free from PF Publications, 354 Gerrard Lane, London SW17 2NY) and from some aquatic shops. For a present to an aquarist friend or relation that will be used all the year, the 1974 Pocketbook and Diary is hard to beat.

Shrimp Tablets

A NEW food from TropoCare (The Headlands, Scotland Lane, Harrogate, Leeds LS18 3HX). Pure Shrimp Tablets, is particularly suitable for the bottom feeders such as catfish and for oscars and large cichlids that appreciate food in tablet-sized bites. When dropped into the tank the tablets sink to the bottom and disintegrate. The manufacturers suggest that one tablet will feed approximately 20 medium sized fish at a meal. About 45 tablets are packed in each plastic container.

Changing Over to Continuous Water Circulation



By
**FRANK W.
ORME**

Illustrations by
the author

Part of the author's fish house. Arrows indicate the newly installed water pipes connecting the tanks as described in the article.

FOR some considerable time I have been considering whether to convert my fish house to the continuous circulation system. I have seen a number of variations of this system; some incorporate a filter tank, others have overflow pipes set into the base of the tank—but what happens if the latter method decides to leak and is not noticed? Early in the year the decision was made—I would convert.

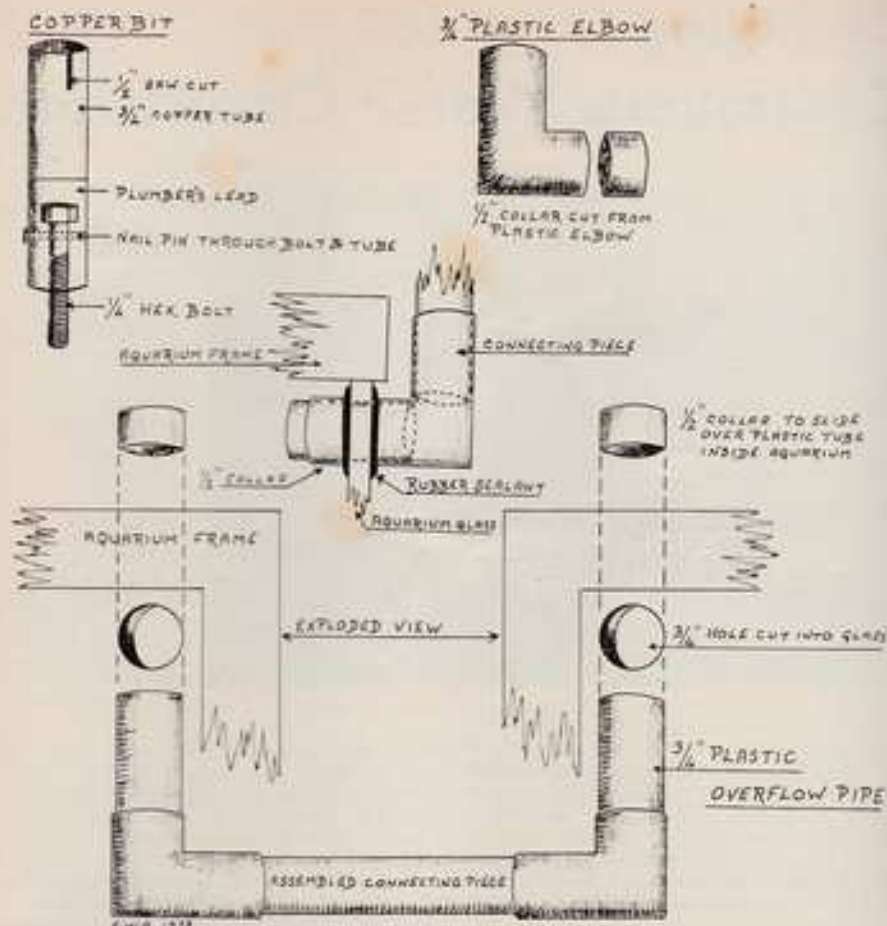
Opinions differed as to the best means of drilling the glass but the most popular seemed to be the use of a bit made from copper tubing. I decided that as the latter method was also the cheapest I would adopt the idea. A plumber friend was approached for a scrap 3/8 inch piece of 1/2 inch tube. This was stood on end and half filled with dry sand. A 1/4 inch hexagon-headed bolt was placed upright head down, in a central position on the sand in the tube and hot melted plumber's lead poured carefully into the top of the tube. When cold, the sand was poured out and a small hole drilled straight through the tube and bolt shank. A small nail was then driven through the hole to pin the bolt and tube firmly. This was done to prevent the bolt twisting when the bit was in use. Finally, a 1/4 inch

saw slot was made in the tube end and the bit was ready for use.

Next a guide was required—this being simply a piece of hardwood with a 1/4 inch hole drilled in such a position that when clamped to the tank the hole would be where the glass was to be drilled; a second piece of wood was also required as a backing piece. The only remaining requirements were a hand brace (I found an electric drill unsatisfactory) and a tin of coarse-grade carborundum paste.

I had decided that the sides of the tanks were to be drilled with the fish still in them. Therefore the water level was lowered, and the guide and backing piece were placed in position in the top front corner and clamped there with a G clamp. The copper bit was placed in the brace, carborundum paste placed into the open end of the bit to slightly overflow and the drilling started. A steady strong pressure is required and, to drill 1/4 inch glass, I found that the operation took roughly 20 minutes for each hole. As each tank requires two holes (except for the tank that is to be first in the system, which requires only one hole), it is quite a laborious task and was spread over several evenings.

Eventually the last hole was drilled and the



Details of the glass-drilling bit made by the author and assembly of the water-circulating pipes

interconnections could be made. First all holes and surrounding areas of glass had to be thoroughly cleaned. I found a cloth moistened with carbon tetrachloride ideal for this purpose, and it only required a wipe with a dry cloth to leave all surfaces clean and free of grease.

For the connecting pipes $\frac{3}{8}$ inch plastic overflow pipe and elbow bends were obtained from a local builders' and plumbers' merchants; the pipe is sold in 12 foot lengths and is easily cut to size with a fine-tooth saw. The elbow joints had half the length of one leg removed, making sure that it was cut square, and into each of these shortened legs a

piece of tube $1\frac{1}{2}$ inches long was firmly pushed. A length of plastic tube was then cut to bridge the gap between the holes drilled in adjoining tanks. These pieces of tube were lightly pressed into the elbows and the assembled piece was checked against the holes for correct length; if correct the assembly was firmly pushed together and a final check made.

A ring of silicone rubber sealant was run around the edge of the holes and the connection pipe pushed hard home; a further ring of the sealant was placed around the pipe, against the inner glass face, and the pieces cut from the elbow joints slid

over the tube and pushed tight against the glass, making the assembly really firm in its attachment to the tank.

The final tank, of course, contains an overflow, basically made in the same way as the connectors, the difference being that only one elbow is required for the remaining hole. This elbow has a long piece of tube turned downwards and by the use of further elbows and tubing leads to the exterior and to the nearest main drainage point. After assembly the whole arrangement was left to set for 24 hours.

A $\frac{1}{2}$ inch hole was drilled through the framework of the fish house, above the first tank, and a piece of $\frac{1}{2}$ inch plastic tube pushed through. A plastic hose pipe was joined to the external part of the tube and the other end to the water supply. Fingers crossed, the tap was slowly carefully turned until a trickle of water ran into the leading tank; slowly the level rose until it began to run through the connecting tube and trickle into the next tank. After a time water was circulating through all tanks,

and with a sigh of relief from me, it was found to work perfectly without any leaks in the system.

The continuous circulation system has proved, after a number of months' use, to have been well worth the time and trouble involved to install it. Although the rate of algae growth has increased, necessitating the front glasses being wiped over every other day, the water remains perfectly clear despite heavy feeding of young fish. When siphoning the tank bases the water level falls but is automatically refilled by the system. In time alone the system has proved a great saver and in addition the fish appear to enjoy the moving water conditions.

Being the fish breeder's quiet time of the year, the months ahead would be a good period in which to convert your tanks, if the system interests you, so that you can reap the benefit of your labours next season when the advantages will become most obvious.

Bizarre and Ever-popular Marine

The Sea Horse

ONE of the aquatic wonders of our planet is this bizarre little marine fish that differs completely from all other forms of water life, either marine or freshwater—a quirk of Nature unequalled amongst the 18-20 thousand estimated species of fishes throughout the world. Through the ages the sea horse has had a variety of descriptive names: *Hippocampus*, which itself means 'horse-caterpillar', have also been known as knights of the seas, because of their resemblance to the small black knights on a chess board, as sea dragons and as stallions' heads.

Certainly this creature manifests some unbelievable behaviour. It swims as no other fish does, practically vertically, with darting, jerky movements; it anchors itself firmly to stones, sea-weed and corals with its monkey-like tail, by which means it can withstand the battering of violent currents; it nods its head as it moves around searching for food. Above all, this freak of Nature seems to overturn all natural laws with the male of the species incubating the eggs and carrying them around like a kangaroo in a pouch in the front of its body, from whence, after some violent body trembling, the young fish are spewed out into the sea currents where they fall prey to other marine life. Fortunately enough survive to propagate the species.

In some parts of the world they have been

described as a 'chameleon-horse' since, like the chameleon, they can change colour according to their surroundings—from dark grey to brown or greenish bronze, to pink, even to black. Their eyes pivot independently—while one covers the surface for food the other is watching in another direction for enemies.

Different species of sea horses, from a miniature 2 in. to 10 in. or more, are known. The head, body and tail are composed of tiny round bony structures, ribbed and spiny, and its body ends in a long, tapered, coiled flexible tail. The sea horse is a poor swimmer but a small gas-filled bladder holds him proud and erect. Unfortunately, this organ is prone to puncture by the teeth of enemies or needle-sharp rocks or coral. If this happens, the bladder deflates with the escape of gas and the sea horse loses

By
J. LEE



balance and is doomed to sink toward the bottom to die.

I have kept sea horses in a tank on two occasions over the years and have spent hours sitting in front of the tank making notes on their unusual behaviour in the aquarium. On both occasions the fish were housed in all-glass tanks. When I first kept them about 15 years ago I used a large glass battery-jar tank, 18 in. by 15 in. by 12 in., with a 1 in. layer of well-washed silver sand on the base. Three small pieces of coral were added for the fish to cling to. Synthetic salts made up the sea water to a density of about 1.020 which, in those days, was considered a comfortable density for small marines.

Anchorage

When I kept them on the second occasion, some years later, a 30 in. by 12 in. by 15 in. silicone-sealed all-glass tank was used that I had made myself and had placed high up in the fish house where it could receive a good light, since these creatures do not like dim or bad lighting conditions. Again synthetic salts were used (density 1.025 on the hydrometer, the pH being close on 8.3). The base was covered with a 1 in. layer of well-washed beautiful orange-coloured gravel (collected off a beach in the Isle of Wight). At each end of the tank a pyramid was placed, one made out of thick pieces of plastic tied in the centre with strong fishing gut or line and the other made from a tongue ripped from a clean piece of floor-board well scrubbed and tied in the same manner. These I found ideal for the sea horses to anchor their tails around when resting or feeding. Along the back of the tank I placed four small plastic aquarium plants but I did not include any coral as I feared that the sharp niches might be dangerous to them.

When keeping marines a good filter must be used and aeration given to keep the water circulating and constantly on the move, but with sea horses the aeration must not be too violent or it will upset these slow-moving creatures, who would find it difficult to catch their food in rough water. A regular pH check is also essential. A reasonable temperature for marines is between 65 and 75°F. Any higher than this can result in the fishes showing discomfort. I kept my marines at about 70-74°F, where I found they did very nicely.

The dwarf sea horse *Hippocampus zosterae*, which I kept, grows to 2 in. in size and comes from the coast of Florida, the Gulf Coast and Pensacola Bay. They are easier to breed and to keep than the large species such as the 10 in. species *Hippocampus hudsonianus*, which requires more food and a varied diet of large crustaceans, white worm, tubifex, and small fishes such as guppy fry, which they relish. On the other hand, dwarf sea horses need a constant supply of brine shrimp floating

around—but a word of warning. All the brine shrimp eggs that have not hatched out must be eliminated since they are indigestible and will block up the intestines of the sea horse and cause internal damage. My *Hippocampus* seemed to touch only moving living organisms—dried foods were ignored but throughout their life they always accepted brine shrimp, which they sucked in through their tiny, pipe-like mouth. My fish were also given small daphnia, micro worms, well-chopped spinach, green algae and frozen plankton.

Although many aquarists mix this species with other marine life sea horses are better kept on their own, since they are such slow swimmers they do not get their fair share of food when there are faster aquarium inmates to greedily consume it. With other species there is also the danger of the sea horses being molested, so to increase their chances of survival it is better to keep them on their own. Great care must be taken that all uneaten food lodging on the bottom of the tank is removed so that water pollution is avoided, and the tank must be siphoned out regularly each week.

The life span of the sea horse is estimated to be 2-3 years, slightly less for the dwarfs. In spite of lavishing the greatest care on them I have never been able to keep this species longer than 4 months; and indeed I've never yet met an aquarist who can honestly say he's kept one for long. Since reading the authorities on this subject it appears that they agree that this wonderful little animal does not take kindly to aquarium life.

Many Species

It is estimated that there are about 40-50 different species of sea horse. Some drift near British coasts and turn up in the North Sea. The sea horse is related to the pipe fishes, which are also found in the Mediterranean and the Atlantic Oceans; I've kept these, too, but without great success. Perhaps one of the most interesting varieties of the species is the Japanese sea horse, where the males carry their pouches on the lower side and have long and ragged outgrowths from the body that resembles sea weed.

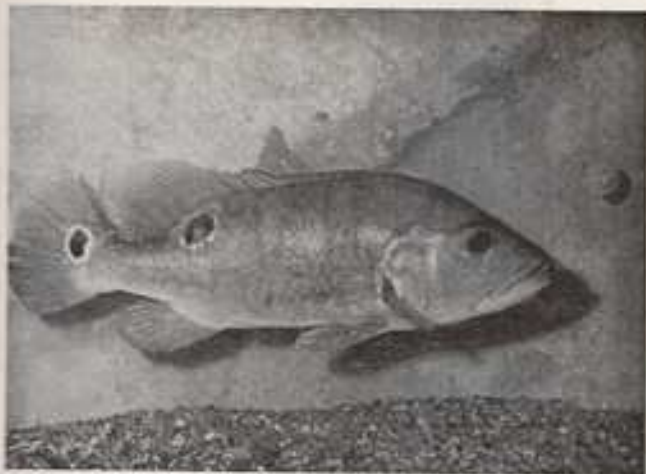
Without doubt these fish are easily one of the most interesting species I've ever kept in my long years of fishkeeping. Indeed, perhaps I feel soft-hearted towards them, but it seems to me to be a great pity that these harmless helpless-looking creatures should be taken from their native waters to die so quickly in captivity when they could probably live so much longer in the wide open spaces of the seas.

However, I still have the dried-out bodies of the sea horses I kept. One final peculiarity about them is that when they die their body can dry out hard and perfect, with tail curled, to be preserved as small ornaments.

Is it New to You?

Photographs
by CLIFF HARRISON

The hardy green knife fish *Eigenmannia virescens* has a hearty appetite and these 5 in. specimen photographed at Walton Manor Fish Farm, Surrey, avidly take raw meat, oatmeal, large flakes and live foods. To 18 in. in nature but about 12 in. in aquaria.



A large cichlid from South America named as *Cichla ocellaris* (eyespot cichlid) although not certainly this species. Length about 10 in. but believed to reach 24 in. Smaller fishes and raw meat form the best diet and a large well-aerated tank is essential. Photographed at Harrow Green Aquatics, London. Body is silver, with dark bands, and red shows in pelvic and anal fins and lower caudal fin.

First time import from South Africa, this 18 in.-long fish (right) is not identified. Its dark brown body tapers to the caudal and the small mouth is another marked feature. Seen at Walton Manor Fish Farm.



COMMUNICATION IN THE FISH WORLD

Signals that Cannot be Seen

By IAN C. SELICK

WHEN we see a shoal of Congo tetras swimming in a large aquarium suddenly change direction, all in perfect unison, do we stop to wonder at the means of communication between each fish? When we watch the fin-shaking displays of a cichlid before spawning, do we recognise the message being passed from one fish to the other? How do other fish communicate? Why do they communicate? In this article, I shall attempt to give a brief coverage of all the known and recognised methods of fish communication, and an explanation of their significance in the everyday life of fishes.

The concept of fish communication can be taken at two different levels. (1) Communication within the fish. Communication at the cellular or organ level is the most important for the individual fish and is a product of both the nervous system and the endocrine system, the former conveying quick, electrical messages around the body—controlling such activities as locomotion, the latter being a slower method of control by chemical messengers in the blood streams called hormones. These con-

trol such phenomena as growth and egg production. (2) Communication between fish. This is mediated either physically or chemically, the former being, in most species so far studied, the more important. It is this aspect which will be the concern of the present article, being the most important to the average aquarist.

Chemical Communication

This means of communication, although not actually visible, may prove to be an extremely important factor in the language of fishes, particularly those which live constantly in the dark—such as the deep-sea fishes, or such fish as the blind cave characin (*Anoptichthys jordani*), which lack eyes. Other fishes among which chemical signals are important are bottom-dwelling types such as catfish and bullheads from freshwater, and blennies and gobies from seawater. Here the fish may be mainly nocturnal, or simply live in murky water where visual signalling is difficult.

It is well known that the olfactory powers of fish



Photo

W J HOWES

An example of a fish with remarkably acute sense of smell is the common freshwater eel. Tests show that eels can detect the presence of alcohol at very high dilution in the water.

are quite remarkable; for instance, the common eel (*Anguilla anguilla*) can detect alcohol in the water at a concentration where only a few molecules reach the olfactory receptors. These olfactory receptors need not all be situated in the head as we would expect, however. In many fishes that have an acute sense of smell these receptors are scattered all over the fish's body, thus giving the equivalent of a 'binocular' effect, enabling the fish to more easily locate the source of the stimulus. In many fishes these receptors are used primarily for food location and not reception of communicating substances, called pheromones, in the water. This group of substances are known to occur widely in insects and mammals as well as other animals so it comes as no surprise to find they are also produced by fishes. They are small molecules and are thus easily dispersed in water or air, but large enough to be capable of many variations—thus each fish species may produce its own particular recognition pheromone which will differ subtly from that of a related species.

As far as I know, none of these substances has been isolated and identified, owing to the very nature of their release—in extremely small quantities, which makes them difficult to collect. However, by isolating fish in pure water it may be possible to collect dilute solutions of these chemicals which have the expected effect when added to tanks containing other, similar fish: e.g. one unusual effect found in the American bullhead (*Ameiurus* sp.) is the secretion of an 'anti-aggression pheromone' in colonial living individuals, which after several days' exposure will stop two previously incompatible males from fighting.

'Fright Substance'

It has been shown that social behaviour and recognition in these bullheads depends little on vision as if the fish are blinded (a condition that prevails in some natural populations) the behaviour does not change significantly. However, Gunther Sterba reports that these fish are also very sensitive to sounds in the water—so communication may be mediated by both smell and hearing.

Relatively little is known about chemical signals in aquarium fishes; however, some cichlids have been studied along with other fishes and found to produce *schreckstoff* or 'fright substance', which is released on attack by a predator. This substance is recognised by conspecific fish, which promptly flee. This substance has been found primarily in the Ostariophysi (comprising cyprinoids and siluroids), although finding it in cichlids somewhat upsets this observation. An interesting point is that only young *Tilapia macrocephala* produce this substance—they are school-living, whereas adults are solitary and would have less need to communicate the presence of a predator.

It seems likely that these substances are produced as an adaptation to a schooling mode of existence, as shown by *T. macrocephala*. In such fishes as the minnow (*Phoxinus phoxinus*) and the bitterling (*Rhodeus amarus*), both principally schooling species, this reaction is strongly present from about 40–50 days of age. Among common aquarium fishes where the reaction is pronounced are the characins, such as *Pristella riddlei* (X-ray tetra) and *Aphyochorax rubropinnis* (bloodfin) and other small non-predaceous types. The reaction to the *schreckstoff* varies from species to species, e.g. *Epiplatys danricus* (flying barb) reacts by jumping, a *Corydoras* catfish will try to bury itself in a thicket of plants, whereas the tetra (*Tetraodon lineatus*) will swim round at an angle of about 60 degrees stirring up the mud on the bottom of the pond to camouflage itself.

This fright reaction causes the skittishness of small characins when first introduced to a tank, particularly if their skin has been slightly damaged, as the substance is released by special secretory cells in the upper layer of the skin. However, the reaction may be carried on more quickly by other behavioural patterns, e.g. a damaged hatchet fish releases *schreckstoff*—another fish responds by jumping—other hatchets in the shoal observe it and also jump.

As dead fish freely exude fright substance this means that fish of the same species will shun the fish as food unless decomposition has started, when the substance is no longer released in quantity. From the aquarist's point of view this means that in a tank containing only one type of fish, a dead one, if unnoticed, will often remain in the tank until pollution occurs as the other fish may refuse to eat the corpse.

Another use of chemical substances is in the recognition of offspring by parent fish, particularly in those fishes that look after the young—primarily the cichlids and other perciformes. Eggs do not have any smell to the parents as these are not expected to move—whereas the young do; thus any smell they have allows the parents to keep track of them if they go out of sight. Visual recognition remains the chief means of tracing youngsters, however.

An interesting use of the acute smell of fishes is the recognition by salmon of their home stream or river when they return to spawn. It appears that salmon are able to recognise some factor, or combination of factors, in their particular stream and almost unerringly choose the correct river to ascend. Thus anything that interferes with the fish's sense of smell, such as organic or heavy metal pollution, will confuse the fish and result in less fish reaching the spawning site.

In conclusion of this short section on chemical communication it must be said that much work

still needs to be done on this aspect of fish physiology and that that which has been done is not necessarily conclusive. However, once these communication substances have been identified, it may be possible to use them as selective attractants for fishing, growth stimulators or repellents to inhibit

predators from attacking cultivated fishes. Who knows, in the near future we may be able to go into an aquarist shop to buy a packet of 'Love-In' to stop our Malawi cichlids from fighting!

Next month—Physical communication in fish.

MARINIST'S Notebook

By ROY PINKS

I HOPE I may be forgiven for appearing to dwell at undue length on the subject of anemones in my notes, but there is wide interest in their culture and not half enough recorded about them, and I very much hope that readers will continue to contribute their own experiences if they differ from or complement those which I have noted.

Alas! My first anemone purchase has succumbed after 6 months in my clown/anemone collection and, not unexpectedly, I am still searching for an understandable reason for the deterioration which it suffered. This specimen was introduced in early January and, after surviving a really heavy nitrite concentration during the seasoning period of its tank, it gave shelter to a sebae clown for several months until the latter fickle creature abandoned it in favour of a slightly brighter coloured specimen. A third anemone was included at a later stage, but it may be noted that the sebae ignored this completely, possibly because it was of a whitish hue, and much less of an exciting proposition than its predecessors.

It remained for two smaller clowns to establish possession of the 'unpopular' anemones, at least, for so long as they were not chased away from them by the original of their species, now visibly putting on size and losing charm in the process. Possibly the arrival of a very large and highly coloured anemone in late May set the seal on the demise of the founder specimen. This latest acquisition, some 10 inches across when fully extended, was staggeringly beautiful from the very outset and immediately attracted the three clowns to its lengthy and all-embracing tentacles. The large clown gradually drove the other two fish away and one of them took up residence in each of the newer anemones, leaving the first unoccupied.

From this time onwards there was a steady deterioration in the condition and size of this specimen, which took to wandering about the tank, frequently finishing in an upside-down posture. It remained firm to the touch, however, and although it had diminished to about a tenth of its original

size, it gave no indication that it was actually dying until one morning I noticed that some tentacles and part of the trunk seemed to have lost cohesion. It was not very easy to spot this. Anemones assume the weirdest shapes and attitudes, and often give the impression that they are about to expire, then as suddenly display their beauty almost as never before.

I had come to the conclusion that my loss had arisen because the creature had starved to death, as it had become clear that any living food which settled on any of the anemones was subsequently removed by the clowns, and even pellets of food pushed into the 'mouth' were purloined by the clowns, which burrowed into their host until it yielded its temporary bounty. It was beginning to look as though the anemone was vital to the well-being of the clown, though the converse was not necessarily true.

Just to make matters more complicated, I was talking it over with my dealer, who has had some experience with invertebrates and is of the firm opinion that clowns and anemones are something of a mixed blessing because, in his experience, the anemones received *too much* food. As they seem to do best when fed with a little live food about twice a week, it seemed that another good reason had emerged for keeping anemones on their own. I had certainly noticed that my clowns had taken food they did not care for to the anemones (such as dried food and surplus earthworm), and I fancy that the former was allowed to remain whilst the worm was stolen when desired by the fish—an altogether uncertain existence for the anemones, and a confusing situation for the aquarist, as the anemones' true requirements were quite impossible to judge.

I have made no redeployments as yet, partly because of the purely sensual appeal of the clown/anemone relationship, and possibly because those fascinating pictures in the July issue of *PFM* of that spawning present the sort of carrot which few of us can resist.



by
ARPEE

Personal COMMENT

When one writes regularly about fishkeeping one has to read about it just as regularly, not just for the interest conveyed by print, but to keep in touch with what is going on in the aquarium world. It is not altogether surprising that when one is involved to this extent, not so very many contributions actually set the blood racing. A recent notable exception to the normal pattern was the commentary, supported by splendid photographs, written by W. A. Tomey on the subject of how the Netherlands garden with water plants (*rxz*, August).

I think he rightly touches only briefly on the possibilities of this activity in relation to competitions. The stylised and rigorous conventions of the worlds of flower arranging and Ikebana immediately spring to mind, but I think Mr Tomey visualises underwater gardening in aquaria as something for everybody which can be developed as the individual pleases, quite independently of the standards so arbitrarily set by select committees of taste. Although this is not by any means a new subject, its presentation at this time is a welcome one because it emphasises the gentle sort of craftsmanship which does the whole hobby of aquarium keeping such a powerful lot of good.

If you watch visitors to an aquarium show I think you will find that it is the furnished tanks which really get the message across. It is true that the giants and the marines get looked at, but as often as not the epithets 'ugly' and 'too expensive' may be heard in low-key mutterings by the viewers, who reserve their superlatives for the tanks with lots of plants and a few well chosen fish, and I believe it is these which bring more converts than anything else. Now, it has always seemed to me to be quite difficult to convey to the uninitiated just how to train aquarium plants to best advantage, but this particular article really whets the appetite. More important, perhaps, than the guide to plant characteristics is the advice that maintenance entails several hours' work each week.

I am by no means convinced that the sort of people attracted to aquarium keeping are as short of time as is often suggested—surely they take up the hobby to pass the time they have to spare.

Often this spare time is spent in uncongenial or deadly boring surroundings, in which cases the mere fact of having a series of duties to perform is more than half of the overall attraction. If golfers could all hole in one every time out they would probably take up fishkeeping or something containing equivalent challenge, and I am sure that most people who leave the fish hobby do so because they think that they have done it all and seen everything. Many of these will have been bitterly disappointed, perhaps, because their fish have failed or their expensive plants have been eaten by snails or fish or both. Had they for a moment considered a fishless tank full of the most appealing plants, perhaps they would have found something unexpectedly satisfying.

The sort of technique advocated in Mr Tomey's article does, I think, hold untold possibilities for the keen gardener who wants a somewhat 'different' winter pastime, but who can't really cope with an ambitious collection of fish. By applying all the skills of normal gardening he will acquire numerous others when tackling the problems of underwater cultivation. Furthermore, it is evident from the study of human activity at garden centres that there are thousands of people with money to spend on plants, but whose gardens are choked already with the consequences of 'instant gardening'. Almost literally, all the possibilities have been exhausted, and there's nothing more to develop. Now, if these frustrated souls turned their attention to aquarium gardening they would, I believe, find that there was not only a very considerable challenge in this specialisation, but that they could spend their pocket money in just as fascinating a fashion at specialist water plant nurseries as ever they did at the ever-beckoning garden centres.

I am fortunate in living not so far from a well-known establishment at Cirencester, and I know from experience how much pleasure its owner gets from developing an aquarium plantation. A successful project may take many years, as does a beautiful garden, but the effort is so supremely worthwhile that I would recommend this most seriously to any reader who has tired somewhat of the usual trends of the hobby. We are all distracted by loud cries to buy larger tanks, bigger and stranger fish, to 'go tropical marine invertebrate' and so on. The effort in most of these directions is finite, or nearly so, but the dedication necessary to maintain a really first-class planted tank will sustain and inspire, and I look forward to some evidence that aquarists in this country will learn what they can from the Netherlands and some day match their neighbours in this most satisfying of accomplishments.

Unusual Spawning of One of the Loricariids



Loricaria filamentosa

AQUARISTS often assume that this South American catfish is difficult to keep in the aquarium because it comes from fast-flowing streams; but this is not so, and, in fact, members of the Loricariidae demonstrate the exact opposite. In spite of the conditions they are used to in their natural habitat, clean, oxygen-rich waters, this family of fishes has adjusted fully and completely to life in the aquarium. In a reasonable-sized, well-planted tank, provided with plenty of stones and roots, they do well. Water conditions are not critical; nor are the fishes demanding about temperature. Water from 68° to 82°F (20-30°C) and of any depth is acceptable to them. They are omnivorous and accept any food that they are capable of catching, as well as dried and freeze-dried foods given as a change of diet. They are not, however, prepared to eat up the rotting remains of other fishes' food. To maintain them in good health and ensure their correct growth a good quantity of algae must be a regular addition to their diet.

The colouring of *Loricaria filamentosa* is not particularly attractive, merging, as it does, into the background of the tank, but because it is peaceful and undemanding and extremely interesting to breed this catfish is a most desirable addition to any aquarium.

With plenty of richly varied food the fish come into breeding condition at 7 months and it is advisable to allow them to spawn

By RUDOLPH ZUKAL

Photographs by the author

Translated by F. MARSH

in the community tank. They lay their eggs in crevices between stones, in tall roots or, if these can be provided for them, in small tubes about 6 in. long (150mm.) and 1½-1¾ in. (30-40mm.) round (bamboo canes can be used or artificial ones made). The cane or tube must not be more than 1½ in. in diameter, since the male fish who will be looking after the eggs, will avoid it; the space is too large and he cannot stretch out his fins to cover and guard the eggs. Also, his spined dorsal fin is used for support and must actually reach the top of the cane or he will not feel secure and safe.

Spawning can be induced by replacing about one-tenth of the tank water with fresh, cold water. The catfish spawn in the tubes mostly in the afternoon or early evening and, as mentioned above, it is the male fish that takes over the brood care. Once the fish have spawned the tubes containing the eggs can be transferred, together with the male fish, to a smaller, previously prepared tank (a 14 in. by 8 in. by 8 in. tank will do) that has been half filled with water from the community tank and topped-up with fresh, soft water. Also, if possible, this nursery tank should be gently aerated with a stream of fine bubbles.

Many of my friends maintain that the fry will



The length of hollow cane selected for spawning is cleaned inside and out. Here the male is seen, head on, at this task. The photograph opposite is also of the male.



Here the female fish is seen waiting at one end of the cane (top picture) while the male is inside and then (bottom picture) she too disappears into the cylinder (note that this has been cut along its length)



Lengthwise halving of the cane supplied for the fish enabled the pictures of the male with the eggs to be taken after removal of the 'roof' of his tunnel.

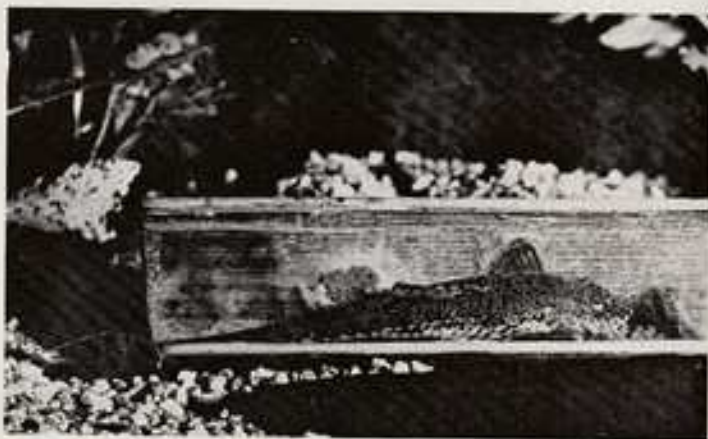
hatch without the presence of the male, provided that this fine airstream sweeps over the eggs, but I must emphasize that, in my opinion, the presence of the male is absolutely essential and no form of artificial aeration can take his place. At a temperature of 75-82 F (24-28°C) (and a higher temperature will not speed up the hatching) the fry hatch on the ninth day. They are immediately free-swimming and attach themselves to the tank glass by their sucker mouths. At this stage they are just about $\frac{1}{2}$ in. long (8-10 mm.) and as they have no prominent yolk sac they must begin feeding at once.

Once the last egg has hatched the male will leave the tube and remain lying on the bottom of the tank, showing no further interest in the fry. He has taken no nourishment during spawning or

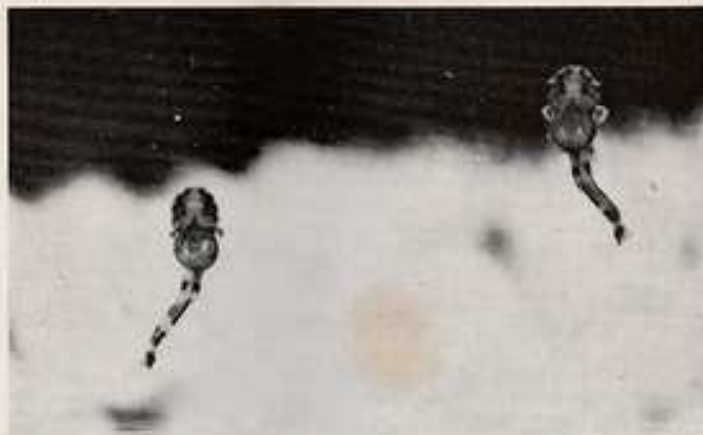
while looking after the eggs. Once the fry are hatched the male can be removed and returned to the community tank.

The jaws of the young fish are small and so, of course, their food must be very fine. For the first few days of life they should be fed with nauplii, Grindal worms and similar fine foods that are capable of remaining at the bottom of the tank without easily dying and causing decay. It is also a very good idea to use a small inside filter in the nursery tank, filled with activated charcoal to help to remove any possible pollution arising from disintegrating food. After 3 weeks, chopped tubifex can be fed to the fish.

Snails are also a useful aid in keeping the tank bottom clean; the *Ludova* species is best—they will remove and consume everything that the



In the two pictures on this page different views of the male with the eggs are shown. The male remains within the tube with his eggs until all have hatched.



Enlarged view of the recently hatched young of *Loricaria filamentosa* hanging from the glass.

filter has not dealt with. With this treatment the fry will reach a size of 2-2½ in. (5-6 cm.) within about 3 months.

When I obtained my first four *Loricaria* they were about 2 in. (5 cm.) long and I was told that they were two pairs. At the time I found this difficult to believe as I was sure that at this size sex differences were not visible. Now I know that an experienced breeder can recognise the sexes certainly by the shape of the head. The male has a wedge-shaped head with blunt 'corners'. It remains like this throughout the adult state when, again the male, is provided with short quills each side of his head.

A last couple of random thoughts—the eggs are about 2-3 mm. in size, not completely round, and brownish coloured like honey. The spawning itself lasts about 3-4 hours, during which time 150-250 eggs are laid.

As with many so-called problematical fish, where difficulties in keeping and breeding exist, there are few problems that cannot be solved and all that is necessary is for an aquarist to bring interest, patience and precision into play without expecting any financial reward. Then, I am convinced, one won't have to wait long for a positive result.

Occasional Import

The spotted leporinus (*Leporinus maculatus*), whose breeding habits were reviewed in the July issue of *PFM*, is only occasionally imported into this country. The specimens featured here, photographed at Queensborough Fisheries, were about 2½ in. long, though they could be expected to be double that size in maturity. Members of the genus *Leporinus* have never achieved great popularity in the home aquarium.



Photo

CLIFF HARRISON

MARINE PROJECT — 2 YEARS ON

Marine Losses Through Disease

By ROY PINKS

OF all the aspects of marine fishkeeping, disease continues to be the least well-documented, and hence there is a great need for a frequent exchange of information by active aquarists. I found that, after the initial 'seasoning' period of each tank, during which injudicious introductions caused all sorts of trouble, casualties were of a distinctly individual nature. In other words, new arrivals seldom gave rise to anything more serious than the odd touch of *Oodinium* or white spot, both of which proved simple to treat successfully, *in situ*. I did not, most fortunately, perhaps, experience the mass failure of a tank due to a mystery disease brought in by a newcomer, though I have read about this sort of happening times without number. It might just be that as I treat all new fish with copper sulphate for up to a week, this might have helped.

Some fish I have lost appear to have died because of troubles they had within them, long before they came into my possession, and they all managed to keep it to themselves, though there were others whose maladies were potentially dangerous yet never came to anything. One particular group of complaints interested me because they were described by Mr H. Cotton as having possible freshwater origins. Of all the possibilities conjured up by this conclusion one is compelled to wonder whether there can be real danger of cross-infection from freshwater tanks already in one's possession, and a number of elementary precautions certainly suggest themselves. As a consequence I have been using one set of feeding utensils and scrapers for the marines, and another for the freshwater tanks, though I suppose that if I thoroughly cleaned them after use in each individual tank, this would be more in keeping with the principles of strict hygiene.

The following is a list of some of the diagnosed ailments which have affected my fishes: it is not complete because in some cases the first I knew of a death was the non-appearance of a familiar face at too late a stage for recovery of the remains to be

made. In one or two cases the other occupants of the tank had reduced the corpse beyond the stage at which it could be subjected usefully to a post mortem.

<i>Heniochus</i>	<i>Ichthyophonus hoferii</i>
<i>Chaetodon ocellatus</i>	<i>Dactylogyrus</i> gill flukes
Copperband	<i>Bucephalus</i> liver flukes
Striped chromis	Unknown virus
<i>Heniochus</i>	Three large tapeworms (probably <i>Diphyllobothrium</i> sp.)
Copperband	Actinomycosis

The other fishes that I lost during the period under review included neon gobies, domanoes, clowns, file fish, a small butterfly and chromis. The gobies, I rather assumed, are not very long-lived, and as they did well for up to a year and then deteriorated I put their demise down to *amoo Domini*, though I would have expected better of them. The clowns and the chromis were largely the victims of bullying or bad water conditions, together with one combination of bullying and *Oodinium*. The file fish were fairly obviously failures through malnutrition, but they displayed the sort of reactions I would have expected from poisoned fish, and therefore a post mortem would have been particularly interesting. The butterfly was altogether too small to have stood a reasonable chance of survival after capture, but it was a case of my taking a challenge and, like many others, failing completely.

At the end of my original series of articles in *PFM* I made a tabulation of my marine casualties and compared them with those in my freshwater tanks over the same period. The reader would be forgiven for concluding that I was demonstrably pretty inept at both branches of the hobby, and indeed I felt very much that way at the time. Happy to say, the trend that had so ominously established itself began to ease at about the 1 year stage, and during the second year I have experienced losses

on much the same basis as those which cause disappointment in almost every livestock hobby.

Fortunately, for every such failure there are very many more successes, and in this respect I feel that I, at least, have turned the corner in keeping tropical marines alive. One thing is quite certain: the casualty rate has dropped significantly since I ceased to fill every vacancy with a new fish, and this suggests that I had been running too close to the safety margin, which is a very common mistake of the enthusiast. Perhaps one day some genius will market a tank with a quarter of it sealed off completely, access to which can only be gained by the payment of a heavy fine. Fanciful, perhaps, but maybe that is how we should regard the situation always.

Medicaments

The treatment of disease has remained as obscure a subject as ever it was, and despite the numerous 'magic cures' on the market our fish seem to continue to die fairly soon after beginning to look sick. Only once have I managed to restore a fish from the badly off-colour condition to normal good health, and it is clear to me from the numerous post mortems I have had carried out, that even had I a chest full of medicines, I should have been at a complete loss to know what to do merely by looking at the ailing fish. Apart from those which exhibit signs like lumps or lesions, most sick fish look the same.

The classic instance in my case was the *Hemichnus* with tapeworms, and I tried every cure I had on this unfortunate fish, with absolutely no success. It was a very great surprise when I read the post-mortem findings on this because the symptoms were like practically everything listed on the bottle labels.

On the whole I have found that copper sulphate, for all its drawbacks, at least works sometimes. No other medication I have tried has ever worked, and in at least one case the effect of the drug on other fishes has been quite severe. It is advertised as an in-tank cure, but I believe this to be misleading, and so do several others who have tried it. One range of drugs specifically instructs the user to treat fish in separate containers, and although I have had no success in their use I regard the numerous cautions and copious advice on the accompanying leaflet as being highly responsible. My only concern about this method of treatment is that the fish, already weak, are further weakened by the netting process and the shock of transference to and from the medicated water. A hospital tank, which few can afford or will afford, seems to be essential if cures like these are to be effectual. Unfortunately some of them may adversely affect the fish if it is left exposed to them for more than an hour or so, and thus we are back to the risks of

further physical shocks to the fish during the process of being moved. We do, indeed, seem to need a wide-spectrum in-tank medication, which will prove harmless to the nitrifying bacteria, but I fear it will be a very long time before this tall order will even be attempted, let alone fulfilled.

My present policy of despair is to treat three times with copper sulphate and then, if the patient fails to respond, it is isolated and experimented on with one of the available drugs, unless the condition seems to be the sort of thing which will clear itself up. An astonishing malady crops up every few months with my regal tang, which suddenly displays blackish patches, which develop into pink sores. Just as one is getting desperate and looking askance at all the other fish, the whole thing subsides and the tang continues to gobble its food as though nothing had ever happened. Having said this I shall probably find that the whole community will expire during the next visitation of these 'boils', and in the light of my past experience it will serve me jolly well right for having taken the matter so lightly. I should be particularly interested to hear if any other readers have experienced this form of outbreak, and if so, whether the results have been comparable with mine.

Working Aids, Gadgets etc.

There is a multitude of oddments available to the marine aquarist, with which his dealer will no doubt acquaint him. The high-power pumps and the protein skimmers jostle with far humbler items, and we may ask ourselves what is vital and what isn't. The cheap undergravel system with a fairly cheap pump have worked well for me, and I certainly wouldn't change the basic technique without the evidence of some as yet unknown fundamental breakdown. But, given unlimited money to spend, I think I would invest in a really good pump to drive my larger tank.

Good though the air pump I have has proved, it is subject to failure of one sort or another from time to time, and at closer intervals than I care for. Alone of all the things I have bought, I think the pump perhaps the most vital part of the whole argument, and I cannot emphasise too strongly to the beginner to do his homework really well on this particular item. Insist on a home trial before you buy your pump. The throughput of air is the most important factor; noise, though a cause for rejection by some people, can be accepted if you can 'lose' it somewhere in your menage without annoyance to others. But, obviously, go for a quiet and powerful machine for which the dealer can prove he can supply the spares across the counter. Be content with no less.

My only other required gadget, which was not purchased during the first 2 years, is a marine pH test kit. I must admit to not even having purchased

one yet, but it is useful as an indicator that your tank conditions are as they should be. In particular, where large quantities of copper sulphate have been used over a period, and where there is also an absence of coral sand and a minimum of coral, one has to remain watchful that copper salts are not re-formed in the tank water as the pH falls. In many cases this probably won't matter very much, but if invertebrates are present there is bound to be trouble, as also, I fear, with certain fishes which are naturally sensitive to this condition.

My project did not include the examination of protein skimmers, ultraviolet scanning of the water, and similar techniques. These, like ozonisers, are additional bits and pieces to have to worry about, and the results may indeed have been better had I tried them, but my aim was always to keep things simple and cheap.

(To be continued)

COLDWATER SCENE



By FRANK W. ORME

Feeding and Heating When Temperatures Fall

DANK mornings and misty evenings. Falling leaves, the smell of smouldering bonfires. November the fifth and 'Spare a copper for the gey'. These things are all a reminder that, whether mild or severe, winter will very soon be with us and the wise take the precaution of expecting the worst and making preparations for the cold and freezing weather now, rather than waiting until the last moment.

The end-of-season tasks, which were detailed in last month's PFM, should now receive attention without delay, if you have not attended to them yet. This will ensure that your fish are given the optimum conditions in which to pass through the coming cold months.

As the temperature falls the amount of food should be reduced accordingly until by the end of this month, or mid-December depending upon prevailing temperatures, all feeding ceases. I have found that once the water temperature has fallen to 40°F the fish lose all interest in food. It is therefore both wasteful and dangerous to offer it to them, because any uneaten food may cause pollution.

Some writers advocate the occasional small feed if a warm spell occurs that causes the fish to become active. My advice is to leave well alone and continue to withhold food. My own fish in the outdoor pool receive no food until around the middle of March; those in the fish house may possibly receive a feed of live food during February if weather conditions appear to be improving, otherwise they are treated the same as the pond fish. This lack of feeding does not harm the fish. In fact, if you are tempted to give food during a warm spell it could cause trouble to the fish.

Of course the above remarks apply only to fish

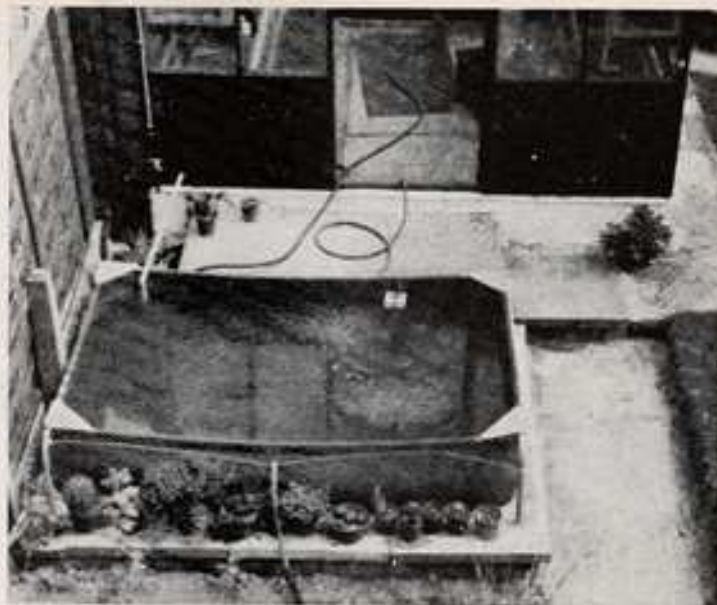
kept outdoors in either a pool or fish house but not to indoor aquaria. The indoor fish tank can be treated a little more leniently, feeding can be reduced to weekly intervals, or even two-weekly if in a sufficiently cool position.

* * *

The fish-house keeper should check over the heating equipment to ensure that it is working efficiently. If some form of heating has to be installed I would suggest consideration be given to a thermostatically controlled electric blower-type greenhouse heater. These are compact, easily portable, well-insulated and, usually, trouble-free. After connecting, all that is required is to set the thermostat to the lowest position and switch on as soon as the first ice forms in the tanks. The idea is not to keep the fish warm but to prevent thick ice forming in the aquaria and possibly creating sufficient pressure to break the glass.

A quite satisfactory and perfectly suitable alternative is a greenhouse paraffin heater. I know that many seem to think that the fumes will harm the fish but this is not so; for many years this was my only means of fish-house heating and I found it quite safe to use. Of course, this form of heating is more troublesome than electricity; the reservoir should be kept filled, the wick trimmed and the appliance kept clean. Attention to these routine points will ensure that the heater burns clean with very little fume, and certainly there should be no smoke if the heater is properly maintained. The slight oily film that occasionally forms upon water surfaces can be quite easily removed by drawing a piece of newspaper slowly over the water. If paraffin is to be your means of heating it would probably be

Photograph by the author of the temporary pool used for fish, adapted from a plastic paddling pool as described below. The pool is placed outside the author's fish house



worthwhile getting in a good supply of fuel before it becomes too short to obtain easily. The world shortage of fuel oil coupled with a heavy seasonal demand could result in a serious supply shortage, so be prepared beforehand.

- * * *

Many pool owners use one of the popular forms of pool heater. If this is your preference now is the time to make sure that your heater is still in working order. Personally I think that if this type of heating is used it should be operated only for short periods, to thaw a hole into any ice that forms. Prolonged use could encourage the fish to gather near the warmth, instead of semi-hibernating as they should do over the winter. The old method, and a good one, if ice covers the pool is to rest a pan of boiling water upon the ice until a hole has been melted through; the level of the water is then lowered a little and the hole covered over with two or three layers of sacking. This allows any noxious gases to escape and if the hole should freeze over again it can be easily thawed out. On no account should ice be broken by blows from a hammer, or any other implement; the concussive shock waves will do the fish no good.

* * *

Being in need of extra pool space, earlier this year, I looked around for a suitable method of providing a fair surface area and depth of water in a container that would be easily movable when it was no longer required. The answer was found in a child's paddling pool, advertised in the National

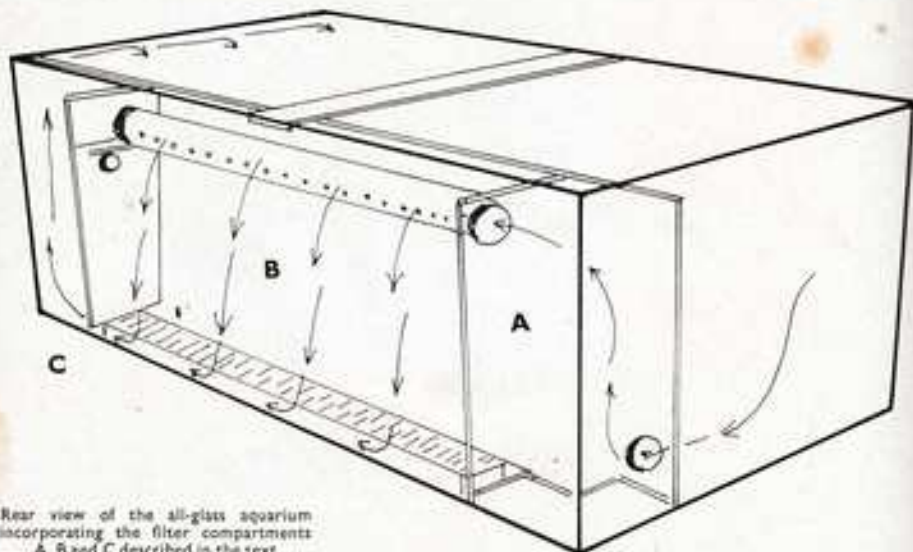
Press by one of the larger discount houses. The cost is a little under £5.00. Made of heavy-weight red plastic material it is suspended from a sectional steel tubing frame and has a drainage point built in. When erected it has a depth of approximately 15 inches and a surface measurement of 6 feet by 4 feet. Collapsed, it measures roughly 4 feet by 9 inches and so takes up little storage space.

Before using it I cut a small hole, at a height of 12 inches from the base, and cemented, with impact adhesive, a short piece of plastic hosepipe therein to form an overflow. The pool was then erected upon a paved area, near to my fish house, and filled to the overflow level. After allowing it to stand for 24 hours it was emptied and then refilled. A further day was allowed to pass before I turned a number of small fish into it.

Over the period in which this pool has been in use I have found it very satisfactory. Temperature fluctuations have not been so great as I expected; nevertheless, the temperature has been much higher than in a conventional concrete pool and this, of course, has been ideal for growing on the young fish, which have fed well and made excellent sturdy growth.

Although I feel sure that this pool would successfully withstand freezing conditions it would certainly not be suitable for over-wintering fish. Nevertheless I can recommend this pool to the person who requires extra growing space and has a spare piece of ground upon which it can be set. When one takes into account the number of extra fish that can be raised the cost is not so very much and well worth the advertised price.

An Integral Aquarium 'Dry Filter'



Rear view of the all-glass aquarium incorporating the filter compartments A, B and C described in the text

AQUARISTS with even the smallest knowledge of marine fishkeeping will by now realise that efficient filtration and water circulation are perhaps the most important considerations in the successful keeping of sea animals (I write 'sea animals' advisedly since people think only of fishes and quite ignore the immense category of very interesting lower animals available). In particular many freshwater enthusiasts would experiment with a marine tank but are inhibited by a number of objections. These include, for example: (a) The rather 'sterile' look of many marine tanks created by the use of starkly-coloured coral skeleton and the lack of those aquarium plants that are available in such variety for the freshwater tank. (b) The complicated-looking equipment, such as filters, water-circulating outlets, taps, water and air pumps, strewn around on or under the marine tank, all of which require extra room or extra expense to disguise them. (c) The high cost of such an installation.

If we look at these points a little more closely, however, we find that (a) in a healthy marine tank set up with correct water circulation, filtration and lighting a good growth of green algae will appear;

(b) the problems of the space required for the additional, rather ugly technical equipment required for the marine tank can be successfully resolved; and (c) if one considers the often extensive and expensive apparatus found beside the average freshwater aquarium, then the comment 'a marine tank is too expensive for me' is hardly valid.

The use of modern silicone rubber sealant enables us to build much of the necessary equipment for ourselves. Yet I still know many fishkeepers for whom the all-glass aquarium is taboo. They won't trust the strength of an aquarium without a frame even though they cannot give serious proof of their fears. If a wooden or plastic rim is merely glued round all-glass tanks they are promptly sold, whereas the same aquarium, without the rims, immediately arouses the tank-frame supporters' mistrust! It is my belief that the proprietary all-glass aquaria on sale in the shops

By W. A. TOMEY

Illustrated by the author

are of excellent quality and are stronger and more durable than the framed tank; they need little repair and with them corrosion is a thing of the past.

It is simple to make a useful aquarium from glass and silicone rubber sealant. If you do it yourself you cut costs and you can make the aquarium, terrarium or paludarium to suit your own taste and the requirements of your living room as well as building in the filters required for the marine tank. Work carefully and accurately and keep to the basic rules—make sure the glass is clean and free from grease; use only well squared-up glass and never economise on the thickness of the glass or the quality of the sealant.

To return to point (b)—the extensive, complicated-looking equipment required: I have found a really good-looking built-in 'dry filter' designed by Mr P. A. Nendels and Mr H. Schrijen, who are both members of the Haven Society of Marine Fishkeepers (Heerlen, Holland).

First let me explain the difference between a 'wet' and a 'dry' filter. By a 'wet' filter we understand a filter in which the filter bed always remains under the water. The water circulates through the filter and is returned to the aquarium again by use of some mechanical power such as an air pump. The so-called 'dry' filter was, until now, placed above the aquarium. A powerful pump lifts the water upwards out of the aquarium to a perforated horizontal pipe from which it 'rains' down into a perforated filter box. As it falls the water is aerated and the oxygen requirements of the bacteria in the filter bed are satisfied.

After passing through the filter bed the water pours out of the perforated bottom of the filter tank back into the aquarium. An ideal filter, perhaps, but hardly a suitable one for the living room tank!

The ingenuity of the Haven Society members, Mr Nendels and Mr Schrijen, has now produced a practical 'built-in' dry filter that works well, looks fine and can be made easily. Here's how it can be done.



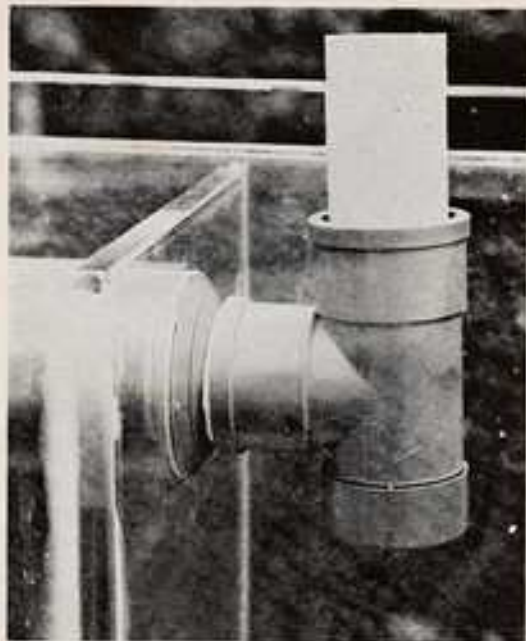
Compartment A is on the right with the water entry point seen at the bottom. The perforated 'streaming tube' is being fitted in compartment B.

To the intended width (front to back dimension) of the aquarium we add at least another 4 in. (10 cm.)—the tank height is unaltered. At the original planned width partition 1, of $\frac{1}{4}$ in. (8 mm.) glass, is fixed so that a filter 'box' covering the whole of the back of the aquarium is formed. This 'box' must be at least 4 in. (10 cm.) wide. It must be possible to clean it out thoroughly if necessary and to do this the 'box' will have to be a hand's width wide. I know one hobbyist who made this filter box so narrow that even with the aid of a washing up brush he wasn't able to clean it out!

Depending on the length of the aquarium itself, the space allowed for the filtration area can be

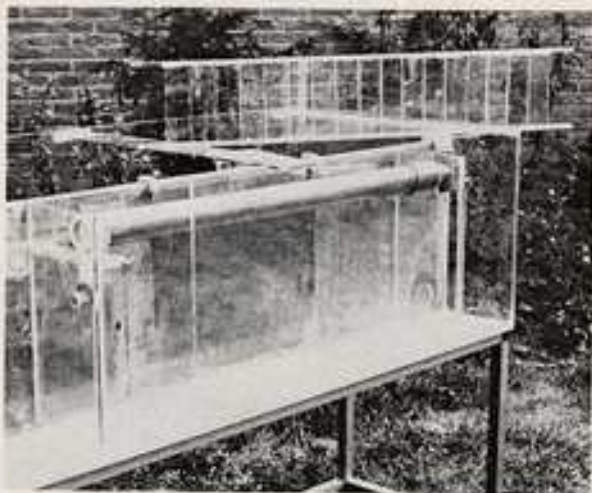


This all-glass aquarium whose design and construction is discussed in the text was made by Mr H. Rixoord of Bijlmer, Abblasterdam, Holland. In this picture it is seen from the rear before the pipes etc. were fitted.



divided into a number of compartments by further partitioning (see the illustrations). The filter area shown in the photographs is divided into three: compartment (A), into which the water flows from the main tank; from here it passes through partition 2 into compartment (B), where is housed the 'water streaming' tube, the filter-bed and filter-bed grating; finally, the filtered water passes through partition 3 into (C), the small compartment from which the pump lifts the water back into the main tank.

With larger tanks a further division can be made to provide a dry compartment to house the technical apparatus, such as the channel pipes etc.



It will be easier to describe the construction details by reference to the photographs. A channel has to be made near the bottom of partition 1 for the water to pass through from the tank into the filter 'box'. This can be done in one of two ways: either by simply cutting a $2\frac{1}{2}$ -3 in. (6-8 cm.) piece from the corner at an angle of 45° (which method has the disadvantage that once the filter starts working the pull of the water is likely to drag the substrate and even living creatures from the main tank) or, what is better, the holes required in the filter partitions are drilled professionally by a glass-cutter. To prevent the substrate being sucked into the filter area we can make the opening above the substrate (at a height of about 2 in.). Then a closely-fitting, coarse mesh grating is fitted over the hole on the tank side of the partition (it must be possible to reach this grating easily to remove it if necessary for cleaning, but it will prevent smaller fishes etc. disappearing into the filter).

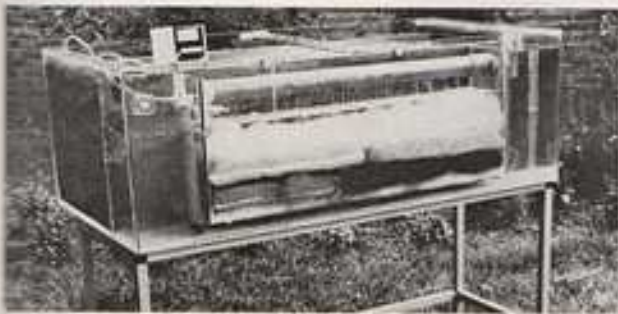
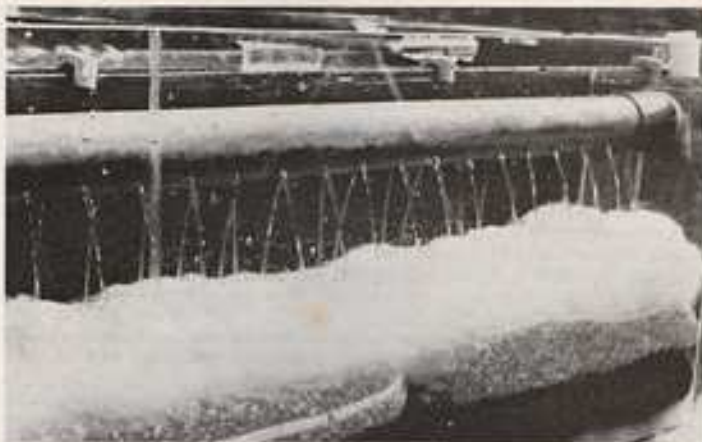
Partition 2 extends from the bottom to the top of the tank. A hole is drilled in this partition so that the top of it is $\frac{3}{4}$ in. (2 cm.) below the surface of the water. The diameter of the hole (2 in. or 50 mm. in our tank) is determined by the outside diameter of the 'streaming' pipe that must be used to give the correct quantity of water to be dealt with by the pump (in our case, a Turbelle 1000 pump). If drilling glass is too much of a problem, these small, dividing partitions (2 and 3) may be made of plastic sheet or plexiglass, but if the latter are used it should be remembered that a special primer is required to make them usable with silicone rubber sealant.

The vertical height of partition 3 depends on the grating used under the filter bed, since the partition actually rests on this. For example, if the grating is $1\frac{1}{4}$ in. (3 cm.) high, then partition 3 must be $1\frac{1}{4}$ in.

Top of the page: a T-piece has been fitted at the end of the 'streaming tube' that projects into compartment A and a close-fitting internal pipe has been added to form a means of regulating water flow to the tube in compartment B

Left: resting on the top of the aquarium is the grating (made of strips of glass) from compartment B, on which the filter-medium is laid. The emergency overflow aperture in partition 3 (left) can be seen below the end of the 'streaming tube'

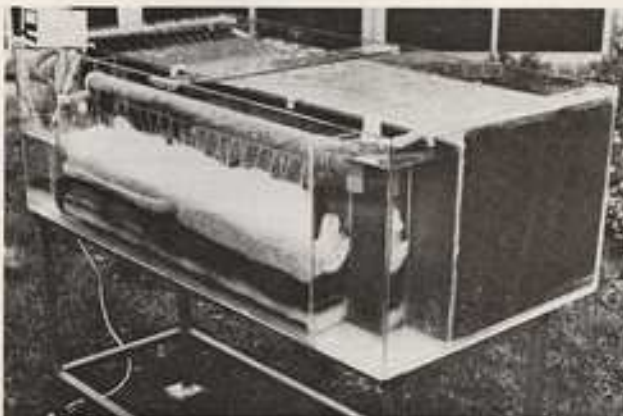
The filter in operation and working correctly. As the water sprays into compartment B on to the filter medium it is thoroughly aerated, to the benefit of the aerobic organisms providing for chemical purification in the filter bed and does not accumulate above the filter medium.



Information for the article supplied by P. A. Nendels and H. Schrijen

Photography by W. A. TOMEY

Above: too great a water flow causes the filter to be 'wet', i.e. submersed, with decrease in aeration of the sprayed water. The uptake pipe of the water pump on the top of the tank can be seen in compartment C (left of aquarium)



Right: filter medium is packed in net bags and rests on a glass grid. The jets returning filtered water to the tank can be seen at the top of the tank to the left.

shorter than partition 2. This leaves a space at the bottom through which the water can flow from the filter bed to be pumped back into the main tank.

It is recommended that a hole should be drilled two-thirds of the way up partition 3 (diameter $1\frac{1}{2}$ in., 3 cm.). This serves as an emergency outlet should too much water be flowing into the filter bed compartment or should the filter-bed become blocked. If this should happen our filter then becomes a 'wet' filter; the pump starts pumping air instead of water, making an unpleasant noise and, what is more critical with a marine tank set-up, the oxygenation decreases. This small opening ensures that enough water flows from compartment B at least to keep the pump working.

The opening in partition 2 must be of the same diameter as the outside diameter of the perforated plastic delivery pipe, and preferably this should be about 2 in. and at the very least $1\frac{1}{2}$ in. (5 cm. or 4 cm.). This diameter of pipe can be easily fitted with a control to decrease the rate of flow if necessary, whereas a smaller pipe found to give too little flow cannot be remedied without a great many difficult alterations being made such as prising the partitions loose and drilling them again.

It is most important to be able to regulate the water flow (see the photograph) when this filter technique is being used, so that the filter bed is never under water, and indeed no depth of water should form there. The principle on which the system depends is the free streaming down of the water.

A good fitting flange or collar will keep the perforated pipe in place and the other closed end can be supported on partition 3 by a small strip of glass or plastic stuck there. Make certain that this pipe can be dismantled so that the filter-bed compartment can be cleaned out and the filter medium replaced. The number and diameter of the perforations to be drilled in the pipe depend on the amount of water flowing through and the capacity of the water pump, and this will have to be decided by experiment. If the holes are to be small, more of them will be needed but in any case a diameter bigger than $\frac{1}{4}$ in. (4 mm.) is not required for normal indoor aquaria. The holes should be drilled just below the mid-line of the sides of the

pipe and not actually underneath it as this gives a better spray effect. Remember that not every kind of plastic is suitable for use in a marine tank when choosing this pipe—use a pipe that is suitable for a domestic water supply as this will be non-toxic.

Just above the base of compartment B is a grating that supports the filter bed. This grating can be made from glass off-cuts or from perforated plastic pieces, though strips of glass are preferable. You will notice that at the ends the glass cross-pieces are missing—this is to facilitate removal of the grating; these end strips are not sealed on but just left 'loose'. Over this grating the filter medium is placed. The water streams through the medium and out into compartment C.

As the cleaning of the filter, particularly at the back of the tank like this, would be made very difficult if there were any loose filter medium about, filter bags should be made (from nylon shopping bags, for instance) so that the filter medium, whether it be gravel, charcoal, coral sand, broken shells etc. can each be held in its own container within compartment B. The filter bags should be a good oblong shape so that they lie close against each other and against the filter wall. Water will always seek the way of least resistance and if the bags fit well the water will be made to go through them and not around them. A piece of well-fitting foam plastic can, finally, be placed underneath all to catch the coarse dirt.

The filtered water is returned to the tank by the pump from compartment C through a perforated pipe which, if well placed, will return not only the water but plenty of air into the tank. It is also possible in the illustrations to note the difference in the clarity of the water in the three compartments. Of course, the water being returned can be diverted by a T-piece above the water level or can be brought back into the tank by means of a perforated tube running through the substrate.

When we are planning the sizes we need for this project, if an extra 4–4½ in. (10–12 cm.) can be allowed on the height of the tank then the pump housing and overhead lighting can be incorporated into the whole tank. This extra space is particularly important when a pump like the Turbellie, which must be kept above the water level, is used.

Meetings and Changes of Officers

ABINGDON AS. Secretary, Mr G. R. Hall (16 Mossell Crescent, Littlemore, Oxford); show secretary, Mr D. Higgs (28 Austin Place, Abingdon). **New venues:** The Barley Mow, West Saint Helen Street, Abingdon.

DEVIZES AS, New Society. Secretary, Mr R. Aslet (The Burgallow, Bidden Green Farm, Embsay, or Pewsey, Wilt); show secretary, Mr H. Brown (Patriot, Downton Garden, or Chippenham, Wilt). Meetings every 4th Tuesday, The Three Crowns, Devizes.

KNOWLE & DAS, BRISTOL. Chairman, Mr J. Gray; vice-chairman, Mr J. Stirling; secretary, Mr P. Randall; treasurer, Mr W. Perry; programme officer, Mr D. Owen; reporting secretary, Mrs E. Webb (Kiln, Andross Drive, Dundry, Bristol).

LEYTONSTONE & STRATFORD DAS. Chairman, Mr R. J. Loggsvater; vice-chairman, Mr A. Howe; secretary, Mr R. Sampson (55 Bute Road, Barklyside, Essex); treasurer, Mr R. Dale; show manager, Mr F. Lucas; show secretary, Mr R. Davies; librarian, Mr P. Barry; F.R.O. Mrs H. P.

Loggsvater. Meetings every Thursday, Harrow Green Baptist Church, Harrow Road, Leytonstone High Road.

ROTHERHAM & DAS. New secretary, Mr M. Wardworth (105 Clapton Lane, Rotherham, or Rotherham, York).

SOUTH LONDON AS. Chairman, Mr E. Snaiser; secretary, Mrs F. Jarvis (21st A, 223 Holter Green Lane, Lewisham, London, SE13). Temporary venue, 18 Ormskirk Road, New Cross, London, SE4, Tuesdays at 8.0 p.m.

WEYMOUTH AS. Meetings second Tuesday of month, 7.30 p.m., Ratcliff Hall, Queens Road, Radpole Spa, Weymouth. Visitors and new members very welcome.

If an underwater pump, such as an Eheim, is used, then the extra height required is only about 3 in. (8 cm.). This is sufficient to accommodate the lighting, and incorporating the whole area like this gives better control of the salt spray that arises from the perforated return pipe. (It is a good idea to fix some small strips of glass at the top edges of the aquarium to rest the cover glasses on.)

The working plan for construction should be as follows: (1) clean the glass and make certain that it is quite free of grease. (2) Fix the sheet that is to be the back of the aquarium filter compartments on the tank bottom, having first marked on the back with a felt pen exactly where the partitions are to

go. (3) Partitions 2 and 3 can be fixed on next. (4) Partition 1 is then fitted. (5) The tank ends and finally the tank front are fitted.

Now, what have we achieved? We have excellent filtration, an oxygen-rich area in the filter bed that supports the bacterial flora, and good, clean water, purified bacterially and crystal-clear; a good strong stream-through from one end of the aquarium to the other; all the technical equipment is hidden from view at a minimum cost. The pump and lighting are hidden and a maximum salt spray given. Both the filter and the tank are illuminated, which will have the effect of encouraging an algae growth.

Fish Diseases and their Treatments

DISEASES OF FISHES. C. van Duijn Jnr, 372 pages, numerous line and half-tone illustrations, 3rd ed. Hiffe Books, London 1973. £6.00.

DISEASES OF POND FISHES. O. N. Bauer, V. A. Musselius and Yu. A. Strelkov, Trsl. from the Russian, 220 pages, line illustrations. Israel Program for Scientific Translations (John Wiley, Chichester), 1973. £9.85.

ONE aspect that has emerged in recent years from studies of fish diseases is that viruses are responsible for quite a number of the disorders. This is not a particularly heartening discovery for the fish pathologist since virus infections in all animals including man are notoriously difficult to treat. But perhaps this gap, between obtaining the identification of a disease and developing an adequate means of treating it, is one that is all too common in fish pathology. The amateur aquarist involved with application of treatments to fish in the relatively small volumes of water in garden ponds or aquaria, is more fortunate than the fish farmer, for whom some types of disease treatment are uneconomical for use in hatcheries and large ponds.

This difference is one that emerges clearly in a comparison of the two very useful books on the subject published this year. **DISEASES OF FISHES**, the revised (third) edition of this well-known book, is directed primarily at the aquarist, and the variety of treatments described (at times bewilderingly many) reveals the sophistication of the aquarium sphere. **DISEASES OF POND FISHES**, a new translation of a Russian book for fish farmers (an important industry in the USSR), breeders, fish pathologists and veterinarians, more often than not is concerned with what might be termed the grosser forms of treatment, but nevertheless its whole approach to diseases has a good many lessons for aquarists,

particularly in disease prevention and healthy pond management. The Russian book also has an interesting section, and one most useful for those with the necessary facilities, on the techniques of identification of diseases.

Fishes from the wild are frequently hosts to parasites (in the USSR 1,500 species of parasites are known to occur in freshwater fishes!) and it is, of course, when the animals are brought together in close confinement and in crowded conditions that these previously relatively harmless passengers wreak the havoc of a full-scale infestation. Also, some diseases, say the authors of **DISEASES OF POND FISHES**, although their causative agents are present in the water, require a special state of the fish or a certain condition of its environment for them to become apparent. Quarantine is an indispensable procedure for newly imported fishes if the introduction of parasites and other infectious conditions to existing healthy stocks is to be avoided. The Russian authors state that 'the minimal period of quarantine for imported fish is one year'! For other fish they mention that water temperature must influence the duration of quarantine and give 20 days as the period for water temperatures of 12°C (53°F) or above, with longer periods below this temperature. Fishkeepers who have had to cope with the troublesome infestations frequently presented by coldwater fishes will in particular appreciate the practical points of advice given in **DISEASES OF POND FISHES**. A recommendation that must be followed up is the one that the commonly used salt bath treatment for parasitic diseases should finish with a 2-hour period spent in running water ('If this is omitted, parasites which remain on the fish would be returned to the pond').

It is unfortunate that this book is so highly priced, more noticeable because of the poor

quality of reproduction of the photographs within it, and two serious criticisms are the lack of any indications of natural sizes in the captions to illustrations of parasites (although the text does give these fully) and the absence of a subject index. *DISEASES OF POND FISHES* was published in Russia in 1969, and the delay in the appearance of the English version means that the bibliography supplied is no more recent than 1967-1968.

C. van Duijn's *DISEASES OF FISHES* is as valuable as were the earlier editions (a down-grading in quality of paper used has meant inferior reproduction of illustrations, however), and it has been extended to include most recent findings. Information on marine fishes has also been added, although this is an area in which a great deal has yet to be elucidated. There is one section that Mr van Duijn should strike out in future editions. It is on page 228 and is headed 'Constipation'; with it can go the reference to magnesium sulphate on page 331—all too ridiculous for words in a book of this calibre.

A very common group of signs in fish diseases (whether of parasitic origin or not) is 'pop-eye', scale-protrusion and body swelling. These are of low diagnostic value for most often they appear to represent generalised oedema resulting from failure of visceral (liver, kidney) function, whatever the cause. It seems desirable from the fishkeeper's standpoint that this should be emphasised in textbooks since much wasted effort can be involved in attempting to deal with a fish showing these signs, if they are taken as indicative of a specific disease, which is an impression, not always intended by the author, I think, that might be obtained from some sections of Mr van Duijn's book.

Two valuable reference books for the fishkeeper are provided in these titles, essential for an aquarium library since without them the field of fish disease would be but poorly represented by English texts.

ANTHONY EVANS

Readers' Queries Answered



Spawning Signs

What can I do for a pair of fish that should be spawning but do not? The female fish appears to be quite ready with the ovipositor visible but nothing happens. I bought these dwarf Congo cichlids for this reason and am very disappointed not to have had a spawning. Should I try to obtain another male?

No, not at present. If the fish are amicable with each other leave them together. With these dwarf cichlids the spawning indication is not the visible ovipositor in the female, as this is permanently projecting, but the great distension that takes place in the female when ready to spawn. The fish should be conditioned with plenty of live foods, and kept at a temperature of about 78°F (25°C) for spawning. A medium-sized tank will do, filled with slightly acid water; plenty of hiding places should be provided, such as rock caves or

broken flowerpots placed upside-down in the tank. It is the female who carries out the brood care and the male should be removed from the tank after the spawning.

Fluoride in Water

It seems most likely that fluoride will be added to our water supply in this area next year. What effect will this have on my fish? I have mostly barbs, with a few coldwater fish in another tank. I would find it hard in this region (the Black Country) to find a clean supply of water from pond, lake or stream, so it looks as though I should be forced to use tap water. I have heard all kinds of opinions, some as drastic as that it will be impossible to continue the hobby. I should like to have your opinion on the matter.

There is no need for concern about the effect of the fluoridation of the water supply on your fish. Amounts of fluoride added for

dental health purposes produce concentrations no greater than those of many natural waters in which fishes are found or of water supplies that many aquarists have been using for years. Obviously the solid content of the water will be slightly higher than it was before and this might be a factor influencing the suitability of the water for hatching the eggs of egglayers that require very soft acid water, but this is by no means certain. The more uncritical opponents of fluoridation schemes have been prone to use all kinds of 'evidence' of the unsuitability of fluoride; thus, in one town in America, the announcement of coming fluoridation brought a spate of complaints that goldfish (and cats and dogs) were dying from fluorides before the water authority had commenced the fluoridation!

'Rams'

I would like to try some Apistogramma ramsi again since there are some young adult ones available in this area now, but I have not in the past been particularly successful with them; a year is about the longest I've managed to keep one. They were in a community tank of medium-sized fishes; the tank seems to be quite healthy and is well-planted. As far as I can tell the fish seemed to get their fair share of food.

If you are certain that the fish have not got one of the more easily recognisable diseases and are not

being affected by one of the hazards of community life—such as being harried by a belligerent swordtail or black widow or annoyed by a sucking loach, and if you have provided something approximating to first-class conditions for this fish, i.e. soft slightly acid water, plenty of hiding places in plant and rockwork, and a temperature in the 75-80°F (24-28°C) range—then it may be that you are expecting too much of the species. Above all, it has quite a short life-span—2 years being a good average age for this species. Assuming your fish were several months old when obtained they may well have died from natural causes. Although it looks such a sturdy fish it is not exceptionally robust. It is reputed to have poor resistance to disease and be particularly susceptible to chemicals placed in the water for any reason.

Crypto. ciliata

Is it usual for Cryptocoryne ciliata to be difficult to grow? I am having no success with it at all. It seems to have quite a different texture from some of the other cryptocorynes, and I am wondering if it has special requirements?

This species is very much a bog plant and grows best in emersed conditions. When immersed the plant often looks very stringy as it tries to put out emerse leaves. It also requires very strong lighting. It is a useful plant though because it can withstand the presence of some salt in the water; for example, it will come to no harm in a tank to which a little salt is added for the benefit of mollies, for instance. In its natural habitat (India, Pakistan, Thailand, Vietnam and Indonesia) it can often be found in brackish shore waters.

Pipe Fish Menu

I have obtained a pipe fish recently but I cannot seem to tempt it to eat. I've tried it on marine fish flakes, small pieces of raw fish, tubifex and daphnia.

These fish will only eat live foods; you should have been successful with daphnia, as it is crustaceans they are particularly interested in, not worms. The mouth is very small and food is sucked in whole. Newborn livebearer fry are accepted and are easily provided; such a diet will have to be supplied for this fish permanently.

AquaGLOSSARY

No. 14

A PFM guide to the meanings and accepted pronunciation of the scientific names of aquarium subjects, arranged by word-roots in alphabetical order

Lepis (Greek): scale. Pronounced 'lep-iss'. The generic name of the north American garpikes (*Lepisosteus*; 'lep-iss-oss-tee-uss') indicates their body armour of bony scales (*osteo*, Greek: bone). Several temperate marine fish genera utilise the root: *Lepidion* ('lep-id-ee-on') means small scales (as also does *microlepis*); *Lepidopus* ('lep-id-oh-puss') means scale foot (*pus*, Greek: foot) and refers to the scaly pelvic fins beneath these fishes; *Lepidorhombus* ('lep-id-oh-rom-buss') means scaly turbot, and the megrim, sail fluke or whiff is a turbot-like fish with rough, large scales. The trivial name *oligolepis* ('olly-go-lep-iss') means 'few scales' and is used in the names of the tropical fishes *Barbus oligolepis* ('bar-buss olly-go-lep-iss') and *Moenkhausia oligolepis* ('monk-how-see-ah olly-go-lep-iss'). The pike cichlid (*Crenicichla lepidota*; 'kren-ee-sick-lah lep-ee-doh-tah').

Octo (Latin): eight. Pronounced 'ok-toh'. In the trivial names of the cichlid *Cichlasoma octofasciatum* ('sick-lah-soh-mah ok-toh-fash-ee-ah-tum') and the marine fish *Chaetodon octofasciatus* ('kite-oh-don ok-toh-fash-ee-ah-tuss') the eight bands (*fasci*, Latin: band) shown on these fishes are indicated (present only in the young of the cichlid). The water plant *Potamogeton octandrus* ('po-tah-mo-gee-ton ok-tan-druss') has a trivial name indicating eight stamens (*andr*, Greek: male, man).



COMPETITORS at the TORBAY AS Open Show travelled from London, Wales, Herecombe, Plymouth, Somerset, Saltash, Bude and Exeter to take part and enter over 500 fishes in the coldwater, tropical and marine classes. Added attractions at the Show were displays of orchids and reptiles, and a fascinating demonstration by Mr O. Thomas of Buckfast in the art of making fishing flies. The best fish in show award, a gold pin and the award for best livebearer went to Mr C. Turner of Cardiff. Other awards were won by: Master D. Parham (best Junior entry), Mr M. Leeder (best shark), Mr S. Lloyd (best coldwater), Mrs J. Griffiths (most popular fish), Mr E. & Mr T. Woolley (President's Own Choice), FBAS Championship trophy, Mr G. Thompson.

B; 1, Mr C. Saunders (Exeter, 79); 2, Mr C. Turner (Cardiff, 77); 3, Mr A. D. S.

FBAS Basic Show Class Letters: A, furnished aquaria and aquascape; B, Barb; C, characin; D, cichlid; E, labyrinth; F, egg-laying toothcarps; G, tropical catfish; H, Corydoras and Brochis; J, rasbora; K, danio and W.C.M.M.; L, loach; M, a.o.s. tropical egg-layers; N, pairs of fish; O, guppy male; P, guppy female; Q, swordtail; R, platy; S, mollie; T, a.o.s. livebearer; U, singletailed goldfish; V, twintailed goldfish; W, a.o.s. coldwater; X, breeders' classes; Y, marine fish; Z, plants.

Kirby (Plymouth, 76). C: 1, Mr C. Turner (784); 2, Mr A. D. S. Kirby (78); 3, Master P. Phillips (Torbay, 76). Co: 1, Mr C. Turner (78); 2, Mr L. Hodgkiss (Plymouth, 74); 3, Mr A. D. S. Kirby (78). D: 1, Mr D. Vickery (Ilfracombe, 81); 2, Mr J. Bragg (Torbay, 80); 3, Mr Lipscombe (Ilfracombe, 79). Da: 1, Mr E. Short (Torbay, 80); 2, Mr L. Hodgkiss (79); 3, Mr H. Gardner (Plymouth, 77). Db: 1, 2 & 3, Mr J. Bragg (80, 78, 77). E: 1, Mrs J. Griffiths (Torbay, 79); 2, Miss A. Corner (Torbay, 75); 3, Mr R. Wolfe (Plymouth, 74). Ea: 1 & 3, Mr C. Turner (80, 75); 2, Master B. Phillips (78). F: 1, Mr F. J. Denning (Torbay, 75); 2, Mrs O. Lay (Plymouth, 75); 3, Mr J. Rundle (Plymouth, 74).

G: 1, Mr C. Turner (78); 2, Mr M. Poole (Torbay, 77); 3, Mr L. Hodgkiss (75). H: 1, Mr M. Leeder (Plymouth, 79); 2, Mr R. Luscombe (Plymouth, 75); 3, Mr A. D. S. Kirby (76). J: 1 & 2, Mr E. Eurnshaw (Taunton, 79, 87); 3, Mr R. Wolfe (77). K: 1, 2 & 3, Mrs V. King (Torbay, 78, 77, 76). L: 1, Mr C. Turner (79); 2, Mr C. Saunders (78); 3, Mr C. Lipscombe (77). M: 1, Mr M. Leeder (81); 2, Mr H. Gardner (79); 3, Mr L. Leeder (Plymouth, 79). N: 1, Mr A. D. S. Kirby (80); 2, Mr C. Turner (79); 3, Mr T. Mudge (Exeter, 78).

O: 1, Mr E. & Mr T. Woolley (Torbay, 78); 2 & 3, Mr W. G. Reid (Plymouth, 78, 75). P: 1 & 3, Mr J. Rundle (75, 74); 2, Mr W. G. Reid (75). Q: 1, Master C. Blachford (Torbay, 81); 2, Mr J. Bragg (80); 3, Mr L. Leeder (79). R: 1, Mr C. Turner (83); 2 & 3, Mr J. Rundle (85, 79). S: 1, Mr R. J. Smith (82); 2, Mr M. Leeder (82); 3, Mr T. Smythe (Torpoint, 81). T: 1 and 2, Mr C. Fidoek (Exeter, 85, 82); 3, Mr E. & Mr T. Woolley (81).

Us d: 1 & 2, Mr R. King (78, 74); 3, Miss K. Sparks (Torbay, 72). Us c: 1, Mr R. M. Speare (Bude, 74); 2, Mr C. Fidoek (71); 3, Mr R. King (76). V: 1, Mr S. Lloyd (Bristol, 74); 2, Mr N. M. Speare (73); 3, Mrs J. Griffiths (Torbay, 72). W: 1, 2 & 3: Mr G. Thompson (Torbay, 74, 73).

Wa: 1, Mr S. L. Pearey (Taunton, 86); 2 & 3, Mr R. King (71, 69). Xb: 1, 2 & 3, Mr M. Poole (Torbay, 74); 2, Mr W. L. Rundle (74); 3, Mr C. Turner (71). Xc: 1, 2, Mr L. Hodgkiss (77); 3, Master N. Cole (Plymouth, 76); 2, Mr J. Rundle (76). Xu: 1, 2 & 3: Mr R. King (80, 77, 76). Y: 1 & 2: Mr L. Doubleday (B.M.A. & Exeter, 82), 70; 3, Mrs L. Doubleday (68). Yb: 1, Master D. Parham (B.M.A., 80); 2, Mrs L. Doubleday (78); 3, Mr L. Doubleday (77). Z: 1 & 2, Mr W. L. Rundle (81, 80); 3, Mr R. King (77).

NEWS of the activities of **HIGH WYCOMBE AS** reaches us from Mr T. Green, P.R.O.: "The Society have been keeping Mr P. Ginger from the unemployed list of late. On August 30th he delivered a slide lecture simply entitled "Various Fish Slides" with obvious knowledge and such wit as to prevent the evening becoming merely academic. Next month he returned to judge the 12-a-side match arranged against Amersham AS, which the home team won by 156 points to Amersham's 144. Individual placings were: 1, Mr T. Hall (HW, convict); 2, Mr T. Hall (oscar); 3, Mr B. Jessop (A. R. cylindraceus). Mr Ginger's post-judging comments were felt to be of value by all present, even the member who admitted that his fish was not too good but that it was housed in a "lovely tank".



DETAILS of the **HUDDERSFIELD TFS OPEN SHOW** are as follows:

Guppies: 1, Mr L. Smith (Castleford); 2, A. & L. Barrett (Castleford); 3, Mr & Mrs Wells (Doncaster). Mollies: 1, 2 & 3, Mr R. Brown (Scunthorpe). Swordtails: 1 & 2, Mr J. Ibbotson (Keighley); 3, Mr J. Brown (Hyde). Platys: 1, Mr Lawson (N. Society); 2, Mr T. Smith (Sheffield); 3, Mr J. Ibbotson, *var. Livbearers*: 1, Mr A. Moss (Huddersfield); 2, Mr & Mrs Marshallson (Oldham); 3, Mr J. Furness (Castleford). Characins, small: 1, Mr A. Moss; 2, Mr & Mrs Marshallson; 3, Mr & Mrs W. Smith (Ossett). Characins, large: 1, Mr D. Kennedy (Keighley); 2, Mr J. Furness; 3, Mr T. Smith. Barbs, small: 1 & 2, Mr & Mrs Wells; 3, Mr & Mrs Furness. Barbs, large: 1, Mr T. Smith; 2, Mr S. Bartley (Huddersfield); 3, Mr Dunn (Horsforth). Danios & rasboras: 1, Mr R. I. Payne (M.A.S.); 2, Mr H. Jackson (Keighley); 3, A. & L. Barrett (Castleford). Egg-laying toothcarps: 1, Mr & Mrs Armstrong (N. Society); 2, Mr L. Smith; 3, Mr T. Smith.

Angels: 1, Mr Dunn; 2, Mr D. Harrop (Huddersfield); 3, Mr J. Ibbotson. Dwarf cichlids: 1, Mr R. I. Payne; 2, Mr L. Smith; 3, Mr J. Furness. Cichlids, large: 1 & 2, Mr R. Asherton (Grimwood); 3, Mr D. Kennedy. Anabantids: 1, Mr G. Gillespie (Castleford); 2 & 3, Mr A. Churchin (S. Leeds), *var. Anabantids*: 1, Mr R. I. Payne; 2, Mr & Mrs Armstrong; 3, Mr J. Ibbotson. Anabantids, small: 1, Mr G. Gillespie; 2, Mr J. Ibbotson; 3, Mr C. Woolnough (Huddersfield).

Corydoras: 1, Mr G. Gillespie; 2, Mr W. Edwards (Castleford); 3, Mr T. Smith, *var. Catfish*: 1, Mr L. Burr (Scunthorpe); 2, Mr & Mrs Gabe (Chesterfield); 3, Mr C. Woolnough. Loaches: 1, Mr & Mrs Marshallson; 2, Mr R. I. Payne; 3, Mr T. Smith.

ARRANGEMENTS are now being made for the annual *Fur, Feather and Aquaria Show* to be held in the *King's Hall, Lower Clapton Road, London, E5* on *Saturday 24th November* (organised in association with the *Essex, North and East London Aquarists Association*). The aquaria section of the show will comprise one *inter-club furnished aquaria class*; an *individual aquascope class*; an *individual miniature furnished aquaria class*; 21 *tropical fish classes*; 3 *breeders' classes* and a *plant class*. Entries will close on *Saturday 17th November 1973* and copies of the show schedule are available from the *General Manager of Baths & Civic Recreation, London Borough of Hackney, 39 Lower Clapton Road, London, E5 ONU*.

Sharks & flying foxes: 1, Mrs P. Wales (S. Leeds); 2, Mr C. Spaven (S. Leeds); 3, Mrs I. S. Brook (Huddersfield). *var. Tropical*: 1 & 2, Mr L. Burr; 3, A. & L. Barrett (Castleford).

Breeders, livebearers: 1, Mr A. Moss; 2, Mr J. Furness; 3, Mr & Mrs Wells. Egg-layers: 1, Mr & Mrs Wells; 2 & 3, Mr A. Churchin. Pairs, livebearers: 1, Mr & Mrs Wells; 2, Mr J. Furness; 3, Mr & Mrs Marshallson. Egg-layers: 1 & 2, Mr & Mrs Wells; 3, Mr A. Churchin. Fancy goldfish: 1, Mr C. H. Whitney (Accrington); 2 & 3, Mr M. Edwards (Half Moon, Billingham). *var. Coldwater*: 1, Mrs K. Wild (Accrington); 2, Dr Lewis (Huddersfield); 3, Mr C. H. Whitney. Common goldfish: 1 & 2, Mr C. H. Whitney; 3, Mr H. Ackroyd (Huddersfield). Juniors: 1, A. Beal (Doncaster); 2, A. S. Furness (Castleford); 3, A. Wild (Accrington). Ladies: 1, Mrs V. Hough (Huddersfield); 2, Mrs B. Kaye (Top Ten). Furnished jar: 1, Mr M. Wild (Accrington); 2, Mr J. Ibbotson; 3, Mr & Mrs Gabe.

ALTHOUGH the number of entries at the **BRISTOL AS** Open Show was down this year, the quality of the fishes shown was superb. There was a tie for the Mabel Davis trophy, awarded for the best exhibit in the show, as the judges were unable to award any more points to the one than the other of a veiltail exhibited by Mr S. T. Tibble and a phantoms barb entered by Mr D. I. Mackay. The F. G. Denman Cup for highest number of points in the show was awarded to Mr N. Gray and the B. T. Child Challenge Shield was won by Mr R. J. King for the second best coldwater fish.

Goldfish: 1, Mr T. Hamshire; 2, Mr S. Lloyd; 3, Mr D. I. Mackay. Bristol shubunkins, 3 in.: 1 & 3, Mr R. Pinnoch; 2, Mr D. S. Langdon. Bristol shubunkins, 1 in.: 1 & 3, Mr D. S. Langdon; 2, Mr A. E. Roberts. Veiltails: 1, Mr S. T. Tibble; 2, Mr J. Linale; 3, Mr A. E. Roberts. Moons: 1, Mr S. Lloyd; 2 & 3, Mr A. E. Roberts. Telescopes (other than moons): 1, Mr S. T. Tibble; 2, Mr G. J. Bell; 3, Mr R. J. King. Orandas: 1 & 2, Mr A. E. Roberts; 3, Mr R. J. King. Nymphs & comets: 1, Mr K. P. Press; 2, Mr W. Leach; 3, Mr C. Packer. Fantails, scaled: 1 & 2, Mr R. J. King; 3, Mr R. Davis. Fantails, calico: 1, Mr C. Packer; 2, Mr J. Linale; 3, Mr S. T. Tibble. Koi, *var. pearl or trout*: 1, Mr C. Collins; 2, Mr W. Ham; 3, Mrs M. Dunlop. Bristol shubunkins, bred '71: 1 & 2, Mr R. Oxenham; 3, Mr G. J. Bell. Moons, bred '71: 1, 2 & 3, Mr A. E. Roberts. *var. Fancy fish, bred '71*: 1, Mr A. E. Roberts; 2 & 3, Mr R. J. King. Breeders, singletails, team of 4: 1, Mr J. Phillips; 2, Mr G. A. Fleming; 3, Mr A. J. Churchill. Breeders, team of 4: 1 & 3, Mr A. E. Roberts; 2, Mr J. Linale. Bristol shubunkins, *var. match*: 1, Mr A. G. Churchill; 2, Mr G. A. Fleming; 3, Mr W. H. Clark. Novice, Bristol shubunkins: 1, Mr A. G. Churchill; 2, Mr K. Gray; 3, Mr R. J. Bennett.

Furnished aquaria, tropical: 1, Mr R. A. Bennett; 2, Mr N. Gray. Furnished aquaria, inter-club: Bristol AS. Plants: 1, Mr K. P. Press; 2, Mr S. T. Tibble; 3, Mr A. W. Leach. Fighting fish: 1 & 3, Mr N. Gray; 2, Mr K. P. Press. Labyrinth: 1, Mr R. C. Hyett; 2, Mr D. I. Mackay; 3, Mr R. A. Bennett. Barbs: 1, Mr D. I. Mackay; 2, Mr W. Ham; 3, Mr N. Gray. Characins, H & M: 1, Mr R. C. Hyett; 2, Mr G. R. Farber; 3, Mr K. Dunsford. *var. Characins*: 1, Mr J. Phillips; 2, Mr G. R. Farber; 3, Mr R. A. Bennett. Cichlids: 1 & 2, Mr R. C. Hyett; 3, Mr T. Dunsford. Angels: 1, Mr N. Gray; 2, Mr K. P. Press; 3, Mr T. Hamshire. *var.*

Atkinson; Taylor trophy (highest total points, tropical), Mr B. Basson; Taylor trophy (highest points, coldwater), Mr V. Hunt. Club members' trophies: W. Taylor & Son trophy (tropical), Mr F. Willis; Henry Luff trophy (coldwater, highest pointed fish), Mr D. Stokes; King Cup (clubbankin), Mr E. Binstead; Emma Banbury trophy (plant), Mr G. Parish; A.V.T. trophy (highest points), Mr V. Hunt.

Class winners were (Ba, Basingstoke; Br, Brighton; G, Gosport; H, Havant; K, Kingston; P, Portsmouth; Sa, Salisbury; SPASS, Sp; U, unattached:

Aa, Portsmouth; Ab, Portsmouth; Ad, Mr A. Atkinson; Ady, Mr F. Bailey (P); An, Mr A. Atkinson (U); Aw, Mr P. Fennel (U); Af, Mr J. Linstead (P); Ak, Mrs J. Stillwell (P); B, Mr B. Adams (S); Ca, Mr J. Bailey (U); C, Mr J. Pollard (K); Da, Mr J. Willis (P); Ds, Mr D. Stokes (G); D, Mr N. Ross (G); E, Mr A. Horsman (Br); E, Mr D. Mackay (K); F, Mr M. Strang (Ba); G, Mr B. Basson (Ba); H, Mr J. Pollard (K); I, Mr D. Mackay (K); K, Mr S. Calderon (H); L, Mr B. Basson (Ba); M, Mr F. Willis (P).

O, Mr R. Bax (Br); P, Mrs J. Stillwell (P); Q, Mr A. Megham (H); R, Mr B. Basson (Ba); S, Mr B. Basson (Ba); T, Mr B. Basson (Ba).

Ua, Miss W. Fisher (P); Ub, Mr J. Pollard (K); Uc, Mr E. Binstead (P); Ud, Mr V. Hunt (P); Ue, Mr W. Evans (P); Uf, Mr D. Stokes (P); Ug, Mr A. Morrison (P); Uv, Mr P. Bailey (P); Uw, Mr D. Stokes (P); Ux, Mr E. Binstead (P); Uy, Mr W. Fisher (P); Uz, Mr V. Hunt (P); Va, Mr E. Willis (P); Vb, Mr M. Strang (Ba); Vc, Mrs B. Lamboll (P); Vd, Mr A. Atkinson (U); Ve, Mr G. Parish (P); Vg, Mr B. Basson (Ba); Vh, Mr J. Japs (G).

Judges at the show were Mr Brian Baker, Mr P. Ginger and Mr R. Eason (FBAS A class judges). To entertain visitors there was also a large display of reptiles and amphibians and a comprehensive exhibition of British water life.

MR F. E. WATTS of Coventry received the awards for best fish in show and best coldwater fish at the **BEDWORTH AQUARIST & POOL SOCIETY** Open Show, M.F.A. were the society with most entries and most awards. Trophies were awarded as follows: Characin, Mr J. Ward (Banbury); Anabantid, Mr R. Coyle; Livebearer, Mr M. Crew (Coventry); Breeders, egglayer, Mr J. Salisbury.

As Guppy, male: 1, Mr I. Short (Nuneaton); 2, Mr C. Pratt (Ind.); 3, Mr C. Kinsley (Uxbridge); 4, Guppy, female: 1, Mr J. Salisbury (Ind.); 2, Mr R. Coyle (Ind.); 3, Mr E. Holmes (Banbury); 4, Mr G. W. Allen (Ind.); 5, Mr R. Shikany (Ind.); 6, Mr G. Stood (Charnworth); 7, Mr E. Holmes (Banbury); Characin, H. & H.: 1, Mr R. Brown (Ind.);

LEYTONSTONE & STRATFORD DAS have available a wide show for live with speaker and equipment. Will interested secretaries please contact Mr R. Sampson, 59 Bute Road, Barkingide Essex.

4, Mr J. Salisbury (Ind.); 5, Mrs Crew (Charnworth); 6, Mr Ward (Banbury); 7, D. & H. Charnworth; 8, Mr Roberts (Ind.); 9, Mrs. named; 10, 2 & 3, Mr K. Duns (Pebble); 11, Mr T. Davis (MVA); 12, Mr Roberts; 13, Mr Mark (SASS); Cichlids, ATNS: 1 & 2, Mr T. Davis; 3, D. & H. Angell; 4, Mr P. Watts (Coventry); 5, Mr T. Salisbury (Bosworth); 6, Mr E. T. Cobhill (MTA) (see Cichlid); 7, Mrs Duns (Charnworth); 8, Mr G. W. Allen (Ind.); 9, Mr Kinsey (Ind.); 10, Mr E. Bax (Br); 11, Mr Martin; 12, Mr G. Nield (Goodyears End); 13, Mr R. Coyle; 14, Mr E. T. Cobhill; 15, Mr M. Morris (Hickley).

Corydoras & Brochis: 1, Mr R. Dodman (Charnworth); 2, Mr G. Bax (Br); 3, Mr G. W. Allen (Ind.); 4, Mr Mark; 5, Mr C. Pratt (Ind.); 6, Mr C. Clarke (Hickley); 7, Mr P. Hande (Coventry); 8, Mr R. Coyle (Ind.); 9, Mr T. Kinsey (Bosworth); 10, Mr E. Bax (Br); 11, Mr F. Hiss; 12, Mr E. T. Cobhill; 13, G. & S. Noble (Charnworth); 14, Mr R. Hough (MTA); 15, Mr B. Brown; 16, Mr R. Hough (MTA); 17, Mr R. Brown; 18, Mr R. Hough (MTA); 19, Mr E. T. Cobhill.

Platy, egglayers: 1, Mr K. Brooks (MTA); 2, Mr J. Goodman (Gosport); 3, Mr K. Pratt (Bosworth); 4, Mr E. Williams (Charnworth); 5, Mr R. Underwood (Sp); 6, Mr C. Pratt (Ind.); 7, Mr E. Williams (Charnworth); 8, Mr J. Salisbury; 9, D. & H. Loveham; 10, Mr E. Holmes (Banbury); 11, Mr P. Allen (Ind.); 12, Mr D. White (Bosworth); 13, Mr I. Gould (MTA); 14, Mr R. Coyle (Ind.); 15, Mr C. Pratt (Ind.); 16, Mr E. Williams (Charnworth); 17, Mr F. E. Watts; 18, Mr D. McIntyre (Sp); 19, Mr D. Pennington (GKN); 20, Mr R. Hough (MTA); 21, Mr S. Cooper (see Goldfish); 22, Mr F. Underwood (Sp); 23, Mr P. Watts (Coventry); 24, Mr C. Pratt.

RESULTS of the **BUXTON & DAS** third Open Show are as follows:

Guppy: 1, Mr & Mrs Marshall (Bosworth); 2 & 3, D. & M. Laycock (Sheffield); 4, Mrs B. Brown (Bosworth); 5, Mr C. Martin (Charnworth); 6, Mr J. Japs (Gosport); 7, Mr P. Watts (Coventry); 8, Mr B. Brown (Ind.); 9, Mr & Mrs J. Thorne (Northwich); 10, Mr Arden (Doncaster); 11, Mr F. Fenny (Doncaster); 12, Mr & Mrs Fletcher (Doncaster).

Small guppies: 1, Mr & Mrs L. Thorne; 2, Mr N. Carr (Doncaster); 3, Mr M. Clarke (Banbury); 4, Mr P. F. Caven (Banbury); 5, Mr A. Ann (Adderbury-Letch); 6, Mr J. Japs (Gosport); 7, Mr R. Hall (Derby R.I.); 8, Master A. Maffin (N. Staffs); 9, Miss J. Gullane (Bosworth); Characin, small: 1, D. & M. Laycock; 2, Mr & Mrs Parsons (Gosport); 3, Mr B. Brown (Ind.); 4, Mr & Mrs Bailey (Bosworth); 5, Mr R. Madhoo (Coventry); 6, Mr A. Cass (Macclesfield); 7, Mr & Mrs Shikany (Ind.); 8, Mr & Mrs Simpson (Gosport); 9, Master A. Maffin; 10, Mr & Mrs Heap (Village).

Corydoras & Brochis: 1 & 2, Mr M. Clarke; 3, Mr & Mrs Wells (Doncaster); 4, Mr & Mrs Kinsey (Ind.); 5, Mr & Mrs Bax (Br); 6, Mr & Mrs Bax (Br); 7, Mr & Mrs Bax (Br); 8, Mr & Mrs Bax (Br); 9, Mr & Mrs Bax (Br); 10, Mr & Mrs Bax (Br); 11, Mr & Mrs Bax (Br); 12, Mr & Mrs Bax (Br); 13, Mr & Mrs Bax (Br); 14, Mr & Mrs Bax (Br); 15, Mr & Mrs Bax (Br); 16, Mr & Mrs Bax (Br); 17, Mr & Mrs Bax (Br); 18, Mr & Mrs Bax (Br); 19, Mr & Mrs Bax (Br); 20, Mr & Mrs Bax (Br); 21, Mr & Mrs Bax (Br); 22, Mr & Mrs Bax (Br); 23, Mr & Mrs Bax (Br); 24, Mr & Mrs Bax (Br); 25, Mr & Mrs Bax (Br); 26, Mr & Mrs Bax (Br); 27, Mr & Mrs Bax (Br); 28, Mr & Mrs Bax (Br); 29, Mr & Mrs Bax (Br); 30, Mr & Mrs Bax (Br); 31, Mr & Mrs Bax (Br); 32, Mr & Mrs Bax (Br); 33, Mr & Mrs Bax (Br); 34, Mr & Mrs Bax (Br); 35, Mr & Mrs Bax (Br); 36, Mr & Mrs Bax (Br); 37, Mr & Mrs Bax (Br); 38, Mr & Mrs Bax (Br); 39, Mr & Mrs Bax (Br); 40, Mr & Mrs Bax (Br); 41, Mr & Mrs Bax (Br); 42, Mr & Mrs Bax (Br); 43, Mr & Mrs Bax (Br); 44, Mr & Mrs Bax (Br); 45, Mr & Mrs Bax (Br); 46, Mr & Mrs Bax (Br); 47, Mr & Mrs Bax (Br); 48, Mr & Mrs Bax (Br); 49, Mr & Mrs Bax (Br); 50, Mr & Mrs Bax (Br); 51, Mr & Mrs Bax (Br); 52, Mr & Mrs Bax (Br); 53, Mr & Mrs Bax (Br); 54, Mr & Mrs Bax (Br); 55, Mr & Mrs Bax (Br); 56, Mr & Mrs Bax (Br); 57, Mr & Mrs Bax (Br); 58, Mr & Mrs Bax (Br); 59, Mr & Mrs Bax (Br); 60, Mr & Mrs Bax (Br); 61, Mr & Mrs Bax (Br); 62, Mr & Mrs Bax (Br); 63, Mr & Mrs Bax (Br); 64, Mr & Mrs Bax (Br); 65, Mr & Mrs Bax (Br); 66, Mr & Mrs Bax (Br); 67, Mr & Mrs Bax (Br); 68, Mr & Mrs Bax (Br); 69, Mr & Mrs Bax (Br); 70, Mr & Mrs Bax (Br); 71, Mr & Mrs Bax (Br); 72, Mr & Mrs Bax (Br); 73, Mr & Mrs Bax (Br); 74, Mr & Mrs Bax (Br); 75, Mr & Mrs Bax (Br); 76, Mr & Mrs Bax (Br); 77, Mr & Mrs Bax (Br); 78, Mr & Mrs Bax (Br); 79, Mr & Mrs Bax (Br); 80, Mr & Mrs Bax (Br); 81, Mr & Mrs Bax (Br); 82, Mr & Mrs Bax (Br); 83, Mr & Mrs Bax (Br); 84, Mr & Mrs Bax (Br); 85, Mr & Mrs Bax (Br); 86, Mr & Mrs Bax (Br); 87, Mr & Mrs Bax (Br); 88, Mr & Mrs Bax (Br); 89, Mr & Mrs Bax (Br); 90, Mr & Mrs Bax (Br); 91, Mr & Mrs Bax (Br); 92, Mr & Mrs Bax (Br); 93, Mr & Mrs Bax (Br); 94, Mr & Mrs Bax (Br); 95, Mr & Mrs Bax (Br); 96, Mr & Mrs Bax (Br); 97, Mr & Mrs Bax (Br); 98, Mr & Mrs Bax (Br); 99, Mr & Mrs Bax (Br); 100, Mr & Mrs Bax (Br); 101, Mr & Mrs Bax (Br); 102, Mr & Mrs Bax (Br); 103, Mr & Mrs Bax (Br); 104, Mr & Mrs Bax (Br); 105, Mr & Mrs Bax (Br); 106, Mr & Mrs Bax (Br); 107, Mr & Mrs Bax (Br); 108, Mr & Mrs Bax (Br); 109, Mr & Mrs Bax (Br); 110, Mr & Mrs Bax (Br); 111, Mr & Mrs Bax (Br); 112, Mr & Mrs Bax (Br); 113, Mr & Mrs Bax (Br); 114, Mr & Mrs Bax (Br); 115, Mr & Mrs Bax (Br); 116, Mr & Mrs Bax (Br); 117, Mr & Mrs Bax (Br); 118, Mr & Mrs Bax (Br); 119, Mr & Mrs Bax (Br); 120, Mr & Mrs Bax (Br); 121, Mr & Mrs Bax (Br); 122, Mr & Mrs Bax (Br); 123, Mr & Mrs Bax (Br); 124, Mr & Mrs Bax (Br); 125, Mr & Mrs Bax (Br); 126, Mr & Mrs Bax (Br); 127, Mr & Mrs Bax (Br); 128, Mr & Mrs Bax (Br); 129, Mr & Mrs Bax (Br); 130, Mr & Mrs Bax (Br); 131, Mr & Mrs Bax (Br); 132, Mr & Mrs Bax (Br); 133, Mr & Mrs Bax (Br); 134, Mr & Mrs Bax (Br); 135, Mr & Mrs Bax (Br); 136, Mr & Mrs Bax (Br); 137, Mr & Mrs Bax (Br); 138, Mr & Mrs Bax (Br); 139, Mr & Mrs Bax (Br); 140, Mr & Mrs Bax (Br); 141, Mr & Mrs Bax (Br); 142, Mr & Mrs Bax (Br); 143, Mr & Mrs Bax (Br); 144, Mr & Mrs Bax (Br); 145, Mr & Mrs Bax (Br); 146, Mr & Mrs Bax (Br); 147, Mr & Mrs Bax (Br); 148, Mr & Mrs Bax (Br); 149, Mr & Mrs Bax (Br); 150, Mr & Mrs Bax (Br); 151, Mr & Mrs Bax (Br); 152, Mr & Mrs Bax (Br); 153, Mr & Mrs Bax (Br); 154, Mr & Mrs Bax (Br); 155, Mr & Mrs Bax (Br); 156, Mr & Mrs Bax (Br); 157, Mr & Mrs Bax (Br); 158, Mr & Mrs Bax (Br); 159, Mr & Mrs Bax (Br); 160, Mr & Mrs Bax (Br); 161, Mr & Mrs Bax (Br); 162, Mr & Mrs Bax (Br); 163, Mr & Mrs Bax (Br); 164, Mr & Mrs Bax (Br); 165, Mr & Mrs Bax (Br); 166, Mr & Mrs Bax (Br); 167, Mr & Mrs Bax (Br); 168, Mr & Mrs Bax (Br); 169, Mr & Mrs Bax (Br); 170, Mr & Mrs Bax (Br); 171, Mr & Mrs Bax (Br); 172, Mr & Mrs Bax (Br); 173, Mr & Mrs Bax (Br); 174, Mr & Mrs Bax (Br); 175, Mr & Mrs Bax (Br); 176, Mr & Mrs Bax (Br); 177, Mr & Mrs Bax (Br); 178, Mr & Mrs Bax (Br); 179, Mr & Mrs Bax (Br); 180, Mr & Mrs Bax (Br); 181, Mr & Mrs Bax (Br); 182, Mr & Mrs Bax (Br); 183, Mr & Mrs Bax (Br); 184, Mr & Mrs Bax (Br); 185, Mr & Mrs Bax (Br); 186, Mr & Mrs Bax (Br); 187, Mr & Mrs Bax (Br); 188, Mr & Mrs Bax (Br); 189, Mr & Mrs Bax (Br); 190, Mr & Mrs Bax (Br); 191, Mr & Mrs Bax (Br); 192, Mr & Mrs Bax (Br); 193, Mr & Mrs Bax (Br); 194, Mr & Mrs Bax (Br); 195, Mr & Mrs Bax (Br); 196, Mr & Mrs Bax (Br); 197, Mr & Mrs Bax (Br); 198, Mr & Mrs Bax (Br); 199, Mr & Mrs Bax (Br); 200, Mr & Mrs Bax (Br); 201, Mr & Mrs Bax (Br); 202, Mr & Mrs Bax (Br); 203, Mr & Mrs Bax (Br); 204, Mr & Mrs Bax (Br); 205, Mr & Mrs Bax (Br); 206, Mr & Mrs Bax (Br); 207, Mr & Mrs Bax (Br); 208, Mr & Mrs Bax (Br); 209, Mr & Mrs Bax (Br); 210, Mr & Mrs Bax (Br); 211, Mr & Mrs Bax (Br); 212, Mr & Mrs Bax (Br); 213, Mr & Mrs Bax (Br); 214, Mr & Mrs Bax (Br); 215, Mr & Mrs Bax (Br); 216, Mr & Mrs Bax (Br); 217, Mr & Mrs Bax (Br); 218, Mr & Mrs Bax (Br); 219, Mr & Mrs Bax (Br); 220, Mr & Mrs Bax (Br); 221, Mr & Mrs Bax (Br); 222, Mr & Mrs Bax (Br); 223, Mr & Mrs Bax (Br); 224, Mr & Mrs Bax (Br); 225, Mr & Mrs Bax (Br); 226, Mr & Mrs Bax (Br); 227, Mr & Mrs Bax (Br); 228, Mr & Mrs Bax (Br); 229, Mr & Mrs Bax (Br); 230, Mr & Mrs Bax (Br); 231, Mr & Mrs Bax (Br); 232, Mr & Mrs Bax (Br); 233, Mr & Mrs Bax (Br); 234, Mr & Mrs Bax (Br); 235, Mr & Mrs Bax (Br); 236, Mr & Mrs Bax (Br); 237, Mr & Mrs Bax (Br); 238, Mr & Mrs Bax (Br); 239, Mr & Mrs Bax (Br); 240, Mr & Mrs Bax (Br); 241, Mr & Mrs Bax (Br); 242, Mr & Mrs Bax (Br); 243, Mr & Mrs Bax (Br); 244, Mr & Mrs Bax (Br); 245, Mr & Mrs Bax (Br); 246, Mr & Mrs Bax (Br); 247, Mr & Mrs Bax (Br); 248, Mr & Mrs Bax (Br); 249, Mr & Mrs Bax (Br); 250, Mr & Mrs Bax (Br); 251, Mr & Mrs Bax (Br); 252, Mr & Mrs Bax (Br); 253, Mr & Mrs Bax (Br); 254, Mr & Mrs Bax (Br); 255, Mr & Mrs Bax (Br); 256, Mr & Mrs Bax (Br); 257, Mr & Mrs Bax (Br); 258, Mr & Mrs Bax (Br); 259, Mr & Mrs Bax (Br); 260, Mr & Mrs Bax (Br); 261, Mr & Mrs Bax (Br); 262, Mr & Mrs Bax (Br); 263, Mr & Mrs Bax (Br); 264, Mr & Mrs Bax (Br); 265, Mr & Mrs Bax (Br); 266, Mr & Mrs Bax (Br); 267, Mr & Mrs Bax (Br); 268, Mr & Mrs Bax (Br); 269, Mr & Mrs Bax (Br); 270, Mr & Mrs Bax (Br); 271, Mr & Mrs Bax (Br); 272, Mr & Mrs Bax (Br); 273, Mr & Mrs Bax (Br); 274, Mr & Mrs Bax (Br); 275, Mr & Mrs Bax (Br); 276, Mr & Mrs Bax (Br); 277, Mr & Mrs Bax (Br); 278, Mr & Mrs Bax (Br); 279, Mr & Mrs Bax (Br); 280, Mr & Mrs Bax (Br); 281, Mr & Mrs Bax (Br); 282, Mr & Mrs Bax (Br); 283, Mr & Mrs Bax (Br); 284, Mr & Mrs Bax (Br); 285, Mr & Mrs Bax (Br); 286, Mr & Mrs Bax (Br); 287, Mr & Mrs Bax (Br); 288, Mr & Mrs Bax (Br); 289, Mr & Mrs Bax (Br); 290, Mr & Mrs Bax (Br); 291, Mr & Mrs Bax (Br); 292, Mr & Mrs Bax (Br); 293, Mr & Mrs Bax (Br); 294, Mr & Mrs Bax (Br); 295, Mr & Mrs Bax (Br); 296, Mr & Mrs Bax (Br); 297, Mr & Mrs Bax (Br); 298, Mr & Mrs Bax (Br); 299, Mr & Mrs Bax (Br); 300, Mr & Mrs Bax (Br); 301, Mr & Mrs Bax (Br); 302, Mr & Mrs Bax (Br); 303, Mr & Mrs Bax (Br); 304, Mr & Mrs Bax (Br); 305, Mr & Mrs Bax (Br); 306, Mr & Mrs Bax (Br); 307, Mr & Mrs Bax (Br); 308, Mr & Mrs Bax (Br); 309, Mr & Mrs Bax (Br); 310, Mr & Mrs Bax (Br); 311, Mr & Mrs Bax (Br); 312, Mr & Mrs Bax (Br); 313, Mr & Mrs Bax (Br); 314, Mr & Mrs Bax (Br); 315, Mr & Mrs Bax (Br); 316, Mr & Mrs Bax (Br); 317, Mr & Mrs Bax (Br); 318, Mr & Mrs Bax (Br); 319, Mr & Mrs Bax (Br); 320, Mr & Mrs Bax (Br); 321, Mr & Mrs Bax (Br); 322, Mr & Mrs Bax (Br); 323, Mr & Mrs Bax (Br); 324, Mr & Mrs Bax (Br); 325, Mr & Mrs Bax (Br); 326, Mr & Mrs Bax (Br); 327, Mr & Mrs Bax (Br); 328, Mr & Mrs Bax (Br); 329, Mr & Mrs Bax (Br); 330, Mr & Mrs Bax (Br); 331, Mr & Mrs Bax (Br); 332, Mr & Mrs Bax (Br); 333, Mr & Mrs Bax (Br); 334, Mr & Mrs Bax (Br); 335, Mr & Mrs Bax (Br); 336, Mr & Mrs Bax (Br); 337, Mr & Mrs Bax (Br); 338, Mr & Mrs Bax (Br); 339, Mr & Mrs Bax (Br); 340, Mr & Mrs Bax (Br); 341, Mr & Mrs Bax (Br); 342, Mr & Mrs Bax (Br); 343, Mr & Mrs Bax (Br); 344, Mr & Mrs Bax (Br); 345, Mr & Mrs Bax (Br); 346, Mr & Mrs Bax (Br); 347, Mr & Mrs Bax (Br); 348, Mr & Mrs Bax (Br); 349, Mr & Mrs Bax (Br); 350, Mr & Mrs Bax (Br); 351, Mr & Mrs Bax (Br); 352, Mr & Mrs Bax (Br); 353, Mr & Mrs Bax (Br); 354, Mr & Mrs Bax (Br); 355, Mr & Mrs Bax (Br); 356, Mr & Mrs Bax (Br); 357, Mr & Mrs Bax (Br); 358, Mr & Mrs Bax (Br); 359, Mr & Mrs Bax (Br); 360, Mr & Mrs Bax (Br); 361, Mr & Mrs Bax (Br); 362, Mr & Mrs Bax (Br); 363, Mr & Mrs Bax (Br); 364, Mr & Mrs Bax (Br); 365, Mr & Mrs Bax (Br); 366, Mr & Mrs Bax (Br); 367, Mr & Mrs Bax (Br); 368, Mr & Mrs Bax (Br); 369, Mr & Mrs Bax (Br); 370, Mr & Mrs Bax (Br); 371, Mr & Mrs Bax (Br); 372, Mr & Mrs Bax (Br); 373, Mr & Mrs Bax (Br); 374, Mr & Mrs Bax (Br); 375, Mr & Mrs Bax (Br); 376, Mr & Mrs Bax (Br); 377, Mr & Mrs Bax (Br); 378, Mr & Mrs Bax (Br); 379, Mr & Mrs Bax (Br); 380, Mr & Mrs Bax (Br); 381, Mr & Mrs Bax (Br); 382, Mr & Mrs Bax (Br); 383, Mr & Mrs Bax (Br); 384, Mr & Mrs Bax (Br); 385, Mr & Mrs Bax (Br); 386, Mr & Mrs Bax (Br); 387, Mr & Mrs Bax (Br); 388, Mr & Mrs Bax (Br); 389, Mr & Mrs Bax (Br); 390, Mr & Mrs Bax (Br); 391, Mr & Mrs Bax (Br); 392, Mr & Mrs Bax (Br); 393, Mr & Mrs Bax (Br); 394, Mr & Mrs Bax (Br); 395, Mr & Mrs Bax (Br); 396, Mr & Mrs Bax (Br); 397, Mr & Mrs Bax (Br); 398, Mr & Mrs Bax (Br); 399, Mr & Mrs Bax (Br); 400, Mr & Mrs Bax (Br); 401, Mr & Mrs Bax (Br); 402, Mr & Mrs Bax (Br); 403, Mr & Mrs Bax (Br); 404, Mr & Mrs Bax (Br); 405, Mr & Mrs Bax (Br); 406, Mr & Mrs Bax (Br); 407, Mr & Mrs Bax (Br); 408, Mr & Mrs Bax (Br); 409, Mr & Mrs Bax (Br); 410, Mr & Mrs Bax (Br); 411, Mr & Mrs Bax (Br); 412, Mr & Mrs Bax (Br); 413, Mr & Mrs Bax (Br); 414, Mr & Mrs Bax (Br); 415, Mr & Mrs Bax (Br); 416, Mr & Mrs Bax (Br); 417, Mr & Mrs Bax (Br); 418, Mr & Mrs Bax (Br); 419, Mr & Mrs Bax (Br); 420, Mr & Mrs Bax (Br); 421, Mr & Mrs Bax (Br); 422, Mr & Mrs Bax (Br); 423, Mr & Mrs Bax (Br); 424, Mr & Mrs Bax (Br); 425, Mr & Mrs Bax (Br); 426, Mr & Mrs Bax (Br); 427, Mr & Mrs Bax (Br); 428, Mr & Mrs Bax (Br); 429, Mr & Mrs Bax (Br); 430, Mr & Mrs Bax (Br); 431, Mr & Mrs Bax (Br); 432, Mr & Mrs Bax (Br); 433, Mr & Mrs Bax (Br); 434, Mr & Mrs Bax (Br); 435, Mr & Mrs Bax (Br); 436, Mr & Mrs Bax (Br); 437, Mr & Mrs Bax (Br); 438, Mr & Mrs Bax (Br); 439, Mr & Mrs Bax (Br); 440, Mr & Mrs Bax (Br); 441, Mr & Mrs Bax (Br); 442, Mr & Mrs Bax (Br); 443, Mr & Mrs Bax (Br); 444, Mr & Mrs Bax (Br); 445, Mr & Mrs Bax (Br); 446, Mr & Mrs Bax (Br); 447, Mr & Mrs Bax (Br); 448, Mr & Mrs Bax (Br); 449, Mr & Mrs Bax (Br); 450, Mr & Mrs Bax (Br); 451, Mr & Mrs Bax (Br); 452, Mr & Mrs Bax (Br); 453, Mr & Mrs Bax (Br); 454, Mr & Mrs Bax (Br); 455, Mr & Mrs Bax (Br); 456, Mr & Mrs Bax (Br); 457, Mr & Mrs Bax (Br); 458, Mr & Mrs Bax (Br); 459, Mr & Mrs Bax (Br); 460, Mr & Mrs Bax (Br); 461, Mr & Mrs Bax (Br); 462, Mr & Mrs Bax (Br); 463, Mr & Mrs Bax (Br); 464, Mr & Mrs Bax (Br); 465, Mr & Mrs Bax (Br); 466, Mr & Mrs Bax (Br); 467, Mr & Mrs Bax (Br); 468, Mr & Mrs Bax (Br); 469, Mr & Mrs Bax (Br); 470, Mr & Mrs Bax (Br); 471, Mr & Mrs Bax (Br); 472, Mr & Mrs Bax (Br); 473, Mr & Mrs Bax (Br); 474, Mr & Mrs Bax (Br); 475, Mr & Mrs Bax (Br); 476, Mr & Mrs Bax (Br); 477, Mr & Mrs Bax (Br); 478, Mr & Mrs Bax (Br); 479, Mr & Mrs Bax (Br); 480, Mr & Mrs Bax (Br); 481, Mr & Mrs Bax (Br); 482, Mr & Mrs Bax (Br); 483, Mr & Mrs Bax (Br); 484, Mr & Mrs Bax (Br); 485, Mr & Mrs Bax (Br); 486, Mr & Mrs Bax (Br); 487, Mr & Mrs Bax (Br); 488, Mr & Mrs Bax (Br); 489, Mr & Mrs Bax (Br); 490, Mr & Mrs Bax (Br); 491, Mr & Mrs Bax (Br); 492, Mr & Mrs Bax (Br); 493, Mr & Mrs Bax (Br); 494, Mr & Mrs Bax (Br); 495, Mr & Mrs Bax (Br); 496, Mr & Mrs Bax (Br); 497, Mr & Mrs Bax (Br); 498, Mr & Mrs Bax (Br); 499, Mr & Mrs Bax (Br); 500, Mr & Mrs Bax (Br); 501, Mr & Mrs Bax (Br); 502, Mr & Mrs Bax (Br); 503, Mr & Mrs Bax (Br); 504, Mr & Mrs Bax (Br); 505, Mr & Mrs Bax (Br); 506, Mr & Mrs Bax (Br); 507, Mr & Mrs Bax (Br); 508, Mr & Mrs Bax (Br); 509, Mr & Mrs Bax (Br); 510, Mr & Mrs Bax (Br); 511, Mr & Mrs Bax (Br); 512, Mr & Mrs Bax (Br); 513, Mr & Mrs Bax (Br); 514, Mr & Mrs Bax (Br); 515, Mr & Mrs Bax (Br); 516, Mr & Mrs Bax (Br); 517, Mr & Mrs Bax (Br); 518, Mr & Mrs Bax (Br); 519, Mr & Mrs Bax (Br); 520, Mr & Mrs Bax (Br); 521, Mr & Mrs Bax (Br); 522, Mr & Mrs Bax (Br); 523, Mr & Mrs Bax (Br); 524, Mr & Mrs Bax (Br); 525, Mr & Mrs Bax (Br); 526, Mr & Mrs Bax (Br); 527, Mr & Mrs Bax (Br); 528, Mr & Mrs Bax (Br); 529, Mr & Mrs Bax (Br); 530, Mr & Mrs Bax (Br); 531, Mr & Mrs Bax (Br); 532, Mr & Mrs Bax (Br); 533, Mr & Mrs Bax (Br); 534, Mr & Mrs Bax (Br); 535, Mr & Mrs Bax (Br); 536, Mr & Mrs Bax (Br); 537, Mr & Mrs Bax (Br); 538, Mr & Mrs Bax (Br); 539, Mr & Mrs Bax (Br); 540, Mr & Mrs Bax (Br); 541, Mr & Mrs Bax (Br); 542, Mr & Mrs Bax (Br); 543, Mr & Mrs Bax (Br); 544, Mr & Mrs Bax (Br); 545, Mr & Mrs Bax (Br); 546, Mr & Mrs Bax (Br); 547, Mr & Mrs Bax (Br); 548, Mr & Mrs Bax (Br); 549, Mr & Mrs Bax (Br); 550, Mr & Mrs Bax (Br); 551, Mr & Mrs Bax (Br); 552, Mr & Mrs Bax (Br); 553, Mr & Mrs Bax (Br); 554, Mr & Mrs Bax (Br); 555, Mr & Mrs Bax (Br); 556, Mr & Mrs Bax (Br); 557, Mr & Mrs Bax (Br); 558, Mr & Mrs Bax (Br); 559, Mr & Mrs Bax (Br); 560, Mr & Mrs Bax (Br); 561, Mr & Mrs Bax (Br); 562, Mr & Mrs Bax (Br); 563, Mr & Mrs Bax (Br); 564, Mr & Mrs Bax (Br); 565, Mr & Mrs Bax (Br); 566, Mr & Mrs Bax (Br); 567, Mr & Mrs Bax (Br); 568, Mr & Mrs Bax (Br); 569, Mr & Mrs Bax (Br); 570, Mr & Mrs Bax (Br); 571, Mr & Mrs Bax (Br); 572, Mr & Mrs Bax (Br); 573, Mr & Mrs Bax (Br); 574, Mr & Mrs Bax (Br); 575, Mr & Mrs Bax (Br); 576, Mr & Mrs Bax (Br); 577, Mr & Mrs Bax (Br); 578, Mr & Mrs Bax (Br); 579, Mr & Mrs Bax (Br); 580, Mr & Mrs Bax (Br); 581, Mr & Mrs Bax (Br); 582, Mr & Mrs Bax (Br); 583, Mr & Mrs Bax (Br); 584, Mr & Mrs Bax (Br); 585, Mr & Mrs Bax (Br); 586, Mr & Mrs Bax (Br); 587, Mr & Mrs Bax (Br); 588, Mr & Mrs Bax (Br); 589, Mr & Mrs Bax (Br); 590, Mr & Mrs Bax (Br); 591, Mr & Mrs Bax (Br); 592, Mr & Mrs Bax (Br); 593, Mr & Mrs Bax (Br); 594, Mr & Mrs Bax (Br); 595, Mr & Mrs Bax (Br); 596, Mr & Mrs Bax (Br); 597, Mr & Mrs Bax (Br); 598, Mr & Mrs Bax (Br); 599, Mr & Mrs Bax (Br); 600, Mr & Mrs Bax (Br); 601, Mr & Mrs Bax (Br); 602, Mr & Mrs Bax (Br); 603, Mr & Mrs Bax (Br); 604, Mr & Mrs Bax (Br); 605, Mr & Mrs Bax (Br); 606, Mr & Mrs Bax (Br); 607, Mr & Mrs Bax (Br); 608, Mr & Mrs Bax (Br); 609, Mr & Mrs Bax (Br); 610, Mr & Mrs Bax (Br); 611, Mr & Mrs Bax (Br); 612, Mr & Mrs Bax (Br); 613, Mr & Mrs Bax (Br); 614, Mr & Mrs Bax (Br); 615, Mr & Mrs Bax (Br); 616, Mr & Mrs Bax (Br); 617, Mr & Mrs Bax (Br); 618, Mr & Mrs Bax (Br); 619, Mr & Mrs Bax (Br); 620, Mr & Mrs Bax (Br); 621, Mr & Mrs Bax (Br); 622, Mr & Mrs Bax (Br); 623, Mr & Mrs Bax (Br); 624, Mr & Mrs Bax (Br); 625, Mr & Mrs Bax (Br); 626, Mr & Mrs Bax (Br); 627, Mr & Mrs Bax (Br); 628, Mr & Mrs Bax (Br); 629, Mr & Mrs Bax (Br); 630, Mr & Mrs Bax (Br); 631, Mr & Mrs Bax (Br); 632, Mr & Mrs Bax (Br); 633, Mr & Mrs Bax (Br); 634, Mr & Mrs Bax (Br); 635, Mr & Mrs Bax (Br); 636, Mr & Mrs Bax (Br); 637, Mr & Mrs Bax (Br); 638, Mr & Mrs Bax (Br); 639, Mr & Mrs Bax (Br); 640, Mr & Mrs Bax (Br); 641, Mr & Mrs Bax (Br); 642, Mr &

... 1, Mr A. J. Hove (Leynstone & Stratford, Q); 2, Mr I. H. Preece; 3, Mr K. Usher; 4, Mr R. Newman (Luton); 5, Mr M. D. Chapman; 6, Mrs M. Northwell; 7, Mr J. Hove (Ayles); 8, 1 & 2, Mrs Mary Northwell; 3, Mr S. Mason (Buckingham); 4, 1 & 2, Mr R. Usher; 5, 1, 2 & 3, Mr P. Fisher; 6, 1 & 2, Mr A. Looman (GSGB); 7, Mr D. Nutt; 8, 1, Mr T. Woodley; 2, Mrs S. Taylor; 3, Mr D. Nutt; 4, Mr B. Rudman (Buckingham); 5, Mr D. McManis (Luton); 6, Mr P. Mezer (Haverhill); 7, 1, Mr R. Usher; 2, Mr B. Rudman; 3, Mr A. Chandler (Widhamstead); 4, 1 & 2, Mr A. Chandler; 3, Mr D. Kern (Bury St Edmunds); 4, Mr D. Coyle (Dun); 5, Stephen Adams (BGAS); 6, Miss J. Goddard (Shaftbury).

Mrs Beryl Scates of Lirith won the award for the best Lady's Exhibit.

THE first Open Show of HASTINGS & ST LEONARDS AS was an outstanding success. Four hundred and three fishes were benched and the best fish in show, a *Tilapia zilli* was entered by Mr B. R. George of Mid-Kent. Club member Mr Barry Funnell took a great number of slides at the show and these will be made up into a slide show for the Society to see later.

B: 1, Mr J. Bellingham (Tosbridge); 2, Mr M. H. London (Tosbridge); 3, Mr D. Emery (Mid-Sussex); 4, 1 & 2, Mr B. C. Fry; 5, Mr J. Bellingham; 6, 1, Mr P. Jarvis (Fresno); 7, Mr T. Taylor; 8, Mr P. Martin (Hastings); 9, 1 & 2, Mr P. S. Gottle (N. Kent); 3, Mr T. Taylor; 4, 1 & 2, Mr P. D. Elton (Fresno); 5, Mr T. B. Adams (Hastings); 6, 1, Mr M. D. Chapman; 2, Mr A. Livings (Hastings); 3, Mr B. C. Burton (Fresno); 4, 1, Mr B. R. George (Mid-Kent); 5, R. & G. Green (Mid-Sussex); 6, Mr T. B. Adams; 7, 1, Mr W. G. Turner (Basingstoke); 2, Mr D. B. Parthead (Tosbridge); 3, Mr T. Taylor; 4, Mr C. Kullough (Tosbridge); 5, Mr T. T. Jones; 6, Mr J. Livings; 7, R. & G. Green; 8, Mr P. Sawyer (Fresno); 9, Mrs J. French (Hastings).

G: 1, Mr F. J. Farrell (Tosbridge); 2, Mr J. Bellingham; 3, Mr C. Kullough; 4, 1, Mr & Mrs Marple (Greenford); 2, Mr T. W. F. Hughes (Buckingham); 3, Mr B. C. Burton; 4, 1, Mr P. Stanley (Hastings); 2 & 3, Mr C. Kullough; 5, 1, Mr T. Taylor; 2, Mr C. Honey (Greenford); 3, Mrs T. Bellingham (Tosbridge); 4, 1 & 2, R. & G. Green; 5, Mr C. Honey; 6, 1, Mr T. Taylor; 2, Mr D. B. Parthead; 3, Mr R. J. Chapman (Tosbridge); 4, 1, R. & G. Green; 2, Mrs B. M. Parthead; 3, Mr & Mrs S. Fisk; 4, 1, Mrs J. French (Hastings); 2, Mr M. H. London (Tosbridge); 3, Mr W. F. Woodward (Widnes).

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In Brief . . .

... A NEW Society has been formed in south London. This is the SOUTH LONDON AS, chairman Mr E. Stainer. Secretary is Mrs P. Jarvis (Flat 2, 295 Higher Green Lane, Lewisham, London, SE13) and the society is meeting every Tuesday at 8.0 p.m. temporarily at 18 Germany Road, New Cross, SE4.

... SEPTEMBER was a very busy month for members of HASTINGS & ST LEONARDS AS. As well as holding their first Open Show, two lectures were enjoyed—one by Mr P. Harbord on breeding fishes, illustrated with Mr Barry Funnell's coloured slides, and the other by Mr J. Burtles on cichlids. There was also an outing to Windsor Safari Park.

... NEW FOREST AS plan a colour-slide show on designing a furnished aquarium for their November meeting. A recent talk by Mr Bert Coombes on the coldwater side of the hobby proved really interesting. A special offer of water lilies by the chairman, including eschscholae at 25p, proved very popular.

... ABINGDON AS have experienced several changes lately. Secretary's address is now: Mr G. R. Hall, 16 Morrell Crescent, Littlemore, Oxford and the new venue is the Barley Mow, West Saint Helen Street, Abingdon (off the High Street). At their first-ever attempt at showing fish, member and FBAS delegate Mr R. Blundell won best in class with a spanner barb at the Reading and Newbury Shows.

... BRADFORD & DAS will once again hold their annual Open Show at East Bowling Unity Club, Leicester Street, off Wakefield Road, Bradford (Sunday, 18th November).

... THE talk on general fishkeeping by Mr F. W. Coles, secretary of PRIVATEERS AS, to fellow members gave rise to a very lively and enjoyable discussion session afterwards.

... KNOWLE & DAS, BRISTOL enjoyed an interesting and informative discussion when Mr Short and Mr Russell from Bath AS visited the club and it was felt the exchange visit had been a great success. Trophies for 1972/73 were presented at the recent AGM to N. Gray (Open Class); 2, Mr W. Ham; 3, M. Martin and to K. Gray (Novice); 2, J. Stilling; 3, R. Popple.

... RESULTS of the table show at which members of LLANTWIT MAJOR AS competed for the club's perpetual trophies were: Stampton Cup, best fish of night, Mr W. Lashrick; J. Holmes Memorial Cup, breeders egg-layers, Mr A. Ibbertson; President's Cup, breeders live-bearers, Master P. Glover; Miles Thomas Cup, most points over year, Mr A. Ibbertson; W/C Smith Cup, member of the year, Mr J. J. Edwards (judges, Mr C. Harding and P. Jordan).

... CHAIRMAN of LEYTONSTONE & STRATFORD DAS Mr E. J. Lugsday won the club's award for Fish of the Year as well as the Characin shield and, jointly, with Mr A. Hove and Mr R. Sampson the Lausanne Cup. Mr Hove also won the Cup for Highest Points and the Cup for Highest Pointed Platy. J. Sampson was awarded the Junior Points Cup and the Furnished Jars Cup was won by Mr T. Kudervitch. New members welcome—reduced rate for senior citizens.

Dates for Your Diary

2nd-4th November, London's Sixth Annual Exhibition of Fishkeeping: The AQUARIUM SHOW '73 at the Royal Horticultural Society's Old Hall, Vincent Square, London SW1. Enquiries to Show Organiser, PFM, 114 Garratt Lane, London SW17 0NY.

1st November, GSOB Quarterly Meeting, Corvet Hall, Red Lion Square, Holborn, London, WC1, 8.30 p.m.

6th November, MIXENDEN TFS Open Show, Mixenden Community Centre, Clough Lane, Mixenden, Scheldale; Mrs J.

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4th November. FGA Manchester Section Open Show, Longgate Hotel, rear entrance to Belle Vue, Manchester, 1.30 p.m. Details: Mr D. Glen, 15 Norall Avenue, Whitefield, Manchester, Mx5 6QA.

11th November. HARTLEPOOL AS Open Show, Longear Hall, Station Carry, Hartlepool, Co. Durham, TS16 4BW.

11th November. WALTHAMSTOW A DAS Open Show. Details to be announced.

17th November. GSG 25th Anniversary Dinner Dance. Details: Mr A. Lawson, 48 Gordon Road, Enfield, Middlesex.

18th November. BRADFORD & DAS Open Show, East Bowling Unity Club, Leinster Street, off Wakefield Road, Bradford. Details: Mr J. Cavthor, 74

Hastings Avenue, Bradford, Yorks, BD9 4PT.

24th November, 1973 HENDON CONGRESS. Whitefield Secondary Modern School, Clarence Road, Hendon, NW4. Speaker: Mr W. Tanner of The Hague, Holland. Tickets (amp and amp) from Mr B. Hayward, 90 Casswell Gardens, London, NW2.

25th November. AIREBOROUGH & DAS Open Show, Yeading Town Hall, nr. Leeds/Bradford Airport, Bescing 12.00-2.00 p.m. Details: Mr D. Lawson, 42 Fenwick Street, Gaisley, nr. Leeds (phone 4381).

1st December. FBAS Assembly, Century Hall, Red Lion Square London WC1, 2.30 p.m.

2nd December. HORSFORTH AS 4th Open Show, New Civic Hall, Burnzagger, Pudsey.

9th December. BURY ST EDMUNDS & DAS Exhibition of Fish, Oldfellows Hall, Whiting Street, Bury St Edmunds. Doors open from 10 a.m. to 5.30 p.m. Refreshments available.

1974

9th March. CATFISH ASSOCIATION (G.R.) Open Show. Venue to be announced. Lighten classes IG & II. Show secretary: Mr G. Landisano, 7 Wilsley Court, Pinner Road, London, SW11 2AQ (phone: 81421 2530).

18th April. COVENTRY POOL & AQUARIUM SOCIETY Open Show. Further details (s.a.s.) from Mr B. Waddell, 22 Ridgeway Avenue, Coventry, CV3 9DP.

22nd September. TORRAY AS. Open Show, Torquay Town Hall.

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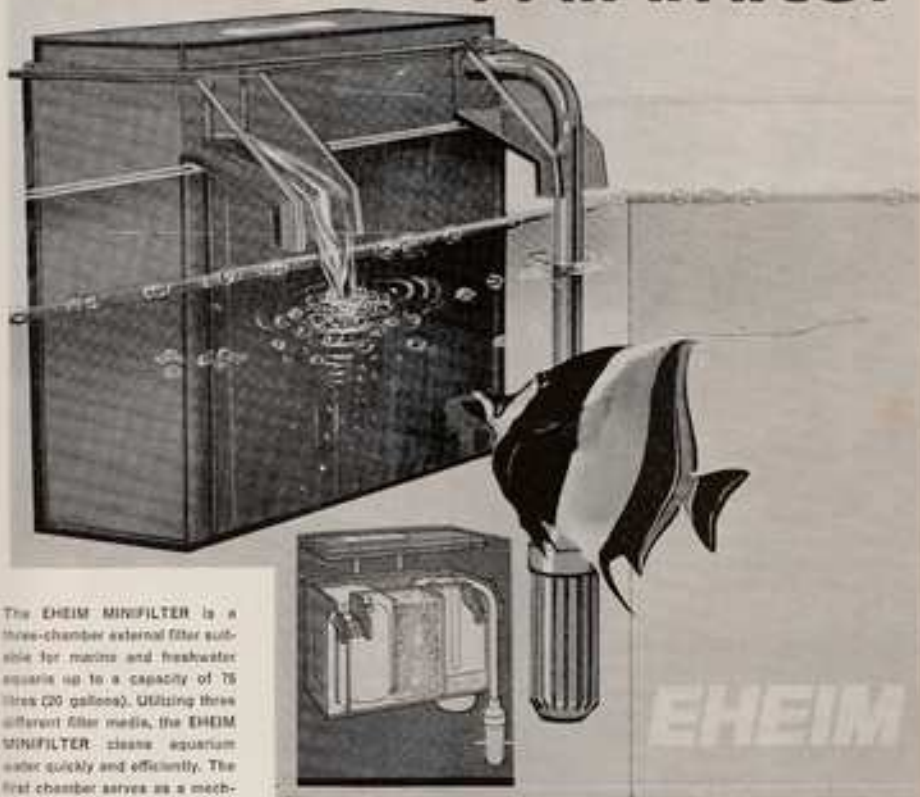
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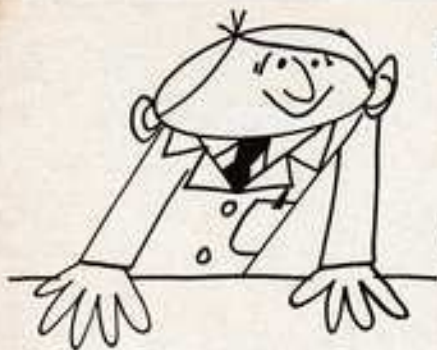
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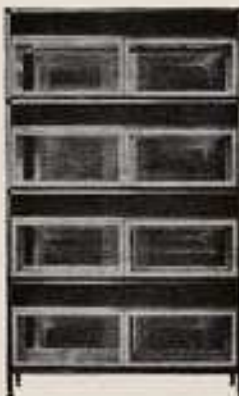
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