

NOVEMBER 1974

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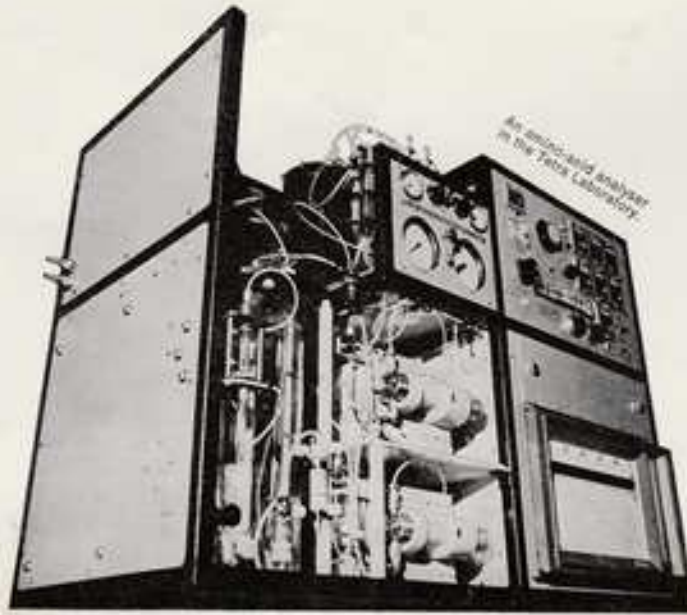
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In This Issue

	Page
Comments and Quotes	321
Heredity	322
Aquarium Maintenance and Breeding of the Sea Horse	329
Meetings and Changes of Officers	332
Personal Comment	333
Koi-Keeping in Japan	336
Coldwater Scene	337
What's New	339
British Aquarists' Festival, Belle Vue	340
Marinist's Notebook	342
The Minnow Called 'Tim's Fish'	343

Readers' Queries Answered	346
Letters	348
Live Foods, Dried Foods and the Fresh Frozen Diet	349
Aqua Glossary	351
Club News	351
In Brief	354
Dates for Your Diary	354

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Comments and Quotes

Spawning Brushes

MANY and varied are the items that have been used to replace water plants as receivers of fish eggs in aquaria and ponds. The feathery roots of river-side willows were once very popular and the fern-like skeletons of marine polyzoans have also been used, with nylon wool skeins and mops coming into use in more recent times.

Commercial fish farms raising goldfish in America have used Spanish moss, but as a result

of scarcity and sharp rises in the cost of this commodity experiments with large nylon bristle brushes of the twisted wire type have been made. When these were supported horizontally at the pond surface in steel frames to form mats 4 ft. long by 15 inches wide, they were readily used by spawning fantail goldfish. It was reported by biologists J. P. McCraren and R. M. Jones in *THE PROGRESSIVE FISH-CULTURIST (USA)* that when the brush 'mats' were put alongside the mats of moss previously used the goldfish deposited eggs in both mats indiscriminately. Advantages of the brushes include durability and ease of cleaning.

**A full report of The Aquarium Show '74
held in London last month will appear in
the December issue of PFM**

The Aquatic Development Group has announced that the measured water volume of the Competition £300 Aquarium at the Show was 76,450 cubic centimetres. Scrutiny of entry forms was not complete at the time of our going to press.

BREEDING FANCY GUPPYS

Heredity

By F. CAMPBELL

IN considering the most suitable environmental conditions for guppies (or anything else for that matter) we cannot overlook the question of inheritance. Guppies, as we have seen from past articles, can present their own particular hereditary problems. These arise mainly from the exceptional range of dissimilarity which exists between the 'genotype' and the 'phenotype'.

The genotype is the entire genetic constitution of any individual; its phenotype is the proportion of the characteristics present in the genotype that it actually shows. For instance we might have a brood of baby guppies whose father revealed a wide spread of caudal finnage, but when they develop we are disappointed to find that none of his offspring exhibit wide caudals. Not to worry, we are looking at the phenotype and the chances are that the trait for wide caudals will have been inherited, and is present in the genotypical make-up. In other words the youngsters have inherited the *ability* to produce widedetailed offspring.

From this we can readily understand the degree of linkage which exists between inheritance and environment. The parent passes to the offspring a set of genes but these genes cannot be fully expressed as visible characteristics unless the offspring are reared in a suitable environment and given a suitable subsistence. For instance, a baby guppy born of parents which are large and shapely, with a good spread of finnage and intensity of colour will contain in the genotype the ability to reproduce all of these factors. If, however, it does not receive the right diet and the right conditions to live in none of the characteristics will be expressed fully in the phenotype. The result could well be a medium sized individual, with perhaps some deformity, an inability to spread its fins to the full and a lack of lustre in its colouring. So the breeder slings it out and herein lies the root of the failure to breed good guppies.

Although the phenotype does not display the qualities the breeder is looking for, the genotype is unaffected by environmental conditions and still retains the ability to transmit the good qualities to the next generation. So it is not always wise to throw out the little ones!

It is not easy to determine what represents the ideal environment for guppies. They are such



This guppy was awarded first and was also best livebearer at the British Aquarists Festival this year (owned by A. Charlton)

adaptable creatures that we may be lulled into a sense of false security by their acceptance of almost any conditions. There is a wide diversity of opinion among breeders and exhibitors as to what constitutes the best environment to ensure success. Points to consider, of course, are size of tanks; whether they should be planted or bare; whether filtration is necessary; pH of the water; lighting; temperature etc. Much depends on the beliefs of the individual and, generally speaking, fanciers discover, mainly by trial and error, what methods serve them best and stick to them. There are, however, few breeders who would disagree that cleanliness is a quality which must always be sought after, and it is how this is achieved which often arouses controversy.

Some might say that the only way to ensure absolute cleanliness is filtration of completely bare tanks, whilst others might favour plants set in gravel and, by maintaining a balance of plants, fish and light, they obtain a clean environment through the natural biological processes. There are many breeders who consider that guppies of exhibition standard should not be used for breeding but simply kept in condition for showing, and that the job of producing more like them should be left to their less illustrious brothers and sisters. In this sort of arrangement the show specimens are kept in bare tanks where there can be little danger of fins and scales becoming damaged by sharp-leaved plants or bits of jagged gravel. Any intermediate bacterial effects can also be eliminated, for any uneaten food is plainly evident and can be immediately siphoned off. Another advantage of keeping exhibition stock in bare tanks is that they can be more easily selected and captured on show days. Where breeding stock is kept in planted tanks the fancier is no doubt influenced by a desire to provide ideal conditions for courtship and also adequate cover for the subsequent fry to hide from cannibalistic parents.

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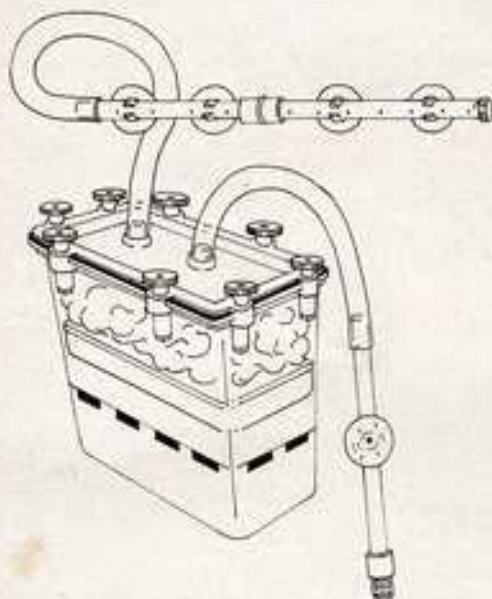
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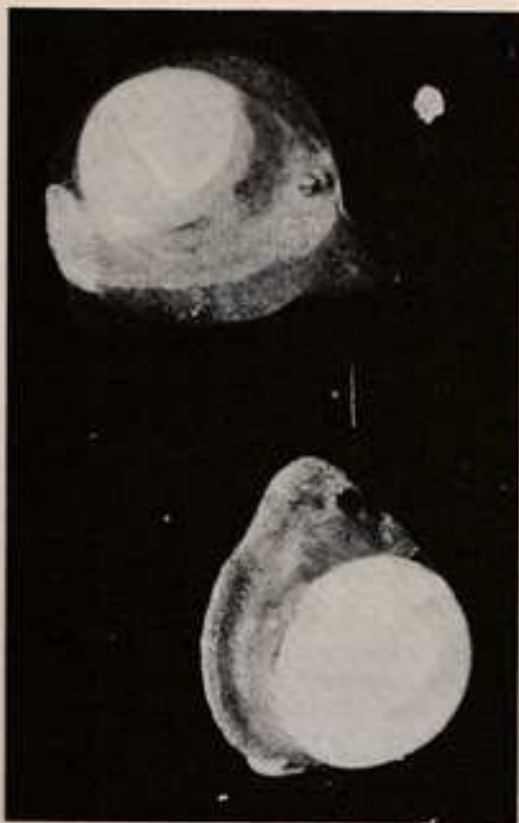
Aquarium Maintenance and Breeding of the Sea Horse

By W. A. TOMEY

Photographs by the author

AS I had been successful in breeding the freshwater pipefishes, *Dorichthys deoratooides* and *Syngnathus palchellus*, I decided to try to breed their close relations, the seahorses. I knew the difficulties involved in keeping seahorses, such as keeping a supply of seawater of the correct composition, the problems of providing them with food and accommodating their behavioural and reproductive patterns, and I thought that it would only create further difficulties to keep more than one species of seahorse, so I decided to concentrate on *Hippocampus kuda*.

I used artificial seawater, in an all-glass tank, to which I added a little natural seawater from the North Sea. This produced a 'healthy' water in which an army of indispensable bacteria were able to develop. Powerful aeration served to produce the desirable strong movement of the tank water through an all-glass filter system. The filter itself was filled with fine gravel, glasswool or nylon wool, activated carbon and broken shells. If it's one of the freshwater hobbyist's biggest difficulties to limit his tank population, for the marine fishkeeper such restraint is absolutely vital, because just one fish too many can completely upset the critical balance. So, my aquarium, containing about 16 gallons of powerfully filtered seawater, was ready. The final touch was to keep it illuminated for 4 weeks before the animals were to be placed in it, so that during these weeks the algae would develop that would make the seawater entirely ready for the fish.



range, is released so that they can suddenly suck the prospective meal into their mouths, mostly accompanied by a clearly audible sound!

Seahorse males are provided with a brood-pouch formed by two folds of the skin of the belly growing together. At mating time seahorses

press their heads against their breast, and this is very noticeable in the aquarium. After some days spent clasping each other's tails, and the most varied courtship behaviour that I have ever seen, the pair will copulate, when the female will press down from between 80 to 400 orange-coloured

Development of the seahorse. Top pictures, embryos at these stages are within the male's pouch, which is distended with the enlarging youngsters. Right: newly born seahorses





A beautiful species of seahorse (*Hippocampus kuda*) pictured in the author's aquarium.

eggs into the male's wide-open brood-pouch—all within the space of a few seconds! During this time the fish's colours can change very markedly, sometimes from a dark brown to a bright yellow with red spots scattered all over the skin! Once the eggs are deposited in the male's brood-pouch, its opening is closed by contraction of a powerful circular muscle.

The embryo develops within the brood pouch and so this process cannot be watched. During

mating time, the inner surface of the wall of the brood-pouch develops a special thickened tissue in which a great number of blood vessels are to be found. These play a very important part in the embryo's development—in my belief by the exchange of the gases carbon dioxide and oxygen: in other words, the breathing of the embryos in their father's brood-pouch is accomplished through the means of this tissue on the inner wall. In some of the literature it is suggested that the purpose of this tissue is to supply food to the embryos, but I don't think this is at all likely.

As the eggs develop, the male's brood-pouch swells up until by the end it is like a cone. At the time of the birth the father gets restless, swims to and fro and presses the pouch against objects in the aquarium, even against the glass of the tank. There are all sorts of indications that the birth is approaching—K. Fiedler observed that, at the time of birth, the father's breathing is considerably quickened, to 102 times per minute as against his normal 34 times a minute.

I have already explained that the pouch is sealed against entry of seawater by circular muscles. When the birth begins the brood-pouch opens a tiny chink and then closes again, and this is repeated until the time of birth. By this means seawater filters into the pouch, so that the conditions inside slowly equalise with those outside. This procedure is of great importance in protecting the young from exposure to the 'stress' of seawater for which they are unprepared (and such stress would hamper the development of normal body functions). At last the pouch opens wide and the young seahorses are pushed out powerfully—at first only a few, but later in waves until the pouch is empty.

The successful raising of young seahorses is very difficult and is still a largely ill-understood procedure on which many fishkeeping enthusiasts have broken their teeth! There is a great deal of investigation for aquarists to do here. That figure of fantasy, the seahorse, has certainly not abandoned all its secrets. Possibly only when these fish are bred successfully in quantity under tank conditions will we be able to keep them alive successfully in our aquaria.

Meetings and Changes of Officers

BARRY AN. New name. The Castle Hotel, Jewell Street, Barry, S. Wales. Fourth Monday of month, 7.30 p.m. New members and service citizens always made welcome. Secretary: Mr M. C. Gatten, 114 Lark, 4 Newton Close, Rhondda, Glam.

BRITISH CYCLID SOCIETY, WEST MIDLAND GROUP. Change of name. Meetings: 2nd Tuesday of month, Midland Vaults, Upper High Street, Wednesbury, Staffordshire.

DORCHESTER & DAS. Chairman, Mr H.

Cornish, vice-chairman, Mr R. Christopher; secretary, Mrs B. Jeffrey; treasurer, Mrs L. Norman; show secretary, Mrs J. Matthews. Meetings: 2nd Thursday of month, Youth Centre, York Road, Dorchester. New members welcome.

FANCY GUPPY ASSOCIATION, MANCHESTER SECTION. Meetings: 1st Sunday of month, 2.00 p.m., Tullis Rooms, Long-night Hotel, Belle Vue, Manchester. New members and visitors welcome.

GLoucester AN. New secretary, Mr A.

Miss G. Parkley (243 Radians Avenue, Quindley Court Estate, Gloucesters).

KILLINGWORTH AQUARIUM ASSOCIATION. Meetings: Wednesday fortnightly, dates in November—15th and 27th, Community Centre, Killingworth. Secretary: Miss C. S. Hickman (14 Craystone Close, Killingworth, Newcastle-upon-Tyne, NE12 9SD).

MIDLAND CYCLID SOCIETY. Change of name. See under BRITISH CYCLID SOCIETY WEST MIDLAND GROUP.

WEDNESBURY & DAS. President, Mr E. Hyde; chairman, Mr R. Farmer; vice-chairman, Mr A. Wood; treasurer, Mr R. Houghton; secretary, Mr W. Law (24 Ross Heights, Rossley, Rugeley, Warwick, West Midlands, B65 8DW); show secretary, Mrs A. Shotton.



by
ARPEE

Personal COMMENT

THESE relentlessly darkening mornings and the yellowing of leaves on the trees are reminders that another summer has passed and that all sorts of preparations for winter must soon be undertaken. One is always looking forward, weather-wise in the country, and many will be asking whether the signs betoken a long and dreadful winter. The pondkeeper in particular will be wondering whether to take special precautions or whether to leave things to Nature. So far as I can tell, the crops in the fields and the fruit on the trees are evidence of good times past and not harbingers of future disaster: how depressing if we had to look on every natural bonus as though there were a catch in it.

Winter brings precious little by way of compensations but few will disagree that the Christmas season is one of the brighter spots. It may be fashionable in some quarters to denigrate the festival, but I doubt very much whether readers of this magazine will go along with that notion. Most of us will be trying in some way to bring pleasure to children, to old people and to the sick as well as to our own families. We all have our own formulae for success.

I was asked recently for advice about buying that all-important tank for junior—it was for a Christmas present. In a few weeks' time the same question will be asked from one end of the country to the other. Instead of ploughing through a lot of verbal advice, most of which would go undigested, I sent the enquirers to the most competent young dealer in the district with instructions to reveal their complete ignorance of the subject and to insist on a rustless tank. I also advised them to shop early because although any reasonable retailer will give unselfishly of his time for most of the year you really cannot expect him to give you a fail-safe lecture on the entire hobby during the last Saturday morning's shopping before the holiday!

The retailer should then really try to analyse the outlook of the buyer and to sell him no more than he thinks his interest and ability are capable of coping with. A skilful dealer will virtually wean his customers on tank water but there are many fools about who will just as soon drown them with

it. The former will know that a modest sale of an 18 inch tank this Christmas, carefully chosen contents and an interested parent, are the ingredients that make for success. Others will consider they have done well to sell a 36 inch bookcase set-up to an indulging and not very interested parent, but unless junior is a pretty capable and determined individual he may well find the first lesson overwhelmingly difficult.

I make no apologies for recommending a rustless tank. Buy one of stainless steel or one which is nylon coated. Not only will they not fall to pieces in a few years' time, they will form suitable receptacles for marine or brackish species if ever the inclination wanders from the conventional. It is quite true that these will cost more but the investment is a really sound one. There are certainly ways of rustproofing angle-iron tanks but they need handyman methods and it is not everyone who wants to do things the hard way. A further point in favour of nylon-coated tanks is that they are much kinder on small hands than many of the others, particularly when they begin to flake and disintegrate, in which circumstances they can be positively dangerous.

Above all things, please remember to impress on junior that the power must be disconnected before he services his tank in any way. This is perhaps a bit drastic for the old hands, but I have no doubt that they will agree with me that safety drills have to be taught young, and that they have to be uncompromising. Relaxations may well follow when a young aquarist really understands what he is about, but there is no safety like 100% safety. Where children are concerned nothing less will do.

I have advised early ordering. We must not forget that this probably means that the dealer will advise setting the tank up a week or so before Christmas if it is to be a Christmas morning surprise. The essential point about all this is the word 'surprise', and if a tank has been there for all to see for days before the 25th it is hardly likely to be a great success on the day unless something really special happens to it. You must strain your ingenuity as to how the element of surprise may be achieved. Physical screening may have to be resorted to, or perhaps it is the fish which will be introduced on Christmas morning—the latter is a particularly thrilling episode. If, however, you have to have things more or less set up before the holiday begins I would suggest

that you install Gro-Lux lighting but do not let the children see its effect until the great day. To most of them, even today it seems like magic.

We will all hope that many youngsters will enter the hobby this Christmas and that their parents will help them along with it.



Looking back over some very enjoyable years of fishkeeping I become more and more convinced that it is in the early, formative, period that one's greatest initiative lies. All sorts of risks are taken and much advice is sought whilst little real notice is taken of any of it. In these circumstances it is not surprising that unexpected success comes to the beginner every so often and this spurs him on to even greater absurdities. Sooner or later steady factors take over, the impossible is tackled rather less often than before and at the same time a greater challenge is sought than the procreation of livebearers or zebras.

I have noticed that, with a precision that is quite uncanny, the novice breeder who has successfully reared some of the commoner egg-layers almost invariably chooses the neon tetra as his next target. If local water conditions are favourable and the prescribed drill is followed it will be found that even this fish is not beyond the skills of many keen and careful beginners. At the same time failures greatly outnumber success because water factors are wrong and the artificial controls needed are quite outside the means of the would-be breeder. I think it is probably true

to say that there are more areas in the United Kingdom where neon breeding is virtually impossible, for reasons of water quality, than the reverse. In casting around, therefore, for something suitably 'difficult' to breed, other attempts are made with such as glowlights, usually with only slightly greater success.

When I found myself in this sort of situation some years ago I discovered that the flame fish (*Hyphessobrycon flammeus*) was just the variety I was looking for as a breakaway from the ordinary, and I can very strongly recommend it to the breeder who is developing his techniques. After a very interesting series of experiments with neons and glowlights, at which point I owned a lot of peat water and not a single fry, I noticed that a pair of flames was moving towards spawning condition quite rapidly—the female was decidedly plump and the male was several shades deeper pink than usual, with his distinctive black-edged anal fin coming more and more into prominence. One of the difficulties I had experienced with the neons was the rapidly changing characteristics of the peat water, which gave a favourable reaction at the beginning of a spawning but which degenerated often overnight, to an unacceptable level. This often meant that I had a successful hatching, but that further progress could not be made by the fry.

The flame is known to be less fussy than many of the tetras as regards water conditions, and this was confirmed in my experiences; in fact I look back in wonder now at some of the things which they did tolerate. I am sure that many of the alkaline water lovers which breed merrily under local conditions would have jibbed at the treatment



Pair of flame fish (*Hyphessobrycon flammeus*) in breeding condition (male above)

Photo: R. ZUKAL

I dished out to those flames, particularly in the very vital first 2 weeks of their existence. I first tried some spawnings in the very soft and acid peat water which I had prepared so carefully for the neons. At about 78-80° F (26° C) the fish spawned quite willingly in a tiny tank (about 8 in. by 6 in. by 4 in.), which had some gravel on the bottom and a couple of nylon mops in the middle of it.

The spawning process is a vivid and exciting occasion in which the pair perform wild tremblings every few minutes, during which eggs are scattered far and wide. About an hour sees it all through, after which a systematic attack on the eggs is made; removal of the pair is therefore essential for success, and if you are using a small floating breeding tank for your pair it is easy to flip them straight back into the surrounding water, avoiding all the perils of a temperature change. A good spawning will yield some 200 fry, and although many of the eggs will turn white the good ones hatch within 24 hours or so, depending on temperature, so the agony of waiting is not really very great.

The young may be seen hanging from the under surface of the water and look for all the world like a series of little golden commas. Their means of propulsion is a very direct wriggling, quite determined, even if the course itself is somewhat uncertain. I always find fry at this stage most interesting to observe; they have great beauty of form and colour and show Nature at its most generous mood, and for a moment it is worth forgetting the price the fish will fetch when you have reared them: a hatching is an uncommon enough happening and deserves to be enjoyed.

When the young begin to take more purposeful journeys it is time to inject some food into the area. After a lot of excursions into the uncertainties of Infusoria culture I settled for Liquifry (red tube). I diluted three drops in a larger quantity of water from the tank and scattered the mixture all over the water surface with a medicine dropper. This was repeated three times a day and the results were very good indeed. In the early experiments I overdid it and the fry succumbed to invading Infusoria encouraged by the over-generous supply of liquid food. The correct balance soon became evident, but the build-up of a slimy growth on the side of the tank often gave cause for concern, usually misplaced, since it could quite easily be removed with a finger, razor blade or what you will. I found that it was possible to sustain young flames with the larger grade of Liquifry until they were capable of taking microworm, and it was noticeable that at this stage they really began to make strides. The appetite of this fish has to be experienced to be believed, and they will go on feeding when all the others have long since stopped. This is possibly why some breeders find a batch deteriorating when they have treated them

similarly to other small tetras, so I think it pays to keep shovelling food into them to make them grow, because the bigger they get, the easier are they to feed.

I find Grindal worm rather difficult to culture, and therefore introduce a sort of mashed white-worm or tubifex after the microworm has ceased to interest. This can be fed by introducing it to the aquarium on the point of a small knife and swirling the mixture into the water to achieve maximum distribution to all quarters of the tank. As the fish become more mature they respond to the approach of food by collecting in hungry groups and of course this makes the process of feeding much easier, and possibly more economical.

At about the half-inch stage the individuality of each fish seems to come to the fore, and aggression is high on its list of features. Many of the smaller and weaker specimens will be mercilessly eradicated by fierce attacks from the stronger ones, and as a result I have found that not a lot of 'weeding' is necessary. Growth is quite rapid and it is naturally advisable to keep up steady progress by feeding with as much live food as possible. You can sometimes be fooled by the willingness of these fish to take large quantities of dried food but, as is usually the case, a mixed diet or a predominance of live food gives the best results.

As the fish grow their colours improve and their usual colour is a delicate pink, which hardens into red overtones when the breeding urge is felt. The liveliness and aggressive nature of many flames makes this an extremely attractive fish to keep, though its stablemates need careful selection. I would suggest a shoal of flames with four or five silver dollars for contrast in both colour and size, with not too high a degree of lighting.



It is rather regrettable that good specimens of flames seem hard to get these days. Home-bred fish often turn out healthy enough, but of uncertain shape, and such should be avoided at all costs. This is not my number one community fish, but it is a wonderful subject for study in smaller groups. An especially good feature for the breeder is its willingness to go from one spawning to the next within 10-14 days; finely chopped earthworm seems especially attractive to them and should assist your persuasions considerably. The flame's ability to breed and thrive in almost impossibly crowded conditions adds to its appeal to the flat dweller, whose fish-keeping is always on a shoestring, but these characteristics should not be abused as the young fish reach the halfway mark, otherwise there is sure to be an unacceptable deterioration in their quality.

Koi-Keeping in Japan

Japanese koi-breeders meet British koi enthusiasts during their visit to the U.K. and answer questions on keeping koi

More than 100 members of the **BRITISH KOI-KEEPERS' SOCIETY** attended at the Conway Hall, Red Lion Square, London, on Sunday 1st September, in order to meet Mr S. Kamihata and Mr N. Takanashi of the Kamihata Carp Breeding Company, Japan. Mr E. A. Allen, the Society chairman, welcomed the distinguished visitors, and in his reply Mr Kamihata regretted the short notice, but he was most pleased to meet members of the British Koi-Keepers' Society and to present a letter from Dr Takeo Kuroki, President of The All-Japan Koi-Keepers' Society whose 8000 members shared an equal interest in keeping the beautiful fish, nishikigoi.

A cine film of the Niigata Prefecture of North Japan showed many scenes of the famous carp breeding area around Yamakoshi Village, and included the techniques of breeding, rearing, grading and feeding, together with views of an auction in progress. This was followed by some excellent slides of Japanese gardens, ponds and koi. Many aspects of koi-keeping were discussed in detail and a better understanding was reached of the situation in Japan. The meeting concluded with an expression of thanks and presentations to the visitors for their time and trouble in addressing the Society and answering numerous questions.

Further details of the meeting are given by Mr Roland Seal and the editors Mr and Mrs M. Waumsley in the British Koi-Keepers' Society Newsletter no. 26: 'Some of the early shots in the cinefilm showed large koi being lifted by hand into tubs for moving to the spawning ponds. In water scarcely as deep as the fish themselves, the men doing this job whirled the koi round two or three times in the water to make them dizzy and easier to handle. Question time proved very stimulating. Mr

Mr S. Kamihata (left) is welcomed to the British Koi-Keepers' Society meeting by the Society's chairman Mr E. A. Allen



Kamihata said that feeding of trout pellets soaked in fish oil takes place three times a day, never after 5 p.m., and only enough food to be consumed within 5 minutes. He also said that from 7,000,000 fry he will only rear 200,000 koi of marketable quality. On the subject of disease called *Anasakibyō* (a disease with holes on the body), Mr Kamihata explained that in Japan they had been very much troubled with this disease for the past 2 years, and that a lot of research was being carried out by such organisations as the Ministry of Fresh Water Fisheries and other Government Departments. Commenting on the depth of Japanese koi ponds, he said they varied in depth from 1.5 to 2 metres (5 ft. to 6 ft. 6 in.). For showing koi he stressed the three main points—shape, colour and pattern.

To a question asking why Japanese koi spawn in the middle of the night, while ours usually spawn in the early part of the day, the reply indicated that in Japan the spawners are put together the morning before and it takes that length of time for the stimulus to produce spawning. Another questioner was told that the normal summer water temperature in Japan is about 25° to 30° C, that is 77° to 86° F. On a question of feeding, Mr Kamihata said that

they do not feed when the water temperature is below 50° F and that, although koi have no teeth, they will eat almost anything that is not hard or spicy. Asked about the lifespan of koi, Mr Kamihata said that koi don't have to register births and deaths, but he was sure they lived longer than humans. Other points to emerge were that doitsu koi tend to grow more quickly than other types, and that colours are enhanced by not changing the water. On the vexed question of sexing fish it was said that, short of dissection, it was not easy with fish younger than about 4 years, but after that the finnage of the male tended to be larger in relation to the size of the fish. A considerable time was spent on the drugs used to cure disease. In general, Dipreterex was used for bacterial diseases and Malachite green for fungal diseases. With Dipreterex 80, which is the strength generally available in the U.K., it is recommended not to exceed a dose of 1 gram to 700 gallons.

The Society welcomes all who are interested in keeping the Japanese fancy carp, and further information is available from the Membership secretary, Mr. D. C. Davis, 137 Gayfield Avenue, Brierley Hill, Staffs. DY5 2BX.

COLDWATER SCENE



By FRANK W. ORME

Winter Safety in Pond and Fish House ● Fish Breeders' Register

ARE we in for a hard winter this year? Although the last two winters have been very mild, one should not be lulled into a false sense of security. Far better to prepare for the worst, and not need the precautions, than to be caught in a hard spell of freezing without preparation! Aquarists who keep their fish in a fish house should make provision for heating the air that surrounds the tanks. A little ice in a tank will cause no harm, certainly it should not worry the goldfish varieties, but thick ice can exert sufficient pressure to break the glass of a tank, even if it is of quarter-inch thickness.

Although the running costs may be a little greater than with other forms of heating my own preference is for electricity. This power source is, normally, instantly available and clean to use and need not be too expensive if coupled to a thermostat. My fish house is heated by a greenhouse-type fan heater, which, when in operation, gives a continuous stream of air from the fan whilst the heating element is switched on and off by the thermostat. The warmed air therefore circulates to all corners of the fish house, the effect being to cut down cold spots and to prevent excessive condensation. Many types of fan heaters are available and most will be found suitable if the thermostatic control is turned to the lowest setting.

Through circumstances or preference it may be that a paraffin heater is decided upon. This form of heating has given adequate and safe warmth in many fish houses for many years. Provided that the makers' instructions are observed and regular maintenance is not neglected, which means keeping the apparatus clean, the wick trimmed and the oil reservoir full, no problems should be encountered. Any oily film that may become apparent, upon the surface of water in the tanks, can be quite easily removed by drawing a piece of newspaper across the water surface, first in one direction and then the other. Use fresh paper for each sweep, and remove the sheet carefully; the oil will then be picked up, leaving a relatively clean surface.

Should you decide to use a paraffin heater in your fish house give some thought to storing sufficient fuel to carry you through any shortage that might arise, if a very cold spell of freezing weather should develop. To be caught without a

reserve of paraffin could lead to disaster—broken tanks and dead fish—so make your provisions for bad weather and low temperatures now.

Preparations to protect the outside pool can also be made. With small pools having a depth of less than 18 inches it is safer to remove the fish and house them indoors. Larger and deeper pools, if not over large, can have a covering screen made for them from a wooden frame over which clear polythene sheeting is stretched. This will afford some protection from freezing but, of course, the sheeting must be kept cleared of any snow. The modern pool heaters will preserve an ice-free open area of water which will allow any noxious gases to escape; alternatively, if the pool freezes over, a pan of boiling water stood on the ice will melt a neat hole through which sufficient of the underlying water can be siphoned to lower the level by about 4 inches. Keep the hole covered with either the polythene screen or with sacking; this will help to prevent the water re-freezing.

The old tale about placing balls, or inflated inner tubes, into a pool in order to absorb the 'ice pressure' has no truth in it, any more than the belief that if pool sides are sloped ice will slide up them and cause no damage. Ice will form a solid grip at the water surface and thicken from this level; if this ice is allowed to become excessively thick the pressure created is likely to cause damage no matter how much the pool sides are angled and irrespective of 'pressure-relieving' objects. Try filling a pudding basin with water; place a tennis ball in the water, and leave it outside during a hard freezing spell. After a time it will be found that neither the ball nor the smooth sloping sides will have saved the basin. It will break under pressure of the ice!

Two prime reasons for taking precautions to avoid complete surface freezing are first, to avoid the build-up of foul water conditions which can occur through pollution. These conditions can kill fish and it is for this reason that I advocate cleaning the pool during the autumn—a clean pool is less likely to become a danger to the fish. Secondly, as already mentioned, concrete and other types of rigid construction pools can be fractured under excessive ice pressure. Preparation in advance avoids low temperatures taking you



To avoid trouble during freezing spells use a can of boiling water to make a hole in surface ice (A), remove some water and cover the hole (B) or cover the whole pond with a frame and plastic sheet (C)

unawares without any safeguards.

With all of these protective measures, whether in the fish house or the pool, it should be remembered that the object is to avoid any form of loss through ice damage. Heating, for instance, should only be sufficient to prevent any more than a rime of ice forming in the tanks; it should not be so warm that the fish remain active. You will find that if the fish can become semi-dormant over the coldest part of the winter, during which time all food must be withheld, they will be more vigorous the following spring. I think that many of the poor spawnings that breeders have experienced have been due to the previous two mild winters.

* * *

September's issue of PFM contained a letter from K. Palmers, of Edinburgh, in which it was suggested that a Register of Breeders would be worthy of consideration. This is a proposition that I think should be considered, and in fact I made a similar suggestion in these columns in December of last year. Admittedly my suggestion was in respect of those who bred fancy goldfish, whereas a Breeder's Register would be far more comprehensive if it catered for all species and varieties of fishes, both tropical and coldwater.

The usefulness should be quite obvious, as should the benefits, if all serious breeders were to give their support. Those seeking a particular type of fish would be able to refer to the Register and discover who, if anyone, was producing home-bred stock of the desired fish. They would learn whether the breeder was prepared to despatch fish or required purchasers to collect simply by writing to the address listed with the name of the breeder, and the price asked, together with any other information needed, could be obtained at the same time.

From the point of view of the breeder, he could possibly find a wider market for the fish that he produced. At the same time the hobby would benefit by having a source of home-bred, healthy fishes rather than having to rely so heavily upon imported specimens whose health is often suspect.

Where else can an elusive fish be found if it is not bred locally and cannot be obtained from dealers or at least not in the quality that is sought? The logical place to look would be in the pages of those magazines devoted to the hobby. Alas, at the present time, this would more often than not prove fruitless.

To remedy the situation merely requires some support and enthusiasm from the many fish breeders who are in the U.K., so why not give some serious consideration to the proposal? Write to the Editor of PFM offering support and, if a sufficient number of breeders were in favour of a Breeders' Register, it might soon be possible to find the breeder of your particular choice of fish within the pages of PFM.

* * *

The Bristol Aquarists Society staged their Annual Open Show during September. At this Show the coldwater fish came into its own, for the tropical section was greatly outnumbered. In the main the quality of the fancy goldfish that were exhibited was very good. A number of fine specimens were displayed, as was to be expected in this stronghold of the goldfish enthusiast, and visitors came from far afield to view them. Much comment, however, was overheard in respect of Class 6. The Show Schedule stated that varieties for entry in this class should be 'telescopes (other than moors), lionheads, celestials, bubble-eyes etc.' To me the intent seems clear as to the types of fancy goldfish to be entered under this heading; however, the 'etc.' was the undoing of the class. First and second places were awarded to London shubunkins. These were two very good specimens and the exhibitor was, no doubt, very pleased that his fish had taken places above the more fancy goldfish opposition.

The judge did, in fact, tell me that he had twice queried these single-tail entries with the show manager, who ruled that they should be judged. I understand that it was considered incorrect to discriminate against the shubunkins when the way had been opened by the Society, by the use

of the 'etc.', although this had not been their intention. I can understand the concern in not wishing to disqualify what I considered to be wrongly classed fish, and, of course, the judge had to abide by the ruling that had been given to him.

Had these two London shubunkins been correctly entered in the class for a.o.v. Pond or River Fish they were of good enough quality to have stood just as much chance of being placed in

the cards.

This instance shows, of course, just how careful the compilers of Show Entry Schedules must be to ensure that the wording is specific and crystal clear, leaving no doubt in the would-be exhibitor's mind about the Show Committee's intention or requirements for each individual class. It also proves how that requirement can be undone if the 'etc.' leads to confusion.

What's New?

Emergency Power

THE tropical fish tank is specifically listed by the manufacturers of the **Jermyn Emergency Power Unit** (along with central heating pump, deep freeze, lighting, television and refrigerator) as one of the items that could immediately benefit from their units in the event of a power cut. These units, shown on TV's 'Tomorrows World' last winter, are

available in two models for maintaining appliances in use requiring up to 150 or 300 watts respectively. The battery-operated inverter provides AC power from standard car batteries. In the event of a power cut, the units will automatically switch to the invert mode to maintain an electrical supply. When the power is restored the unit reverts to mains operation, automatically recharging the battery ready for the next power cut and so giving an uninterrupted emergency electricity supply. The two versions are: 150-3, giving 150 watts output from a 12 volt car battery (price £45.00 + VAT), and 300-3, giving 300 watts from a 24 volt battery or two 12 volt batteries in series (£65.00 + VAT). The unit is fully guaranteed for a year and is available on mail order direct from Jermyn Industries (No. 1 Vestry Estate, Sevenoaks, Kent). A

brochure will be supplied on application.

Grindal Go Up

CUSTOM-built worm mini-factories, along with other products of the aquatic trade, suffer from increased prices in raw materials. The IGM firm have had to announce their first price increase for 3½ years. The Grindal worm culture in its specially designed wooden culture box is now priced at £2.50; Grindal Food is 60p a large bag and extra compost also 60p. All from E. L. Arnold, 80 Monega Road, London E7 8EW.

Sea Algae Promoter

A TRACE element solution to promote the growth of green algae in newly established salt- or fresh-water aquaria is the latest product of research by Aquarium Systems Inc. (distributed by Laboratory Equipment Consultants, 1 Shore Road, Almsdale, Southport, Lancs.). The **Instant Ocean Algae Trace Element Solution** contains appropriate quantities of sodium nitrate, sodium phosphate, sodium ferric ethylenediaminetetra-acetic acid, manganese chloride, thiamine-hydrochloride, zinc, copper and cobalt sulphates, and sodium molybdate, and other elements beneficial to the propagation and sustaining of nitrifying bacteria. The manufacturers do not regard it as a substitute for regular monthly water changes but rather "a healthy addition to the aquatic environment". It is available in 40 ml. plastic vials, which would be a suitable quantity for a 25-gallon tank.



The Jermyn Emergency Power Unit

British Aquarists' Festival, Belle Vue

Reported by F. CAMPBELL

DISTANCE was no object to some of the societies exhibiting at the 23rd British Aquarists' Festival held at Belle Vue, Manchester on 12th-13th October. Edinburgh A. & P.S. and Lancashire A.S. from the far north, Basingstoke & D.A.S. from the deep south, and Northumbrian Aquarists and Hartlepool A.S. from the North-east, mingled with 25 other societies from Lancashire, Yorkshire, Cheshire, Derbyshire and Nottinghamshire to present a truly representative gathering of aquatic enthusiasts.

The Champion of Champions contest between 34 fish which had all won best in show awards was once again the centre of attraction. Mr & Mrs Shipman of Grantham followed up their second of last year by coming first with their *Danio rerio*; second was Mr P. J. Whelan, Blackburn with a *Gloabalium citrinellum* and third was the *Myclopus schultzei* of Mr T. Roberts, North Staffs.

A number of specialist groups were represented; The Fancy Guppy Association had a neat stand with a fairly comprehensive collection of guppy types. The British Killifish Association displayed no less than 54 tanks containing every variety of egg-laying toothcarp, including one as yet unidentified, which took first prize. The British Koi-Keepers



Winning society stands at the BAF: first (top), Castleford AS; second (middle), one of the 'animals' on the roundsabout by Otram AS; third, Village AS (photos by D. Greenhalgh)

Association had an attractive display of their 'living jewels' which were greatly admired by the visitors. The Northern Goldfish and Pondkeepers Society displayed every variety of goldfish and their members were successful in all the coldwater classes.

The ingenuity displayed by those societies who entered for the special prize of £50 for the most attractive stand was truly amazing. The winner was Castleford A.S. and, befitting their locality, they presented a nineteenth century wagon loaded with coal and drawn by a model of Stephenson's Rocket. Second was a roundabout with elephants, zebras and other zoo animals following each other nose to tail constructed by Oram A.S. The display tanks were contained within the animals' 'bodies'. Third came the Alpine chalet of Village A.S. with a Swiss miss and her boy counterpart bobbing in and out to indicate changes in the weather. Edinburgh A. & P.S. in fourth place gave us road works complete with night watchman sitting at his brazier outside his cabin. The Basingstoke effort of a London suburb in the early part of the century, complete with trams and variety theatre, must have been a close loser.

The Witley Grove Press trophy for the best tropical fish was won by Mr B. Cooper, Hartlepool. The Belle Vue Silver Challenge trophy for the best coldwater fish was won by Mr B. M. Rothwell, NGPS; best tropical egglayer, Mr G. Gillespie, Castleford; best tropical livebearer, Mr A. Charlton, FGA. The John East Memorial Challenge trophy presented by the Newcastle-on-Tyne Society to the individual exhibitor gaining the most awards went to Mr B. M. Rothwell, NGPS, who also had most cards in breeders classes.

Detailed results were:

Society furnished aquarium, tropical: 1. Halifax (84, Cosmos trophy); 2. FGA (63); 3. Northumbrian (66). Coldwater: 1. Halifax (31); 2. Blackpool (51); 3. Edinburgh (49). Individual furnished, tropical: 1. Mr A. P. Vassiere (Marsworth, 74, Walter Smith Commemorative shield); 2. Mrs S. Glen (Bury, 73); 3. Mr J. G. Robertson (Northumbrian, 72). Individual furnished, coldwater: 1. Mr D. L. Shields (Halifax, 76, Williamson trophy); 2. Mr A. Mills (Bury, 68); 3. Mr H. Peshall (Oram, 61, Autumnace); 4. Mr H. Peshall (75, Challenge trophy); 5. Mr D. Copeland (Middlesbrough, 70); 6. Mrs D. M. Matthews (NGPS, 67). Novice/youngcup: 1. Mr H. Haddon (Belle Vue, 75, J. Kelly trophy); 2. Mr E. Seaman (Marsworth, 69); 3. Mr A. Kenny (Village, 62).



Blackpool & Fylde AS staged a 'Penny Arcade' (photo by A. Charlton)

Common goldfish and variants: 1. Mr W. H. Ramsden (NGPS, 70, East Lancs Society Trophies trophy); 2. Mr L. Leadbetter (Blackpool, 47); 3. Mr T. Fowley (Edinburgh, 65). Shubunkin (Oram & Leadbetter, 1, 2 & 3, Mr B. M. Rothwell (NGPS, 74, 71, 69). Mossy: 1, 2 & 3, Mr W. H. Ramsden (NGPS, 70, FNAS trophy, 66, 63). Veiltails: 1 & 2, Mr B. M. Rothwell (61, Walter Smith trophy, 70); 3, Mr F. Fount (Accrington, 67). Fan Fancies, goldfish: 1 & 2, Mr W. H. Ramsden (71, FNAS Chester shield, 69); 3, Mr C. H. Whitney (Accrington, 63). and Coldwater fish: 1, Mr W. H. Ramsden (68, FNAS Derby shield); 2, Mr J. Nixon (Middlesbrough, 64); 3, Mr D. Dawson (Oram, 58).

Carp: as single fish: 1, Mr A. Charlton (FGA, 75, FNAS trophy); 2, Mr J. Hetherington (FGA, 69); 3, Mr D. Greenhalgh (FGA, 67). Carps: pairs: 1, Mr F. Williams (Lanarkshire, 76, Harrogate AS trophy); 2, Mr B. Mrs F. Lane (FGS, 75); 3, Mr D. Glen (FGA, 74). Livebearers as single fish: 1, Mr G. P. Norton (Sandgrounders, 68, FNAS trophy); 2, Mr D. Glen (Bury, 66); 3, Mr T. Burton (Blackburn, 65). Livebearers as pairs: 1, Mr R. T. Preece (Marsworth, 65, A. Frison-Bonner Cup); 2, Mr & Mrs Blades (Cresswell, 62); 3, Mr F. Williams (89).

Angels as single fish: 1 & 2, Mr L. Taylor (Hyde, 65, FNAS trophy, 63); 3, Mr M. Wild (Accrington, 61). Angels as pairs: 1, Mr & Mrs K. Ellis (Cresswell, 59, Whitwell & Snykals Cup); 2, Mr & Mrs D. Greenhalgh (Bury, 51); 3, Mr L. Booth (Hyde, 44). Dwarf cichlids single fish: 1, Mrs J. Gillane (Bassett, 78, FNAS trophy); 2, Mr & Mrs A. Buckley (Bury, 77); 3, Mr T. Harrocks (Oram, 71). Dwarf cichlids, pairs: 1, Mr & Mrs Blades (66, FNAS Lancaster trophy); 2, Mr N. Wainwright (Hartlepool, 59); 3, Mrs J. Gillane (55). Cichlids as single fish: 1, Mr B. Cooper (Hartlepool, 62, FNAS trophy); 2, Mr J. G. Robertson (Northumbrian, 70); 3, Mr N. Wainwright (69). Cichlids as pairs: 1, Mr J. D. Watson (Hartlepool, 66, National AS Cup); 2, Mr A. Harbington (Northumbrian, 65); 3, Dr P. A. Lewis (Huddersfield, 62).

Fighters: 1, Mr J. G. Robertson (70, East Lancs Society Trophies trophy); 2, Mr W. Smith (Oram, 67); 3, Mr L. McCourt (Northumbrian, 63). Gouramis as & paradise single fish: 1, Mr M. Gray (Northumbrian, 75, FNAS trophy); 2, Mr J. Nixon (Middlesbrough, 74); 3, Mr P. Goadson (Hyde, 72). Gouramis as & paradise pairs: 1, Mr B. Tappin (Oram, 75, FNAS trophy); 2, Mr A. Charlton (Lanarkshire, 71); 3, Mr N. Small (Halifax, 70).

Barbs as single fish: 1, Mr R. Tompkinson (78, FNAS trophy); 2, Mr & Mrs Ward

(Middlesbrough, 68); 3, Mr P. Bachelier (Leyton, 67). Barbs as pairs: 1, Mr A. Vassiere (69, Aquaria & Pondkeeper trophy); 2, Mr B. Wilkinson (Halifax, 69); 3, Mr & Mrs Blades (64). Characins as single fish: 1, Mr E. Williams (Hartlepool, 72, FNAS trophy); 2, Mr L. McCourt (71); 3, Mr M. Wood (Huddersfield, 70). Characins as pairs: 1, Mr G. Gillespie (Castleford, 71, East Lancs Society Cup); 2, Mr T. Thomas (Village, 62); 3, Mr & Mrs A. Buckley (61). Carps or molluscs as single fish: 1, Mrs J. Gillane (79, FNAS trophy); 2, Mr J. Gardiner (Leyton, 71); 3, Mr J. G. Robertson (65). Carps or molluscs as pairs: 1, Mr B. Blackwell (Middlesbrough, 66, FNAS Warwick trophy); 2, Mr W. Barber (Sandgrounders, 65); 3, Mr & Mrs Buckley (64).

Catfish as single fish: 1, Mr G. Gillespie (61, FNAS trophy); 2, Mr J. Harvey (Hartlepool, 70); 3, Mr J. G. Robertson (76). Catfish as pairs: 1, Mr E. Williams (68, FNAS York trophy); 2, Mr H. Garthwaite (Hartlepool, 79); 3, Mr B. Bligh (Horsingwode, 74). Egg-eating toothcarps as single fish: 1, Mr B. Wagon (BKA, 71); 2, Mr L. Groom (BKA, 70); 3, Mr K. Hill (BKA, 67). Egg-eating toothcarps as pairs: 1, Mr B. Farnham (BKA, 70, FNAS trophy); 2, Mr K. Hill (69); 3, Mr N. Wood (BKA, 67). Loach as: 1, Mr P. Whelan (Blackburn, 76, FNAS Durham trophy); 2, Mr N. Clarke (Bassett, 71); 3, Mr E. Seymour (69) or Other than classes above: 1 & 2, Mr B. Newson (Northumbrian, 79, Leeds AS Rose Bowl, 77); 3, Mr M. Suddon (Hartlepool, 76).

Breeder's egglayers (1-10 points): 1, Mr D. Chantler (Hartlepool, 67, St Martin's Aquaria trophy); 2, Mr M. Strange (Horsingwode, 65); 3, Mr J. Farnes (Castleford, 64). Breeder's egglayers (11-20 points): 1, Mr & Mrs Blades (63, FNAS trophy); 2, Mr D. Dawson (62); 3, Mr A. Vassiere (60). Breeder's livebearers (1-10 points): 1, Mr & Mrs F. Lane (FGA, 62, FNAS trophy); 2, Mr M. Strange (61); 3, Dr P. A. Lewis (Huddersfield, 60). Breeder's livebearers (11-20 points): 1, Mr M. Strange (62, FNAS trophy); 2, Mr D. L. Buckley (Horsingwode, 59); 3, Mr T. Kington (Oram Valley, 51). Breeder's coldwater: 1, 2 & 3, Mr B. M. Rothwell (74, 69, 65). Tilapia Champion Memorial trophy: 1, Mr J. G. Robertson (65, FNAS trophy); 2, Mr H. Peshall (64); 3, Mr A. Bradley (Bury, 78). Marine furnished aquaria: 1, Mr B. Hinde (Blackburn, 68, FNAS trophy); 2, Mr B. Barr (Edinburgh, 54); 3, Mr L. Taylor (Basingstoke, 46). Marine single fish: 1, Mr D. L. Buckley (77, R. Atherton shield); 2, Mr L. McCourt (74); 3, Mr K. Smith (Middlesbrough, 73). Marine fish pairs: 1, Mr L. McCourt (79).

MARINIST'S Notebook

By ROY PINKS

IT is invidious indeed to select as one's favourite any single species of the countless fishes we may encounter in the course of our hobby, but there will always be some to which we are individually especially attracted. So far as I am concerned the wimple fish (*Hemiochus acuminatus*) falls right in the middle of this category, and I think it has almost everything.

Its overall triangular shape, with its familiar black and white bars and a backing of mid-yellow, makes it a bold fish, and it is dashing, too, once it has settled down in a new environment. The dorsal fin ranges through a number of forms, from a fairly stable triangle to a long, filamentous, appendage trailing behind the fish: in the latter case it detracts from its gracefulness in the confines of a tank, and it may become the target for attack by aggressors. It is one of the many pities of aquarium keeping that one can seldom give adequate space for fish like these, and there is no doubt that this is one species, par excellence, which we should aim to provide with shoaling conditions. Public aquaria will no doubt rise to this in time, and a settled shoal would be worth going a long way to see.

My slight qualification about its desirability is based on a personal inability to keep it in good health for any length of time, though I am assured that it positively thrives when enjoying the benefits of greater expertise than I possess. It is certainly not a fussy eater, though I did run into a little trouble in getting a couple of my specimens to overcome their initial reluctance. Freshly hatched brine shrimp worked in one case, and in the other the fish simply got hungry and finally took white worm. Larger specimens ignore brine shrimp unless these are of adult size, in which case they go mad and snap up all that is going, displaying quite remarkable agility in so doing. One I had would never touch flake food, but most of them took the normally available range of marine fish foods, and all had a weakness for finely chopped earthworm.

The *Hemiochus* will probably become tame quicker than any other fish if tempted with small garden worms or shreds of red meat or non-oily fish. Its appetite, when it is in good health, can be staggering, and if you are beset with a live food

crisis in mid-winter, this can be most embarrassing, because if a fish is put off feeding by a temporary restriction of its favourite food, it can prove to be a tricky process to persuade it to accept something else, or even to accept anything at all!

I have found this a splendid fish in terms of temperament. It is nearly always on the go, either patrolling in and out of the swimming areas, or picking minute particles of food from obscure places. I never experienced the least bit of bad temper from any of the specimens in my charge, though they were well able to stand up for themselves when subjected to attack from ill-disposed fish already in residence. In this sort of situation they seemed to assert their superiority by stance and attitude rather than by any form of physical violence, and it is this sort of display of dignity which so commands my respect.

My losses of this species were caused in the main by gill infections, and I found the standard medications quite useless as either alleviation or cure. Once a fish began to display over-rapid gill movements its days could be numbered, and it was with more than usual regret that I had to accept what then seemed to be an inevitability. I am inclined to think that much of the trouble stemmed from low pH rather than from an excess of nitrite, and I would recommend to marinists who try their hands with this very wonderful fish to look to this aspect constantly. It is quite useless to go by the outward appearance of the fish, so always suspect your water as being at fault and give it the necessary replenishment or conditioning at whatever intervals you judge to be right for your own aquaria. About quarterly should be enough, though monthly is better.

Hemiochus come from the Indian and Pacific Oceans, and there are several related species which I regard as less attractive than the *acuminatus*, which is most commonly offered for sale. A 3 to 4 inch specimen will probably cost about £5-£6 at present. Anything much smaller than this can be difficult to rear, though if the price were right and the specimens offered were full bodied and swimming in a sprightly fashion, I would have a go at what would be a reasonable challenge. The prospect of having two or three of these in one tank would turn anyone's head, including mine!

The Minnow Called 'Tan's Fish'



Tanichthys albonubes

TANICHTHYS ALBONUBES, the White Cloud Mountain minnow, is an ideal fish for every aquarist. Its popular name is derived from the fact that it was originally discovered, in 1932, in a small stream that ran down from the White Cloud Mountain in China, though in fact in Europe it is more commonly known as 'Tan's fish' after the Chinese scout who made the discovery; although it has not been with us for so very long it is to be found in aquaria all over the world.

As the literature tells us, it does not require a high temperature. In fact, with acclimatisation the White Cloud Mountain minnow can live in temperatures as low as 50°F (10°C). But 61-68°F (16-20°C) is ideal. At temperatures about 68°F (20°C), the fish will do best in a thickly planted, well-oxygenated aquarium—82°F (28°C) is the very maximum point of the temperature range at which it will live and at this temperature its life span will be short. So it is an ideal fish for the unheated tank.

By **RUDOLPH ZUKAL**

Photographs by the author

It will grow to about 1½ inches (4 cm.) in length, has a peaceful disposition and is not at all fussy in its feeding: live and dried foods are equally acceptable to it. The only thing that *T. albonubes* is fussy about is the freshness of its tank water—in fact, it provides a first-class indicator on this point. If we notice this fish in our tanks swimming at the surface, taking gulps of air, losing its colour and its sense of balance, even though the other fishes still appear lively and fit, we know that there is something amiss in the tank, and that is likely to be the water.



Mature pair of White Cloud Mountain minnows in the spawning tank. The male is on the left.

On account of its colour, the White Cloud is often known as the 'poor man's neon', though the brightness of this coloration is very dependent on the conditions in which the fish is kept. From nose to tail stretches a red-gold line along the middle of the body; the stomach is greyish white, the back greeny brown. The lower part of the dorsal fin is of a golden hue, the upper part is red with a blueish edging. The caudal fin is a mid-red. The brilliance of the line running along the body in young specimens is such that they can almost be mistaken for the genuine neon tetra.

The male is rather smaller, thinner and more brightly coloured than the female and also its

mouth is edged with a pale red. The female is readily identified by her plumper belly. For maintaining these fish a medium sized, heavily planted tank with ordinary tap water at a temperature of 65 F (18°C) or less can be used. Ideally the fish are kept in a communal tank together in a large shoal.

Breeding follows the pattern shown by members of the genus *Brachydania*. Pairs of year-old minnows will spawn eagerly at a temperature of 72-75 F (22-24°C) in a small aquarium amongst fine-leaved plants. Although the parents do not eat the eggs it is advisable to remove them once the spawning is complete. The number of eggs laid

In this picture and in the one above the distinguishing outline of the plump female is most marked.



The chase into a plant mass close to the tank base



As the female dives into the fine-leaved plant clump the male takes up a position close to her flank



Some curling of the male's tail over the female's body can occur during the spawning as shown in this picture

is not usually very great, but can sometimes reach 200. Occasionally the pair will spawn over a period of time, laying small batches of eggs at intervals in amongst the plants. The fry will be free-swimming after 6-7 days and will accept a fine grade of dry food, although a suitably sized live food will give a perceptible improvement in growth rate.

My own particular way of breeding them is as follows. I keep several pairs in a 12-gallon (50 l.) tank well planted with myriophyllum.

These pairs spawn in the tank but are left in with the eggs: when the fry hatch out they are fed with very fine foods whilst the parents continue to be fed with their usual food. It is a simple matter then to remove the young as and when they have grown to about $\frac{1}{2}$ inch in length. This way I can get 50 fish or more a week almost all the year round. I have only rarely observed any cannibalism amongst them and then that has been due to a lack of other available food.

Readers' Queries Answered



Related Spawnings

Would you please advise me if there are two types of *Pelmatochromis kiribensis*? A fishkeeper I know says there were two types which both now go under the name of *Pelmatochromis pulcher*. Also are brother and sister spawnings satisfactory or not?

It is true that the name *Pelmatochromis kiribensis* is no longer correct. For many years there has been great confusion in the aquarium literature and hobby about the

naming of the group. Within the last few years many of the West African cichlids have been reclassified ichthyologically and most of the species of the former genus *Pelmatochromis* have been transferred to the new genus *Pelvicachromis*. However, not only is our fish '*Pelvicachromis*' but it has also been found that the specific name '*kiribensis*' is incorrect. The aquarium fishes that have been known as *P. kiribensis*, *P. klagi* and *P. taeniatus* have, in fact, been the one

fish *P. taeniatus*. Just to make the confusion worse, however, the illustrations used for *P. kiribensis* were often really of *P. pulcher*. Anyhow, *Pelvicachromis pulcher* and *Pelvicachromis taeniatus* are now the two correct names for the fishes that were known as *Pelmatochromis kiribensis*, *klagi*, *taeniatus* and *pulcher*.

The reason for the confusion is that *Pelvicachromis pulcher* is a fish that appears in so many guises. It is to be found over a wide area in tropical West Africa and like all species that are widely distributed over a variety of habitats (it is found both in inland rivers and brackish coastal estuaries) several distinct forms of the species are likely to appear. These are often sold as different species until such time as subsequent research shows that they are merely colour variations of the same fish. And *P. pulcher* is particularly prone to colour variation, even when bred in the aquarium. A



First award for Society Furnished Aquaria at this year's British Aquarists' Festival went to this tank by Halifax AS (photo by A. Charlton)

report of the separate examination of several hundreds of fishes of each sex from eight broods from different parents by Mr M. Moor showed that some colour variation from the 'norm' was apparent in almost every individual fish.

For general aquarium breeding purposes with normal stock there is no disadvantage to the use of spawnings between siblings.

Rainbow Fish

I have recently become interested in Melanotaenia nigrans, the Australian rainbow fish. So far I can find no books, articles etc. that go into any detail about this fish. Can you give me some tips on feeding, breeding, water conditions etc. please?

Melanotaenia nigrans is quite an old-established and popular species for the aquarium tank; this is very understandable as they are most undemanding fish to keep. They are going to grow to about 4 inches in length and are very active fish, so they will need at least a 24 inch tank length in which to swim. It's also best to keep them in a small group and they are quite suitable for a community of smaller and medium-sized fishes. They are very hardy and will stand quite a range of temperatures (from 65° to 75°F; 18° to 24°C) and of water conditions, though their preference is for hard, slightly alkaline water to which a little salt has been added. Feeding them is simple enough as they will happily accept both live and dried foods.

In maturity the sexes are distinguishable by the more intense coloration of the male and his slimmer shape. They will spawn in a 24 inch tank, thickly planted with fine-leaved plants, in about 8 inches of water at a temperature of 75°F. They are likely to go on spawning for a day or two, scattering semi-adhesive eggs as they do, and if they've been well conditioned in advance with plenty of food they are unlikely to touch the eggs while they are still interested in spawning. However, when you are sure that spawning has been completed, then the parents can be removed. The eggs hatch in 6-7 days and the fry are free-swimming on the ninth day. The fry will need plenty of Infusoria and newly hatched brine shrimps as first food, microworms and then sifted daphnia.

Schuberti Barbs

How long should Schuberti barbs take to spawn? I have had a male and a female in a breeding tank now for over a week and they seem to show little interest in each other. I thought with fish like barbs that spawning would be more or less automatic?

Barbus schuberti usually breed within 2-3 days of being placed in the breeding tank—but, of course, this is only if the fish are ready to breed. The female, which to be really mature enough should be over 9 months old, should be really plumped up with roe and looking very deep-bodied. The breeding tank should be a 2 ft. tank, though it need contain water only to a depth of about 8 inches—and try using a water mixture of two-thirds rain water topped up with fresh tap water. If the water in your area is really alkaline, filter the water mixture through peat. Place some fine-leaved plants in the breeding tank. Other well-proven tips with barb breeding are to have the temperature of the water in the breeding tank some few degrees higher than the water in the tank in which the fish have been living, and to introduce the fish into the tank in the evening. Many breeders also try to place the breeding tank where it will receive any early morning sunlight that there may be about. We would suggest now that the fish should be separated and re-conditioned with plenty of live food in their diet until such time as the female looks ready again to spawn.

Illumination

I very much admire the plant growth in the tanks illustrating the articles by Mr W. A. Toney and I would like to be able to produce the same results but so far I have been quite unsuccessful. My own tank, made to fit into a particular alcove, is 44 in. by 17 in. by 16 in. and I would very much like Mr Toney's advice on how to light this tank and what length of time to keep it illuminated.

Mr Toney replies: I would advise the use of two fluorescent tubes of 25 watts each. These are normally about 36 inches in length without the connector ends. To these should be added two small tungsten bulbs,

from 25 watts each, for the evening. It is difficult to state a time for light duration because this must depend on the types of plants in the aquarium. Normally I keep my aquarium lit from 8.0 a.m. to 8.0 p.m. full power; after 8.0 p.m. I use only half the available fluorescent lighting mixed with the tungsten lamps. As for the type of fluorescent tube to be used, the best results are given by mixing: one warm light and one daylight tube.

Bumble-bee 'Cat'

*I would like any advice you are able to give me concerning the so-called bumble-bee catfish, *Leiocassis siamensis*. The one I have in with platys, red-tail black shark, ramirezi, agassizii, keyhole cichlid and *Corydoras* cats is 3 in. Since keeping the bumble-bee with these I have lost a zebra danio and been unable to find any trace of my Siamese algae-eater, and am wondering if they have been a meal for the bumble-bee. This being so, are the others safe?*

It is very likely that the culprit in your tank is the bumble-bee catfish. It is one of those fishes that can be classified as 'peaceful' provided that its tank companions are too big for it to swallow, and although they are nocturnal fishes for the most part they are very active feeders and will eat fishes that are smaller or slower than themselves. They are members of the Bagridae family—a voracious group—and they will also eat small earthworms, or larger chopped ones, maggots, small pieces of meat and rolled oats. Of the remaining fishes in your tank the platys could be at risk though the other fishes listed should be safe enough (assuming that the red-tail shark is of mature size).

Honey Gouramis

I have recently acquired a pair (I hope) of honey gouramis, and I wonder if you could supply me with some information about them. What I would like to know are the maximum and breeding sizes, and whether any special conditions are needed for breeding these fish.

Cobisa chana is one of the smallest of the dwarf gouramis and will reach a length of about 1½ inches. Maturity is reached when the fish are about a year old and they are then ready for

breeding; by this time they will have reached full growth. The male is the more colourful fish, particularly his dorsal fin. The fish are nest-builders and the male builds the nest and looks after the eggs and nest when the spawning is completed—the female should be removed after the egg-laying. They are warmth-loving and the breeding tank should be at a temperature of 82°F (27°C) or slightly higher. The fry will require very fine first food, such as Infusoria and egg yolk, to be followed by newly hatched brine shrimps and sifted daphnia.

Undertank Heating

My query refers to the article by Cliff Harrison (PFM, September) on undertank heating. Having almost completed a rack to take 16 tanks in four rows of four tanks 18 in. by 12 in.

by 10 in. deep, this would appear to require some 160 watts, which at 2½ watts per foot equals 24 yards. Spreading this over a tray 4 ft. by 12 ft. means approximately 18 runs spaced 1 inch apart, which does not compare with the density of the heating cable shown in the photograph. I appreciate that the size and wattage employed in the photograph is not shown, but a rough interpolation would seem to give about 18 inches front to back of the author's rack and the tank sizes in the other are known. Is this used merely to give a fine control of tank temperature in a room already heated by other means?

Cliff Harrison replies: The amount of heating cable (and hence heating capacity) in both examples shown was rather lower than might be required in some circumstances. In the case of Mr Ellis's aquaria, they

are used for killifish, which are for the most part happy at quite low temperatures; furthermore, the room they are kept in is centrally heated and this means that only a small increase in temperature is required. In my own small fish house, in the other illustration given, the insulation is such that only a fairly low amount of heating is needed for the banks of aquaria. I am now using ½ inch thickness expanded polystyrene as the inner lining of the shed, and this seems to be very effective, provided that there are no draughts or large areas of single glazed windows. With the recent upwards trends in the cost of the two most popular fuels for fish-house heating—electricity and paraffin—effective insulation is now becoming essential if running costs are to be kept within reason.



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

Unusual Livebearer

EARLY in 1972 H. Preston and C. Lyon, two Southend members, brought from Mexico several specimens of the two-spot livebearer, *Pseudoxiphophorus bimaculatus*, having caught them in the wild. This species is large, the females reaching about 4½ inches, the males about 3 inches. It is predatory on smaller fishes of guppy size.

I do not know if any of this species have been imported in recent years; we at Southend have bred and distributed numbers of them to various parts of the country and it would be interesting to hear how widespread they now are. Breeding has been successful in numbers and the quality of fry is good. As with most tank-bred livebearers it appears difficult to raise the females to a good size comparable to the wild stock. However, males appear to grow very well and it may be that the females take longer to reach maturity.

D. M. CHESWRIGHT
President, Southend, Leigh & DAS

Breeding Marines?

ONE of the major problems facing marine aquarists at the present time is overcoming the difficulties presented in the propagation of marine

fish, both native and tropical. While many aquarists have managed to achieve spawnings very few have raised the fry to a mature stage. Perhaps it is for this reason that they are reluctant to write down the knowledge they have gained for publication in the various aquatic magazines.

In order to overcome this the British Marine Aquarists Association has, through the initiation of one of its members, Mr Martyn Haywood, prepared a simple questionnaire which covers all the factors likely to influence the successful breeding of marines. We would be grateful if any readers of PFM, both in Britain and overseas, who have spawned marine fish would write to me at the address below and I will forward a copy of the questionnaire. Through the completion of these we hope to be able to determine some factor common to a number of spawnings and this information could be made available for the benefit of all aquarists.

I would stress that we are interested in obtaining this information whether or not the fry were reared successfully or even hatched from the eggs. Thank you for your assistance in this matter.

88 Cornhill Road, GRAHAM C. ROBERTSON
Aberdeen, AB2 5DH, Scotland

Live Foods, Dried Foods and the Fresh Frozen Diet

By CLIFF HARRISON

I HAVE always been an enthusiastic supporter of the use of tubifex worms as a regular food for virtually all aquarium fishes except the very smallest species. Amongst its advantages have been their undoubted high nutritional value, relatively low cost and practically all-year-round availability. Unfortunately, over the last few months supplies of tubifex have been very much restricted, owing to over-collecting in the past and the greater cleanliness of the River Thames where it is found in quantity: as a result its use has become prohibitively expensive for those hobbyists with more than one aquarium. This means we must turn elsewhere to keep our 'pet fish' in peak condition, experimenting with new goodies to tempt their palates.

Perhaps an answer should first be given to the question 'Is dried food alone adequate for my fishes?'. For the beginner particularly the reply must be yes, certainly; partly on account of the varieties that are likely to be kept in the beginner's early days (predominantly livebearers, characins, barbs and the like), and partly because the better-known dried foods are nutritious, and of a wholesome quality. Fishes may therefore be fed regularly with them with confidence that the foods are unlikely to pollute the aquarium unless gross carelessness occurs, and that the end result will be good, healthy stock. However, this broad statement acknowledges that many foods can give appreciably better results (in the eye of an expert, at least) than most of the dried foods, *provided that they are used with care and selectivity*. These last few words are stressed because it is unlikely that anyone with much less than a couple of years' practical experience of fishkeeping could be in a position to be fully conversant with the eating habits of fishes in general; hence the logic of novices relying on relatively foolproof dried foods whilst they study the behaviour of their fishes, and gradually extend the scope of their feeding

experiments. The secret of success here is to know which fish will take particular foods, and in what sort of sizes and quantity; ignorance of these basics will sooner rather than later result in a polluted tank and bodies floating at the surface. Enough said, I hope.

So what foods can we turn to? Just about everything in the way of meat, fish, egg, cheese and vegetables that we eat ourselves, together with many we wouldn't touch, have been tried over the years, and no doubt there are as many fishes with peculiar tastes as there are such humans. Whilst there is much to be said for variety in the diet, you will probably find two or three things that the fish do readily go for, and which can be used to supplement the dried foods.

The number one food in many eyes is live daphnia ('water fleas')—which most people buy in pre-packed plastic bags (when the word 'live' is certainly a misnomer for at least a half of the contents!). Incidentally, I am surprised at how many people believe that the usual pink coloration in the water of such bags indicates the presence of an antiseptic to make the 'daff' safe for aquarium use; sorry, but it is only a coloration—if the chemical was in a strong enough concentration to do any good, the daphnia would all be dead too. Daphnia is found in almost any semi-permanent body of still water (unless the fleas have been consumed already by other occupants, notably fish), and this even includes those shallow concrete ponds used for sailing model boats. Certainly in the South many public parks have these ponds, which, despite their being emptied and cleaned every few months, still manage to produce netfuls of daphnia between times. The most unlikely of places can in fact yield quantities of daphnia, albeit at irregular intervals, and if the hobbyist can establish a 'round' of three or four such ponds in his locality, he can be fairly certain of obtaining his live food for a greater part of the

year. As always when catching creatures in the wild, there exists some danger of introducing unwanted pests—hydra, for example—into the aquarium, but this risk I think is no more than with the pre-packed sorts.

In the summer months mosquito larvae abound in just about every still body of water. Buckets filled with water and placed in some unobtrusive part of the garden will soon provide a regular supply of these nutritious creatures, though they should not be fed to very small fishes—say those below newly purchased neon tetra size. Since the larvae tend to make for the depths as soon as the water surface is disturbed, hiding in the mud and debris at the bottom of the pond, they are rarely caught at the same time as daphnia; this is the reason for cultivating them in clean containers, where the water can be well stirred up to catch them. Do not be too generous in feeding with them, however, as at tropical temperatures these larvae will quickly develop into winged insects and invade the living room or fish house.

Amongst the non-aquatic live foods, worms and maggots have been popular for many decades. Given principally to large cichlids and catfish, they may be used whole or, more usually, chopped; this latter procedure is the reason why I have not used them more often, and I suspect the same must go for many other people also. Worms are certainly an excellent food, but I have reservations over depending too much on maggots: They are reputed to build up excess of body fat if used exclusively, and fish do seem to tire of them rather quickly.

Meaty Foods

Up till now I have been talking about 'live' foods as if the very fact that they were living creatures conferred some especial value on them. By and large this is not so, their real virtue being that they are generally a fairly concentrated form of protein which happens to be presented to the fish in a highly appetising and desirable form. Thus the fish eat heartily and so achieve maximum growth rate (other things being equal). But many other foods can be just as nourishing and appealing, and in some respects far more convenient as well.

Perhaps I should start off by saying that I have never seen any home-made dried food that the fish have accepted to a degree equal to live or high-protein foods. Despite the most meticulous preparation of ox heart, liver or steak—all usually combined with a cereal such as Bemax—as soon as these are dried (to preserve them) they seem to lose much of their appeal. For that reason I have found a freezing compartment or ice box in a refrigerator to be an invaluable asset for keeping fish foodstuffs fresh. One of the easiest foods to use is ordinary steak—braising steak or even

better quality for preference. If a small piece is cut off from a frozen block, and then diced or shredded finely while it is still solid (so much easier than trying to do it to fresh meat, which is all soft and rubbery), the fish will consume it so quickly that the blood does not have a chance to ooze out into the water. Obviously the size of the meat is critical, and depends on the fish it is intended for. I have found meat to be one of the best foods of all, particularly for fish upwards of about 2 inches.

For fishes of all sizes, use a tin of all-meat dog food (not the 'meaty chunks' or others that may already contain cereal). Tip the contents a little at a time on to a wooden chopping board, and use one of those hand-operated food choppers to reduce it to a purée (removing gristle in the process). If desired, a small quantity of Farex can be mixed in, the whole tipped into a plastic container, and frozen solid. Small lumps can be broken off as required and left to float in the tank: as the food melts, the fish will bite off pieces of suitable size.

Young fry from just a few weeks old, together with smaller species up to neon tetra or pencil fish size, will appreciate a food made of ox or lamb's liver. Cook the liver quickly in a small quantity of water, let it cool, and then remove from it all the larger 'tubes'. Cut it up finely, place in a liquidiser with just enough water to make it workable, and reduce it to a fine purée. Again, add a small quantity of Farex if desired, then work it with the back of a spoon through a flour sieve to remove all the tough fibres etc. The remaining 'cream' can be frozen in plastic containers and fed to fish as required. This food should be squeezed between finger and thumb in the water of the aquarium to break it up into a cloud for very young fry, but this is unnecessary for other fish.

All these protein-rich foods mentioned here will pollute the aquarium very quickly indeed if any is left uneaten; as it is so difficult for a beginner to judge the sort of quantities of food required for particular fish, fry especially, I would suggest that he or she uses these foods on just odd occasions to supplement the dried types. I have not yet mentioned the needs of the few types of fish that depend mainly or solely on vegetable foods. For those that do not find enough nourishment in the form of algae in the tank or in their regular dried food, a squashed cooked pea may be offered; the other fishes may find this an interesting change, too! Alternatively, a minute quantity of finely chopped spinach or cabbage may be tried—in fact almost any green vegetable of a suitably soft texture. These vegetable foods create virtually no problems of pollution, though any left uneaten ought to be removed with a fine net or siphon tube.

AquaGLOSSARY

No. 19

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

Flamma (Latin): flame. Pronounced 'flamm-ah'. The trivial part of the scientific name of the flame tetra, *Hyphessobrycon flammatus* ('hy-fess-oh-bry-kon flam-mee-uss'), refers to the red line of this fish.

Hetero (Greek): different. Pronounced 'het-er-oh'. For example, the generic name of the mosquito fish, *Heterandria formosa* ('het-er-and-ree-ah for-moh-zah') in which the size difference of the males from the females is referred to (*andro*, Greek: male). Also in the trivial names of these fishes: harlequin fish, *Rasbora heteromorpha* ('raz-bor-ah het-er-oh-mor-fah'), meaning 'of different shape' (*morph*, Greek: form, shape, structure); flag tetra, *Hyphessobrycon heterorhabdus* ('hy-fess-oh-bry-kon het-er-oh-rab-duss'), meaning literally 'of different rods' referring to its coloured lines; zebra killifish, *Fundulus heteroclitus* ('fun-dew-luss het-er-oh-clit-uss'); the cichlids *Haplochromis heterodon* ('hap-low-krow-miss het-er-oh-don') and *Haplochromis heterotaenia* ('hap-low-krow-miss het-er-oh-tee-nee-ah').

Icthy (Greek): fish. Pronounced 'ick-thee'. Examples of the use of this root occur in the word ichthyology ('ick-thee-ol-oh-gee'), the knowledge of fishes, in the generic name *Nemichthys* ('neem-ick-thiss'), meaning thread fish (*nema*, Greek: thread) and in the generic name of the White Cloud Mountain minnow, *Tanichthys albonota* ('tan-ick-thiss alb-oh-new-bee'), with a literal meaning of 'Tan's fish'.

Soma (Greek): body. Pronounced 'soh-mah'. Examples of fish generic names of which *soma* forms a part are: *Boleotoma* ('bol-ee-oh-soh-mah'), literal meaning 'dart body' (*boleo*, Greek: dart); *Cichlasoma* ('sick-lah-soh-mah'), indicating a body like 'cichla', an old name for a perch-like fish; *Elassoma* ('elas-soh-mah'), literally 'the tiny bodies'; *Zebriasoma* ('zebra-soh-mah').

Tri (Greek): three. Pronounced 'try'. Examples of this prefix used in trivial names are many: *Anostomus trifasciatus* ('an-nos-stom-uss try-fash-ee-ah-tuss'), *Barbus triptilus* ('bar-buss try-spill-uss'), *Dasyllus trimaculatus* ('dass-kill-uss try-mack-yew-lah-tuss'), *Nannostomus trifasciatus* ('nan-nos-stom-uss try-fash-ee-ah-tuss'), *Rasbora trilineata* ('raz-bor-ah try-lin-nee-ah-tah'), referring to three bands (*fascia*, Latin), three spots (*spilo*, Greek, or *macula*, Latin), and three lines (*linea*, Latin). The name of the ivy-leaf duckweed (*Lemna trilineata*, *lem-nah try-sulk-ah')* refers to the three grooves (*sulc*, Latin: groove) between the three veins of the leaves.



RESULTS of the BRACKNELL, DIDCOT & READING Open Show are as follows:

Ag: 1, 2 & 3, Mr K. Lewis, Br; 1, Mr K. C. Smith, 2, Mr M. H. London, 3, Mr J. H. Jackson, Br; 1 & 3, Mr K. Blinson, 2, Mr R. Little, Ca; 1 & 2, Mr R. Cox, 3, Mr S. J. Rigby, Ca; 1, Mr T. D. Hewitt, 2, Mr E. A. Mowbray, 3, Mr A. Davidson, Br; 1, Mr T. Winton, 2, Mr J. G. Dickinson, 3, Mr L. Morris, Br; 1, Mr L. Clarke, 2, Mr B. Blinson, 3, Mr T. Winton, Br; 1, Mr K. Rees, 2, Mr L. Little, 3, Mr T. A. Radler, Br; 1, Mr P. Brown, 2, Mr L. Pearce, 3, Mr P. Saunders, Br; 1, Mr J. Pearce, 2, Mr K. Rees, 3, Mr K. Blinson, Br; 1, Mr L. J. Brazier, 2, Mr A. P. Taylor, 3, Mr R. J. Cannon, F; 1, Mr R. W. Darro, 2, Mr P. Roberts, 3, Mr P. Merril, G; 1 & 2, Mr J. G. Dickinson, 3, Mr P. Saunders, H; 1, Mr J. Lloyd, 2, Miss K. Howell, 3, Mr L. J. Brazier, J; 1 & 2, Mr L. Clark, 3, Mr K. Rees, K; 1, Mr B. Blinson, 2, Mr T. Fraser, 3, Mr P. A. Moya, L; 1 & 2, Mr M. Carter, 3, Mr E. Little, M; 1, Mr J. Clarke, 2, Mrs M. Netherwood, 3, Mr M. H. London, NB-M; 1, Mr W. A. Cosburn, 2, Mr R. Cox, 3, Mr L. Clarke, NO-T; 1, Mr A. E. Weston, 2, Mr T. Fraser, 3, Mr B. Blinson, Or; 1, Mr A. P. Taylor, 3, Mr K. F. Hale, 3, Mrs M. Netherwood, F; 1 & 3, Mr R. Cox, 2, Mr S. J. Rigby, Q; 1 & 2, Mr L. Pearce, 3, Mr A. P. Taylor, R; 1, Mr G. Lester, 2, Mr P. Cripps, 3, Mr K. Blinson, S; 1, Mr M. D. Chapman, 2, Mr L. Little, 3, Mr T. Taylor, T; 1, Mr B. Blinson, 2, Mr M. H. London, 3, Mr L. Little, U; 1, Mr F. Pinder, 2, Mr D. Haines, 3, Mr R. J. Cannon, V; 1, 2 & 3, Green & Radford, W; 1, Mr J. Jupp, 2, Mr T. A. Butler, 3, Mr F. Pinder, X; 1-M; 1, Mr D. Sheridan, 2, Mr P. A. Mowbray, 3, Mr T. Roberts, X; 1, Mr C. Maiters, 2, Mr A. E. Smith, Y; 1, Mr T. Cripps, Z; 1, Mr J. Jupp, 2, Mr L. Little, 3, Mr T. D. Hewitt.

WHEN SITTINGBOURNE & DAS visited Mid-Kent AS for a KAAS League Match the Society were delighted to win all three classes and take the match by 40 points to 8. They also had a very successful KAAS match against North-Kent AS when they won in two of the three classes and the match by 31 points to 23. A very interesting FBAS slide and tape lecture on *Corydoras* by Mr C. Brown was enjoyed by all. Recent table show results: (Judge, Miss A. McDonald).

GH (Judge, Miss A. McDonald): 1, 2 & 3, Mr A. Sharp, where a special award was given to the *Microgaster parakeet*, in first place. TME: 1, Mr P. Floyd. The second table show was judged by Mr I. Mathison and was for the Challenge Cup, 1, Miss D. McDonald, 2 & 3, Mr B. Newman. The Junior Challenge shield also went to Miss D. McDonald as the highest pointed junior, and the Novice trophy went to Master M. Wicks.

Nichols; 3, Mr Adams (Freshness); X B-M 1 & 3, Mr Adams; 2, Mr Peck (Freshness); X O-P: 1, Mr Fry; 2, Mr Cottle; 3, Mr Woodham; Z: 1, Mr Smith (Stainless); 2, Mr Woodward (N. Kent).

In Brief . . .

... **THE FUR, FEATHER & AQUARIA SHOW** has now been revised and reorganised and looks forward to meeting all aquarists. It is to be held at the King's Hall, 39 Lower Clapton Road, London, E.5 on 23rd November. Further details and schedules from the show secretary, Mrs Sybil Hedges, Kol Korner, 150 Ashburton Avenue, Seven Kings, Ilford, Essex (phone: 01-590 3239).

... **IN** the last table show of the series, **BARRY AS** trophies went to Mr M. C. Guthrie and Master Jonathan Webber. A slide show on tropical catfish, given by Mr D. Warneant, rounded off the evening's entertainment.

... **DORCHESTER & DAS** much regret the loss of both their president, Mr P. Mardon, and of their vice-chairman, Mr A. Billington, who is moving with his family to London. Table show results have been: Section 1: Barbs: 1 & 3, Mr R. W. Taylor; 2, Mr G. Fitzgerald. Loaches & botias: 1 & 2, Mr R. Christopher. Pairs: 1 & 2, Mr R. Christopher; 3, Mr R. W. Taylor. Section 2: Barbs: 1, Mr G. M. Fox; 2, Mrs M. E. Fox; 3, Mrs K. Mitchell. Loaches and botias: Mrs M. E. Fox. Pairs: 1 & 2, Mrs M. E. Fox; 3, Master A. Fox.

... **NEW** members of the **BIRMINGHAM SECTION** of the **FANCY GUPPY ASSOCIATION** are Mr D. Hill and Mr J. Hill of Birmingham and Mr C. Beer from Redditch. Visitors are always welcome at meetings held on the fourth Sunday afternoon of each month at The Glebe Farm Community Centre Stechford, Birmingham. The secretary is Mr G. Bescham, 35 Frankton Close, Marchborough, Redditch (phone Ryknild 4697).

... **LEAMINGTON & DAS** have been enjoying a variety of slide shows. Mr C. Chamberlain and Mr F. Stoodley presented one on severum cichlids and Mr and Mrs

Frank Stoodley showed a very interesting non-aquatic slide show on Rome for the holiday season. A Criss-Cross quiz presented by Mr C. Chamberlain proved another favourite entertainment.

... **THERE** were eight entries in the 1974 Garden Pool Competition held by **COVENTRY POOL & AS**. Results were: joint 1, Mr D. Easingwood and Mr A. Simmons (7½); 3, Mr D. Hancox (6½); 4, Mr T. Manning (6). Judges Mr and Mrs C. Hinde commented: 'One of the main points noticed about some of the fibre-glass pools was that most of the plants were on the two sides with the built-in shelves, with one or two lilies in the middle leaving the other two sides completely bare, which did not really enhance the beauty of the pool.'

... **BOURNEMOUTH AS** welcomed members of Portsmouth AS who arrived to take part in the A.S.A.S. quiz. Questions were set by Salisbury AS and at the end of the quiz Bournemouth had won by 37½ points to 33½. Table show results were: av Characin: 1 & 2, Mrs Bebb; 3, Mr Gibbs. Tropical pairs: 1, Mrs Bebb; 2, Mr Clatfield; 3, Mr Middleton. Common goldfish: 1 & 2, Mr B. Coombes.

... **BRADFORD & DAS** search for new headquarters, although successful (the new venue is the Textile Hall, Westgate, Bradford) has had a number of ramifications. Meetings are now being held on the second and fourth Thursdays of the month and as a result of this change of meeting night secretary Mr D. Edmondson has had to resign and two committee members, Mr A. Firth and Mr B. Shepherd, cannot attend at the new meeting time. Treasurer Mr G. Creasey has also had to resign owing to a move to York.

... **WEDNESBURY & DAS** extend a cordial invitation to anyone wishing to join their club, which meets on the first Monday of each month at 8.00 p.m., at the Midland Vaults, Upper High Street, Wednesbury, Staffordshire.

... **WHEN LINCOLN & DAS** held their annual competition for the Richard Baines trophy, judge Mr J. Bower of Sherwood AS awarded this to Mr J. Goldson; 2, Master Senior; 3, Mr Towse.

... **ROEHAMPTON AS** announce that their Presentation Dinner Dance will be held at The Royal Oak Hotel, Coombe Road, New Malden, Surrey on 14th December (6.00 p.m.). Tickets (£2.50) are obtainable from Mrs C. Sawford, 65 Burlington Road, New Malden, Surrey (phone 949 2707). P.R.O. Mr P. Sawford writes 'We will be pleased to see all our friends on this occasion'.

... **COVENTRY P & AS** members have been enjoying a great deal of success at open shows. At the Bedworth Open Show Coventry was the M.A.L. Society with most points. Mr P. Watts won the award for best large fish other than Best in Show with an angel fish that also won the class for Angels (Stephen Watts came fourth in this class). Mr & Mrs Watts won a second in the single-tail goldfish class, a first and third in the av. coldwater and Miss P. Hinde won a fourth in anabantids. At the Nunaton Open Show, Coventry members achieved a first, four seconds, four thirds and a fourth, and at the Goodyers End Open Show a first, two seconds, a third and three fourths were won.

Dates for Your Diary

2nd November. **GSGB** General Meeting, Conway Hall, Red Lion Square, Holborn, London WC1, 2.00 p.m.

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

10th November. **HALIFAX AS** Open Show, The Foston Cottage Community Centre, Cousin Lane, Ellingworth, Halifax. Details: Mr D. Smith, Cobblestone, Gimst, Kings Cross, Halifax; phone Halifax 40116.

10th November. **WALTHAMSTOW & DAS** Open Show.

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

17th November. **BRADFORD & DAS** 27th Open Show, East Bowling Unity Club, Lancaster Street, Wakefield Road, Bradford. Details: Mr E. J. Brown, 8 Garden Field, Wyke, Bradford; phone Bradford 6777.

23rd November. **FUR, FEATHER AND AQUARIA SHOW**, King's Hall, 39 Lower Clapton Road, London, E.5. Details: Mrs S. Hedges, Kol Korner, 150 Ashburton Avenue, Seven Kings, Ilford, Essex (phone: 01-590 3239).

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

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

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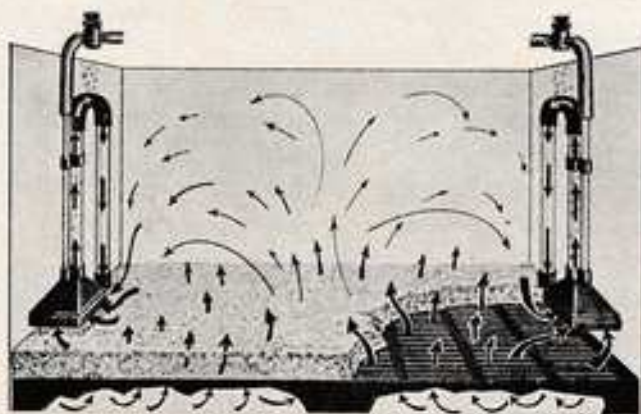
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