

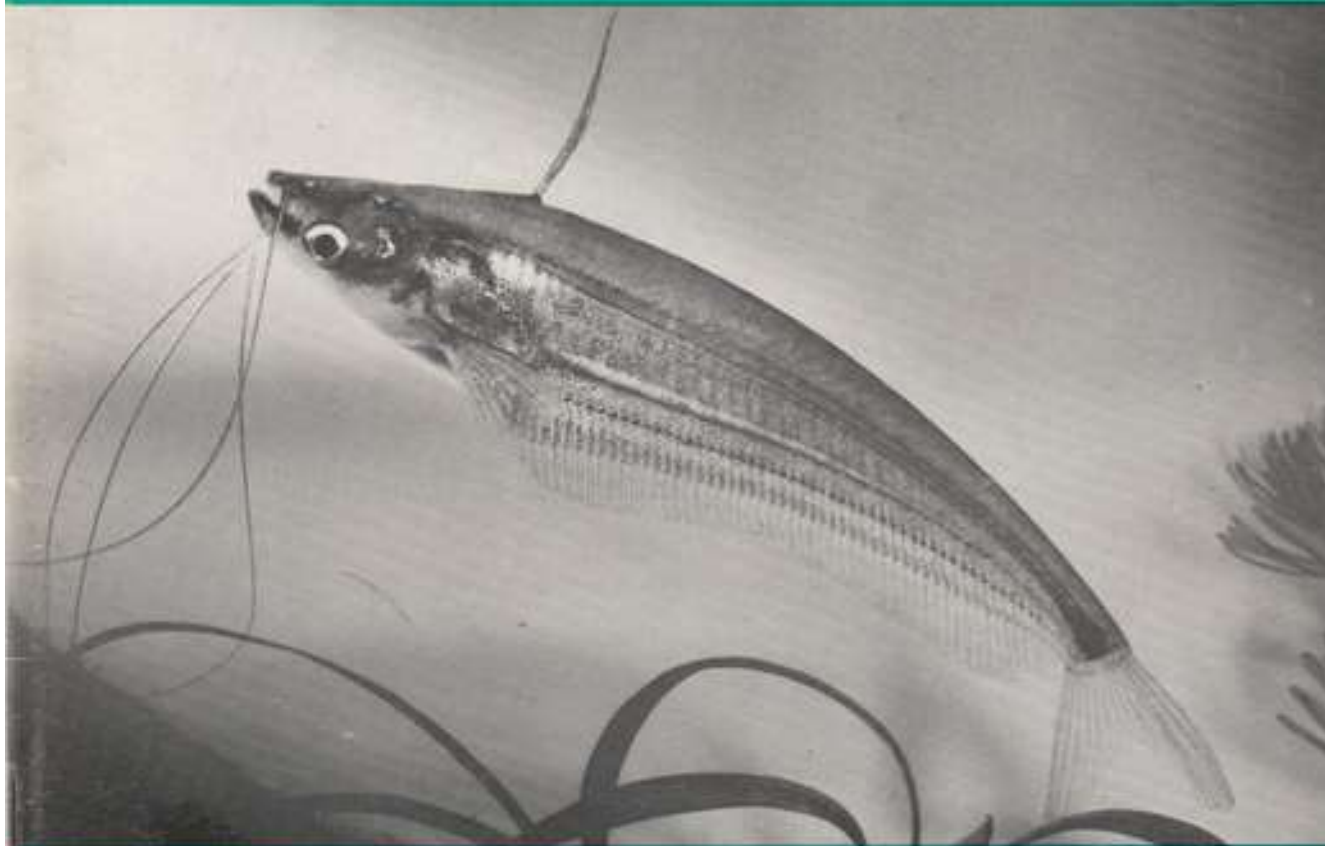
APRIL 1972

15p

Pet Fish

monthly

The PRACTICAL FISHKEEPING MAGAZINE



Contents include:

An Annual Fish from Peru

All-Glass Aquaria

Breeding in Bare Tanks

Tropical Marine Project

Collecting in the Cameroons

Water Gardens with Liners

Sea Catfishes

Queries Answered etc.

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Feeding Table
bylist covering
of Fish
16th Edition
Tetra

Scientific Name	English Name	O	C	T	F	A	L	S	M	B	Average to Adult	Minimum	Maximum	Temperature required °F	Grade of Care required
Anotostomus anostomus	Red Headstander										4	30	80	75-80	0
Aphyocorax nana	Bloodfin										2	20	60	75-80	0
Caracalla strigata	Marble Halibut										1 1/2	24	60	75-80	0
Charodon axelrodi	Marble Characin										1 1/2	20	60	75-80	0
Copeina arnoldi	Washing Tetra										2 1/2	20	60	75-80	0
Corynopoma risei	Half Characin										2 1/2	20	60	75-80	0
Gymnocorymbus ternetzi	Black Tetra										1 1/2	20	60	75-80	0
Hasemania marginata	Red Characin										1 1/2	16	60	75-80	0
Hemigrammus caudovittatus	Black Headstander										2 1/2	24	60	75-80	0
- erythrozonus	Glossy Head Tetra										1 1/2	18	60	75-80	0
- ocellifer	Head and Tail Light										1 1/2	20	60	75-80	0
- pulcher	Garnet Tetra										1 1/2	20	60	75-80	0
- rhodostomus	Rainbow-Nosed Tetra										1 1/2	30	60	75-80	0
Hypseobrycon callistus	Jewel Tetra										1 1/2	20	60	75-80	0
- hamneus	Tetra from Rio										1 1/2	16	60	75-80	0
- georgettae	Georgetti Tetra										1 1/2	18	60	75-80	0
- grahami	Red Gold Dot Tetra										1 1/2	18	60	75-80	0
- heterorhabdus	Flag Tetra										1 1/2	18	60	75-80	0
- ornatus	Ornate Tetra										1 1/2	20	60	75-80	0
- puzosianus	Lemon Tetra										1 1/2	20	60	75-80	0
- rubrolineatus	Cherry Tetra										2	20	60	75-80	0
- lineatus	Black-Lined Tetra										2	20	60	75-80	0
- phantasma	Phantom Tetra										1 1/2	18	60	75-80	0
- glaucus	Glass Tetra										3/4	30	60	75-80	0
- diamond	Diamond Tetra										2 1/2	24	60	75-80	0
- ruber	Red-Eyed Tetra										2 1/2	24	60	75-80	0
- lineatus	Red-Tailed Pencil										1 1/2	18	60	75-80	0
- brown	Brown Pencilfish										1 1/2	18	60	75-80	0
- dwarf	Dwarf Pencilfish										1 1/2	18	60	75-80	0
- neon	Neon Tetra										1 1/2	18	60	75-80	0
- congo	Congo Tetra										1 1/2	18	60	75-80	0

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Comments and Quotes

- Two aquatic surveys
- Research into fish diseases
- Photography at shows
- New oceanarium for London

Numbers and Quality

THE lack of available statistics in connection with the aquatic hobby is a continuing source of amazement to the non-afficionado. Prospective authors, journalists, manufacturers, advertisers and budding social science graduates regularly come to us with requests for exact figures for fishes kept, bred, sold, imported, for details of clubs, club members, proportion of adults to children, female to male enthusiasts and so on. The truthful answer has usually to be that in detail so many of these statistics are just not available. All the more to be welcomed therefore by the statistically minded are the results of two recent surveys published by the Federation of British Aquatic Societies in their Bulletin.

Mr Frank Tomkins, chairman of the FBAS Judges and Standards Committee, undertook a most interesting survey of the facts and figures gleaned from 19 Open Shows held in 1971. The largest number of single fish entries were cichlids (classes D, Da, Db)—678, (a fact that Mr Jim Burtles, secretary of the new British Cichlid Association, has already hastened to point out to us). Characins (classes C, Ca) followed closely with 671 entries, barbs came next with 516 entries and labyrinths were fourth (classes E and Ea) with 512.

The second survey, conducted by Tetramin (U.K.) Ltd., was an analysis of the replies to their questionnaire sent in by nearly 80 societies. This also showed that cichlids topped the list of fishes

kept, followed by livebearers, carps, characins and labyrinths and with mailed catfishes a distant sixth.

Another aspect assessed in the FBAS survey was the quality of fishes at the Shows studied. Mr Tomkins collected the detailed opinions of the various judges for the Shows and applied a points system for evaluation: excellent, 10; very good, 9; good, 7; average, 5; fair, 3; poor, 2; very poor, 1. The figures finally arrived at for quality were the averages of all the above assessments for the Shows.

The results show that the class consistently maintaining the highest quality throughout the year was class H, *Corydoras*, with class D, Cichlids, as the next best single class. Only two single fish livebearer classes were average or above (5 points). Mr Tomkins, commenting on these findings, writes: 'What has happened to those line-bred fishes developed by man during the past? I feel that it is a very sad comment on the present-day aquarist in general; it shows that he prefers to buy natural fish rather than to breed the domesticated varieties'.

Although undoubtedly the simplest method of collecting mass information is through the co-operation of aquarists' societies, it does have to be remembered that since these constitute a rather specialised sample the results do not necessarily give a picture of Mr Average Fishkeeper. For example, we wonder how dealers would rate cichlids in the sales league? But by all means let's see some more fact-collecting about our hobby—facts make such a refreshing change from opinions.

Fish Diseases

A SOMEWHAT gloomy picture of the lack of technical interest in some of the fishkeeper's problems, particularly in the field of fish pathology, was painted in these columns a couple of issues back. Since then it has been encouraging to receive news of ventures in this country that aquarists could regard as steps to advance knowledge in this field. One item is the announcement of a special grant by the Nuffield Foundation of £76,000 to the University of Stirling to establish a Unit of Aquatic Pathobiology there. The University already provides teaching and research facilities in hydrobiology. A Fish Diseases Research Unit of the Ministry of Agriculture, Fisheries and Food at Weymouth is equipped and nearly ready to go into action; it is thought to be the first laboratory in Europe to be specially fitted out for the study of fish diseases. The Zoological Society of London is also developing a Unit of Fish Pathology.

There is no doubt that the work of these centres, although in its applied approach primarily intended to benefit economic fisheries and wealthy angling interests, should produce much that will be of use by the aquarium hobbyist as well.

If the aquarium fish trade could only make its problems known in the right quarters there might be hope that the urgent need of a diagnostic service for the diseases of fishes and advances in aquarium therapeutics would come to be met. As we noted in our earlier Comment, we think that the benefits of co-operation could be mutual for the trade and the fish research scientists.

Photography at Shows

HOW diligent should show secretaries be in stopping the photography of fishes on the benches before judging? A call for stricter enforcement of the ban of pre-judging photography at the Belle Vue British Aquarists' Festival has been made, and in the Newsletter of the Federation of Northern Aquarium Societies two instances of 'near-disasters' that led to the introduction of the ban are recalled. Use of photoflood lighting on one occasion raised tank water temperature to a dangerously high level and at another time 'a large barb was sent hurtling round its tank when a flash photograph was taken'. It is unusual for fishes to react nervously to electronic flash but—as the FNAS writer asks of photographers:

'wouldn't you be annoyed if some idiot started your fish while taking a picture so that it split a fin or lost a couple of scales and thus dropped those few points that make all the difference between a good fish and a champion?'

Most people, we are sure, would react understandingly if the possible results of their actions were pointed out to them, although we can recall seeing some ugly scenes at a large cage birds show when stewards tried to control photography by persistent visitors. The comfort and well-being of the animal being exhibited is really the prime consideration and in all matters touching this the owner and the show secretary should speak with one voice.

New London Oceanarium

AN 'oceanarium' is being planned for the Cutty Sark Gardens, Greenwich, as part of the development of the district as a tourist area. It will include modern aquaria, a small dolphin pool and a cafeteria and will provide for a riverside walkway. It is hoped to open the oceanarium by Easter next year when GLC landscaping and other work should be complete.—EVENING NEWS.



LETTERS

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

Perplexing Cat

IS anyone able to give me some explanation of the behaviour of one *Corydoras julii* catfish? Some months ago I purchased two small tiger barbs and introduced them into my community tank, which contained two red swords, one red-finned shark, two keyholes, one flying fox and one *C. julii*.

I sat back to see how my new tiger barbs settled in their new surroundings, when I noticed that the *C. julii* started to chase the female barb around the tank at great speed. At this stage I took no notice—the only thing I could put it down to was the fact that the female barb must have given the catfish a nip, which they are quite fond of doing. With this thought in mind I took no further notice of

the incident, but what took place next day is as follows: the *julii* cat showed all signs of breeding behaviour. I was fascinated by this as I have never heard or seen anything like it before. The cat was trying to mate with the female tiger barb. However, at last this behaviour stopped and I had a good laugh at the whole affair.

I wish I could say that that was the last of the incident, but alas, no, it was not. Last week I visited my local dealers to purchase two orange chromides. I was in luck—the dealer had a tank full and I bought two young specimens. I made my way home, feeling very pleased with these young

Continued on page 561

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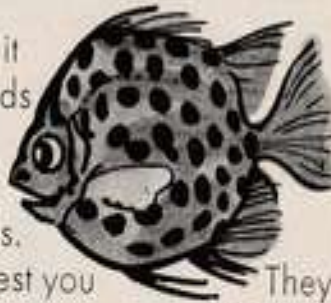
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LETTERS

Continued from 554

chromides. I introduced them to my set-up and to my surprise the *juli* cat made straight for the female orange chromide and started acting the very same way as he had done with the tiger barb, only this time his courtship display was much more impressive—the fanning of the caudal was quite something to watch and his repeated efforts trying to impress her were really funny.

At first the orange chromide took very little notice, only trying to avoid the catfish every time he came close. But as time elapsed the courtship got even stronger. The orange chromide is showing breeding colours and seems to take more notice of the cat's intentions to impress her. What happens next is anybody's guess—at this moment both orange chromide and *juli* cat seem to huddle together and go through more courtship rituals. I would welcome anybody's views on this and shall be very eager to hear what readers say.

Long Ashton, Bristol

G. L. ELVINS

Green Spiders Underwater

BY writing this letter I hope that it may be useful to other aquarists. I had an idea of acclimatizing house plants in the home aquarium. As you will probably realise, I had little success with most of them until I tried the common 'spider' plant. I acclimatized this by gradually sinking the plant into water at approximately 75°F over a period of 7 months; then I rooted this in an aquarium for 3 months, in which it has been growing every since.

It seems to grow in a temperature range of 65-80°F with a great variation of water condition. Fishes such as angels, barbs and tetras seem to live quite happily with the plant. It seems the only conditions that this plant needs are plenty of room and between 8 and 10 hours of light a day. Peat etc. is not necessary, just plenty of fish!

Roadside Est., Leicester

M. J. BENTLEY

Cichlid Specialists

A GROWING number of people are taking a serious interest in the cichlid family of fishes and the British Cichlid Association has been formed to enable all these people to get into touch with those of the same inclination.

It is the intention of the BCA to promote interest in these fishes, gathering and disseminating information about them. With the recent opening

up of the Rift Valley Lakes to the aquarist the current cichlid scene is quite exciting but often mystifying to the uninitiated. By means of a species maintenance programme a number of cichlids will be carefully observed by members and their observations collated to provide valuable reference data. Other aspects of the Association are expected to include a panel of speakers, a library of visual aids to assist members in preparation of lectures etc., a regular magazine (the Cichlid Clarion) covering all aspects of cichlid keeping and various regional activities.

Anyone from beginner to expert will be welcomed and should get value for his £1.50. Application forms are available from me at the address below. Stamped addressed envelope please—my postal bill is enormous.

Nicosia, Cyprus Road,
Burgess Hill, Sussex

JIM BURTLES
Secretary, BCA

Dangerous Dependency

I MUST disagree with the comments made by Mr M. Furniss in his letter on the subject of the use of air pumps in tanks (PFM, March). If a beginner wishes to use an air pump then I would say 'go ahead', but I have never used an air pump in my community tank and I have had no problems with fish or plant growth. In fact, I think Mr Furniss's remark that '... to avoid the common, and perhaps expensive, mistake of overcrowding a quiet pump is a sound investment' is positively dangerous. A pump should never be used to allow more fish to be kept in a tank than the tank space allows without a pump. I should have thought the recent power cuts would have underlined this—more fish are lost through the pumps being out of action than are lost through heaters being out of action in a power cut.

Folkestone, Kent

D. BROOME

Brackish Mollies

THE statement by Mr M. Furniss in his letter (PFM, February) on the article by Mr F. W. Coles that 'it is doubtful whether this (*Poecilia sphenops*) is a brackish water fish' is, I think, misleading. According to Kurt Jacobs in his book LIVEBEARING AQUARIUM FISHES, *Poecilia sphenops* comes from 'rivers, streams, lakes. Especially in estuarine brackish water'. The *Poecilia velifera* is listed as having a habitat 'in fresh and brackish waters, in lagoons, estuaries and streams near the coast'. So that Mr Coles' statement that 'In Nature mollies are found in both brackish and completely fresh water' would appear to be quite correct whether he is talking about *P. sphenops* or *P. velifera*.

Stratford, E. 15

S. MARLEY

Come Muck-Spreading Time

IT is a pity that Mr M. Furniss in his letter (PFM, March) seeking to criticise an article should perpetuate a common myth in stating that 'mulm should be available for the plants to convert to food'. Since the mulm is a particulate and insoluble material it certainly cannot be utilised by the higher plants. Some of it may be useful as soluble products formed after bacterial action on the mulm, but any such consideration overlooks the fact that the value as foods to aquatic plants of the dissolved waste products in fish urine (invisible plant fertilisers in the aquarium) far outweighs any contribution to feeding that the faecal droppings

of fish, accumulating as visible mulm, can make. Stable or byre manure is good fertiliser for land plants because it is rich in animal urine; the insoluble matter in dung also happens to be valuable for land use, however, because of its water-holding property and ability to improve the physical state of soil. These aspects obviously do not apply to the bottom medium of an aquarium, which requires neither manuring nor moistening as submerged water plants do not go short of water and do not depend solely on their roots for feeding. No, Mr Furniss, there really is no need for muck-spreading in fish tanks.

Woking, Surrey

P. TURNER

Meetings and Changes of Officers

BISHOPS CLEEVE A.S. New venue: The Labour Club, Royal Well Bus Station, Royal Crecom, Cheltenham. First Wednesday of month, 7.30 p.m.

BRIGHTON & SOUTHERN A.S. Chairman, Mr A. Dawes; secretary, Mr C. P. Corbin (54 Marlborough Drive, Burgess Hill, Sussex RH13 6LU); treasurer, Mr C. W. Harris. Meetings: general meetings to be held on first Wednesday in month, 8.0 p.m.; N & T Club, Franklin Road, Farnham, Sussex.

BRITISH CICHLID ASSOCIATION. Secretary, Mr Jim Bartles (Nicosia, Cyprus Road, Burgess Hill, Sussex).

CHESTERFIELD & D. A.S. Change of secretary to Mr B. Kerry, 121 Boythorpe Road, Chesterfield.

CYMRU NATIONAL A.S. Chairman, Mr R. W. Wagg (Llanelli Major); treasurer, Mr G. Thomas (Cardiff); secretary, Mr R. Richards (13 Sherwood Street, Llanystydla, Rhondda, Glam.); committee, Mr C. Harding (Cardiff), Mr C. Lewis (Newport), Mr F. Jenkins (Port Talbot), Mr J. Allan (Penarth); show manager, Mr B. Gorwill (Cardiff).

DIDCOT & D. A.S. Meetings: first and third Friday of month, 8 p.m., Easo Research Centre (A.34 near Abingdon).

DORCHESTER & D. A.S. Meetings: second Thursday of month, 7.30 p.m., Dorchester Junior School, Duntzen Road, Dorchester, Dorset.

FEDERATION OF NORTHERN AQUARIUM SOCIETIES. New secretary: Mr Ian Wood (8 Henry Close, Bury, Lancs.; phone 061-764 8251).

HALF MOON A.S. New society. Secretary, Mr K. Goswamy, 6 Robson Street, Haverton Hill, Billingham, Teesside.

HAMPSTEAD & D. A.S. Chairman, Mr R. Pyle; vice-chairman, Mrs E. Hickey; secretary, Mrs V. Beck (1042 Harmond Street, London, N.W.1); treasurer, Mr D. Moore; show secretary, Mr E. Harvey; assistant, Mr J. McShane; FRAS delegate, Mr E. Harvey. Meetings: Bickton Hall, Alcock Road, Kenaham, London, N.W.5.

HARLOW A.S. Chairman, Mr B. Salisbury; vice-chairman, Mr J. Duncanson; secretary, Mr E. Kersidge (74 Glablands, Harlow, Essex); treasurer, Mr L. Harris; show secretary, Mr P. Mendick; P.R.O., Mr P. Allen. Meetings: fortnightly, 8.0 p.m., Petter Street Community Association Centre.

HUCKNALL & BULWELL A.S. President,

Mr E. Smith; chairman, Mr R. Widdowson; secretary, Mrs B. Richardson, 11 Newlyn Drive, Western Blvd., Nottingham, NG8 5GU; assistant, Mrs A. Wright; treasurer, Mr B. Widdowson; show secretary, Mr G. Swainwick (74 Westleigh Road, Strifly); fund raiser, Mrs Duffield; social secretary, Mr Haylock; librarian, Mr J. Buck.

LOUGHBOROUGH & D. A.S. New secretary: Mr D. Keeley (9 Cathedral Avenue, Loughborough, Leics; phone 07944).

MERSEYSIDE A.S. President, Mr R. E. Legge; vice-president, Mr M. D. Murphy; chairman, Mr F. Mulla; vice-chairman, Mr E. Seymour; secretary, Mr B. Hill (1222 Hooghedge Hey, Casil Farm, Liverpool L18 8RY); treasurer, Mr K. Parkes; show secretary, Mr W. Birch; librarian, Mr J. Druce; editor, Mrs V. Puffin (Museum Terrace Towers, Merseyside Athletic and Social Club, 3 Richmond Terrace, off Brook Road, Liverpool 6).

MID-HERTS A.S. President, Mr T. Timms; chairman, Mr C. S. A. Withers; secretary, Mr D. V. Larder (44 Old Park Road, Hitchin, Herts.); treasurer, Mr P. Bird.

NEWS reaches us of the AQUARIUM OF TERRARIUM SOCIETY OF QUEENSLAND, Australia. Mr Ken McCall writes: 'Our Society is still going strong. We have a total membership of around 100 and a separate marine group that has 40 regulars. We still meet on the second and fourth Tuesdays with the marine group meeting on the third Tuesday of the month. The Society took part in the hobby display last November called Hobby Tempo '71. This was a display by many clubs including model train, aircraft, painting, pottery, engineering etc. There is a prize voted by the public for the best display and our Society won it for the second year in succession. Over 10,000 paid to enter the exhibition, all monies going to charity. Visitors are always welcome at our club, and this applies especially to people who have migrated out from England. They can contact our president, Mr Bob Hooley, at 68 Stafford Street, East Brisbane 4169, for full particulars.'

show secretary, Mr A. Lash; Open Show manager, Mr C. S. A. Withers (11 Charnwood Road, St Albans, Herts.). Meetings: second and fourth Friday of month, 8.0 p.m., Trinity Church Furlow, Victoria Street, St. Albans, Herts.

PORTSMOUTH A.S. Chairman, Mr J. Lambell; secretary, Mrs T. Harvey (128 London Road, Waterlooville, Hants.); treasurer, Mr A. Farnbridge (P.R.O., Mr W. J. Wheeler (2 Beechbury Road, Eastney, Portsmouth, Hants, PO4 6Y)). Meetings: first and third Wednesday of month, 8.0 p.m., Portsmouth Community Centre, Twyford Avenue, Mile End, Portsmouth.

SOUTH PARK AQUATIC (STUDY) SOCIETY. Chairman, Mr R. E. Duffley; secretary, Mrs M. Dudley (161 South Park Road, Wimbledon, London, S.W.19; phone 01-542 5562); treasurer, Mr F. Glyn; show secretary, Mr J. Street. Meetings: second Monday of month, 8.0 p.m., Campion Hall, Campion Road, Wimbledon, S.W.19.

SOUTH SHIELDS A.S. New Society: Chairman, Mr I. Southall; secretary, Mr Robert Clark-Charlton (172 South Eldon Street, South Shields, Co. Durham). Meetings: fortnightly, the Neptune Hotel, South Shields.

SOUTHAMPTON & D. A.S. President, Mr J. Fish; chairman, Mr D. Jones; vice-chairman, Mr I. Wynn; secretary, Mr N. L. Jennings (35 Manor Farm Road, Botmore Park, Southampton, SO2 4NU); treasurer, Mrs J. Vincent; show secretary, Mr M. Mansbridge (18 Wakefield Road, Botmore, Southampton).

STEVENAGE A.S. Secretary, Mrs G. Matthews (87 Mollabury Way, Stevenage, Herts.). Meetings: first Wednesday of month, 8.0 p.m., Bedwell Community Centre, Stevenage, Herts. New members welcome.

SUFFOLK A. & P.A. New venue: second Monday of month at the YMCA Hall, Norwich Road, Ipswich.

TOTTENHAM & D. A.S. Secretary, Mr T. Tillyer (15 Talbot Road, Tottenham, London, N.17; phone 01-841 1511) show secretary, Mr K. Massey (74 Westwood Road, South Chingford, London, E.4; 01-827 7513).

UNITED A.S. New Society. Meetings: every other Thursday, 35 Dutton Road, Leyton, London, E.15, 8.0 p.m. For details: Mr S. G. Caswell (21 Dutton Road, Leyton, London, E.15; 01-595 8404).

WELBECK A.S. New Society: Secretary, Mrs J. E. Atypich (12 Lower Oxford Street, Castleford, Yorks., WF10 4AE). Meetings: third Wednesday of month, Royal British Legion Club, Welbeck Street, Castleford, 7.30 p.m.

For the rivulid fancier

An Annual Fish from Peru



Pterolebias peruensis Myers

By RUDOLPH ZUKAL

Photographs by the author

Translation by F. MARSH

AMONG the various types of rivulids that are found in the eastern part of the Loreto province of Peru can be found this egg-laying toothcarp. It has been known to the aquatic world since 1954 and is a slim, elegant, fish that reaches a size of 3-3½ in. The brown *Pterolebias peruensis* or 'little veiled carp' as it is known to German aquarists has reddish and greenish hues. The male's body shows dark bars particularly towards its rear and its anal fin. The male's dorsal, anal and caudal fins are also striped. The female has a rounder body and is also beautifully, but not so intensively, coloured; her small caudal fin is dark-bordered.

The fish should be kept at a temperature not lower than 75°F (24°C). They may be mixed with other peace-loving toothcarps but it is better to keep them only with their own kind. They are at their best when kept in a medium-sized tank filled with ordinary tap water and prepared with a soft bottom medium. Although some authorities suggest that a temperature below 68°F (20°C) does not harm them I would warn against keeping these fish 'cold'. Water that is too soft is also unsuitable for them. So, in order that all their requirements can be provided for, it is a good idea to set out half the tank with a sandy base and plant it normally and to prepare the other half of the tank with a layer of peat. The sand and peat can be separated by a narrow glass strip. A few floating plants and daylight or light from above suit this fish very well.



Accompanied by the male (lower fish) the female appears to be searching for a suitable site for the spawning. This search began after a period of courtship display by the male.

Propagation is fairly simple as the fish spawn frequently and willingly. Their spawning behaviour closely resembles that of the *Cyrtopoma* species. The eggs are laid in the soft base where, in Nature, they will survive the dry season, as the tough egg-hulls prevent the embryos from drying out. Nature has so fashioned these fish that they are sexually mature at 3 months and their life span rarely exceeds 10 months.

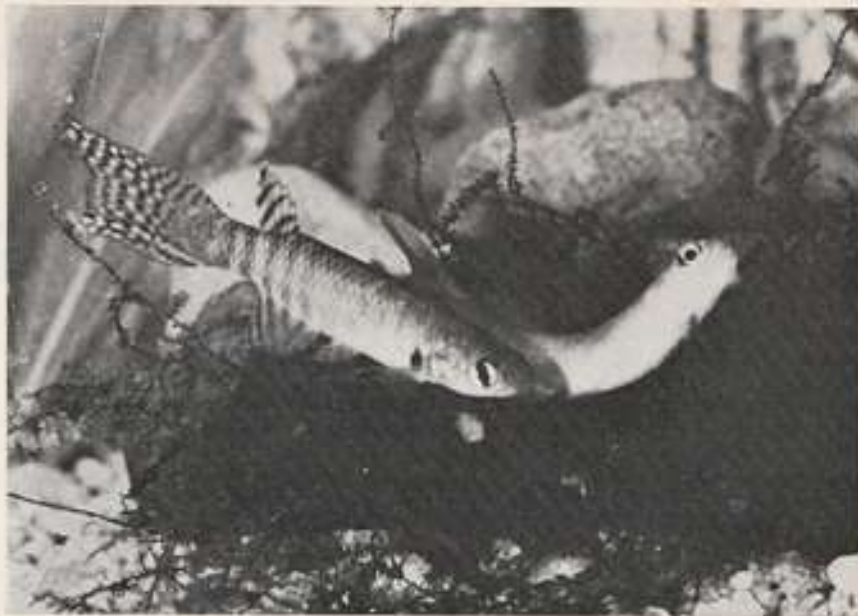
The dry season in their natural habitat lasts a

fairly long time, so it is necessary to keep the peat containing the eggs for a period of 3 months; it should be kept damp in something like a plastic box at a temperature of 72-75° F (22-24° C). After this time, if the eggs are sprinkled with water from the aquarium the fry hatch within a few hours. The eggs can withstand even longer 'dry seasons' than the suggested 3 months and can be hatched out after this time, but they will not hatch if the preservation time is shortened.



Together, in a spawning dive, the pair swim to the tank bottom.

Within a compact mass of plant on the tank bottom the male and female press their sides together and the eggs are expelled. The female's body is curved in an arc



When these rivulids spawn, whether it be in peat or sand, the adults disappear into the substrate so, as I wished to photograph them, I put them into a tank containing Java moss. First of all the male displayed before the female, swimming with jerky movements and alternately spreading and closing his fins. Courting behaviour started when he swam underneath her and tried to reach her side. Then he would try to entice her to a spawning place. In the end the female herself started to

search for a spawning place and the male immediately reacted to this. He turned to the female and the spawning began. Together the fish disappeared into the bottom of the tank; there they pressed together and the eggs were expelled. The male then left the spawning place but as soon as he started to display again the female pursued him.

Once the eggs are hatched, the fry must be supplied with live food of a suitable size as, like the adult fish, they are interested only in live food.



As the eggs are extruded the male twists away from the spawning site. He later commenced his display again before a new spawning dive into the moss

CLIFF HARRISON discusses

the modern technique for making

All-Glass Aquaria

THE popularity of all-glass aquaria has been established for almost as long as fishkeeping itself, for there is much truth in the view that the beauty of fishes is seeing them encased in a transparent 'cube' of water. However, although rusty angle-iron frames certainly detracted from the aesthetic appeal, the early all-glass aquaria, cast in one piece like a rectangular goldfish bowl, had perhaps even more disadvantages.

Distortions in the glass gave a very poor view of the inhabitants. Many were of the wrong proportions (very tall for their base area—the worst were those containers salvaged from use as old-fashioned accumulators). A small chip or crack in such moulded all-glass tanks could unexpectedly spread and cause the tank's contents to be deposited over the floor.

In the late 1960s some hobbyists experimented with epoxy-resin adhesives—generally accepted as the strongest in the world—to glue sheets of glass together to form aquaria. Unfortunately this was not found to be particularly successful, since minute contractions and expansions of the aquarium glass, caused by temperature changes, eventually led to a breakdown in the bond between the glass and this particularly brittle adhesive. Other tests also indicated that epoxy-resin might not be completely inert in some types of water.

It was about this time that the first supplies of silicone rubber sealant, used in various forms in the building industry since the 1950s, were made available to hobbyists in this country by Dow Corning of the United States. Initially there was some confusion with a similar product they market as a 'bathtub caulk', but which contained a strong fungicide found to be very toxic to fish life. Subsequently a similar safe sealant for aquatic use, produced by L.C.I. Ltd., was marketed by a number of British Companies.

For those unfamiliar with silicone rubber sealant, the initial appearance of the product along with the name sealant, is quite misleading; after the curing time of some 48 hours, it is a soft, flexible substance which retains these qualities indefinitely even in a temperature range of -50°C to $+200^{\circ}\text{C}$

(twice the boiling point of water). It can be easily cut with a razor blade or sharp knife, and yet, when used correctly to construct an aquarium, it will withstand almost any amount of strain or pressure, and even the strongest of glass will split before the joint gives.

The strength of silicone rubber comes from the way in which it bonds chemically with the silica in glass (and a number of other substances). To ensure a good bond, the areas to be joined must be cleaned with a solvent that leaves no residue (Thawpit or pure turpentine are ideal) and then dried thoroughly with a soft paper tissue.

In addition to completely frameless aquaria, availability of the sealant has also led to the professional fabrication of tanks in which the frame is primarily ornamental and imparts little strength or rigidity to the unit: typical examples on the market utilise the attractive qualities of anodised aluminium or coloured plastic to encase a watertight glass box.

Quite apart from the obvious appeal, in many cases, of a frameless aquarium there are a number of further advantages which account for the present level of interest in silicone rubber. Aquaria of almost any size and shape may be constructed without the long wait and high cost incurred in the past with angle-iron frames ordered to special design. Such all-glass tanks are often less expensive than a comparable framed tank, and do not rust or deteriorate in appearance over the years.

Just a note or two of caution, though: the silicone rubber does discolour if certain substances, such as Methylene Blue, are present in the water; although this does not fade for several months no harm is done to the strength of the bond. And if you are using a scraper incorporating a razor blade to clean the inside glass, make sure it does not come into contact with the sealant: the best idea is to use a new, non-metallic scouring pad for this job (one that is not tainted with soap, detergent or any other household chemical, of course).

Next month: Practical instructions for making all-glass tanks.

Collecting in the CAMEROON

By
**Dr ALFRED C.
 RADD**
 and
**GEORGE
 CATTANACH**



One of the authors (G.C., left) is seen with another member of the party examining a stream south of Kribi

At last our Douglas DC8 of Air Afrique rolled to a standstill in the Douala night, cabin doors opened and the hot wet tropical air of Cameroon enveloped us. Certainly some of the passengers from the deep-freeze European winter would find difficulty in adjusting themselves to this 'greenhouse type' climate. Two hours later found us in a rather dilapidated looking Douglas DC3 being over the equatorial evergreen rain forests. Occasionally white tufts of cloud below us broke this green velvet carpet adorned with uncountable silver rivers and streams some 3000 feet below. In a hole in this green carpet, which was a jungle clearing and no more, we landed at Kribi.

Our first collecting trip was to two small streams from the River Kribé drainage; this proved successful and very interesting. The streams and many of the flat coastal area of the East Cameroon are all of the soft water type. We measured total hardness around 0.5°DH and electric conductivity from 15 to 30 micro-mhos/cm², water temperature being around 25°C. Through the small buffering capacity of these waters the

pH value is always in the acid zone, with readings between 5.2 and 5.9. Humus and tannin from the decaying vegetation gives these clear streams a colouring from light yellow to peaty brown. One becomes a little excited and one's pulse beats faster at the sight of the fish life here. After the first blind draws with our hand-nets under the heavy vegetation lunging into the stream and through the thick blanket of leaves on the stream bed, our first orange-yellow finned *Aplochelil sexfasciatus* and *Aphyssonion bistratum* wriggled before our eyes.

The males of *Aphyssonion abd.* showing a beautiful wine-red and yellow markings in the vertical fins, a few *Palmatochromis lateri* and *Palmatochromis tanzaniae* also landed in our nets, together with *Neolebias anozogi*, some Clariidae and *Ctenopoma* species. Later we also managed to catch some *Procatopus nototaenia*, the greenish blue sides of the body contrasting vividly with the orange-red back and fins of these shoaling fish.

The next day we visited some of the streams south of Kribi, some

running into the River Lobe and others direct into the sea. Here the *sexfasciatus* and *bistratum* differed slightly from those in the Kribé area, being generally paler and running into more green-yellowish tones. In a swamp area we were fortunate in catching a number of *Aplochelil grubosi*, this rather smaller *Aplochelil* is immediately recognisable by the luminous green-blue iris of the eye. Large shoals of *Nannosthiops univittatus* were found in the quieter area of one of the streams. Water readings taken in these streams were very similar to those of the previous day.

We took the opportunity of a free lift to Bipindi (about 45 miles inland in a north-easterly direction) and tried our luck there. Here near the edge of the higher lying inland plateau—where an entirely different killifish fauna from that in the coastal area lives—we found almost the same conditions as on the coast; the fish here were practically identical with what we had until now caught in the Kribi area. After a week we had investigated nearly every large

and small river in the area around the hotel, and in this time had found a number of other fishes, which for the aquarist were practically unknown, i.e. *Barbus callipterus*, *B. holotaenia* and a beautiful small barb, which Dr D. Thys van den Audenaerde, ichthyologist from the Tervuren Museum in Belgium, recently described as *Raddabarbuis camerunensis*, a short-nosed mosomyrid, a spiny eel (*Mastomelanus*) and various gobies and eleotrids.

True aquatic plants are seldom found in this area, but in sunny patches on quite noticeably flowing parts in the larger streams lilies with their large leaves cover most of the surface. Many fishes, especially our killies, find refuge under these leaves. In brooks and streams with a stronger current one often finds the hooked lily (*Cyrtos suttoni*) shooting their 4-5 ft.-long blister edged leaves with a large star-like white flower over the water. On the stones around which the streams raged or which helped to build the banks were large areas of spear leaves (*Amobium* sp.). These were always found emergent, sending their forked roots and rhizome into the water. Partly over and under the water surface grew the fern *Bolbitis kandelarii*. This decorative plant was collected in 1970 and has since been cultivated in our aquaria. Also found here and in swampy areas is the

water mimosa (*Neptunia alvareza*).

In the business centre of the Cameroons, Douala, we managed after a lengthy search and longer transactions to hire a fairly new Simca 1100. Our first excursion after our return to Kribi took us on the new road to Campo, which had recently been opened to traffic. This town is on the border of Equatorial Guinea on the Atlantic coast. During this trip we discovered the most beautiful biotopes, and more often only a few yards separated the various waters we explored, varying from trickles to larger rivers. This whole area is one mass of wonderful waters.

We had heard from the hotel personnel that there was a small village of pygmies in this area and we intended visiting them. A small path broke its way into the deep jungle, and a few minutes later we were soaked with sweat as if from a sauna bath. There is little chance for the water-saturated air here to disperse owing to the thick blanket of leaves on the giant trees overhead. Accompanied by the melodic cries of hundreds of invisible birds we wandered through rivulets and climbed over fallen trees.

Suddenly, after 20 minutes marching, apparently from nowhere appeared two small men armed with spears, clothed only in long loin cloths. We assumed that they were

hunters from the pygmy clan we intended visiting and surely enough a few minutes later we arrived at the collection of huts—wooden poles with a covering of palm leaves. This was the village of the Bagielle clan with a population of about 30 souls. We had brought tobacco, salt and sugar as presents for them. They lived their primitive way of life as they had for thousands of years, hunting and collecting roots and the fruits of the rain forests.

After watching an impromptu dance put on in our honour, accompanied by the singing and clapping of all clan members, we left the pygmies and turned our attention once more to the streams and river systems. In this area as in the whole of the coastal area of south-east Cameroon the water readings were similar to those previously taken in the Kribi area. We found only a few fishes that were new to us: *Hemichromis fuscatus*, a barb and a further goby.

The chain ferry clanked its way over the wide, quiet, smooth flowing Lobé, on the banks of which loomed the giant trees of the tropical rain forest, building impassable green walls, as far as the eye could see, tall, but beautifully untouched Nature.

How much longer will this wonderful unforgettable territory remain free from the technical 'blessings' of today's overpowering civilisation!

Six Characters in Search of a Caption



Six characters who offer you a chance to win a book. To the reader of PFM who in the opinion of the Editor supplies the best title or caption to the picture a copy of THE PICTORIAL ENCYCLOPAEDIA OF FISHES by S. Frank will be sent. Closing date is 31st May 1972 and no correspondence will be entered into concerning entries sent in.

(Photograph taken at SCAN fish houses by Cliff Harrison.)



Personal COMMENT by ARPEE

OF all the attributes of a well set-up aquarium, I suppose that the quality of water is one of the most important factors. I am not referring here to the pH or the DH but to the mere appearance of it. Some aquarists manage to achieve a mixture which could in other circumstances be mistaken for vegetable soup, whilst others have the facility of maintaining a gin-like liquid that never seems to change from summer to winter, and all without aeration or filtration. I have always aimed at the latter state of affairs, if only for the reason that I like to see my fishes sometimes, but I agree that intriguing effects can be obtained by just letting the algae grow and cutting little windows in it when you wish to become acquainted with the tank's contents. The sudden appearance of an adult firemouth's head at such peepholes can, however, be quite alarming, and the practice is not therefore recommended to the sensitive.

There are times during the year when I am compelled to depart from such standards of visual purity, and this happens when there are dry spells in this part of the country. Since I top up my tanks from a rainwater tank, which derives its input from the roof down-pipe, I am often forced to use progressively greener water than I would have wished until the weather breaks again. It is at times like this that I hope that any visitors will confine their attentions to the garden, the weather or almost anything but aquaria. Fishkeepers are most unlikely to believe my story that this only happens about three times a year and non-fishkeepers try hard not to look at what they sincerely believe to be containers of stagnant and highly dangerous water.

Two factors incline me toward continuing with the habit. The first is that my wife thinks it is a nice change from the crystalline normality, and secondly there is a firmly held view in some quarters that a really green water bath does a power of good to a fish. I think there may be something in this latter view because my fishes often look distinctly well-to-do at such times: certainly they have never resented the treatment. The free-swimming algae may perhaps remind them of their infancy and give them the same satisfaction that we adults derive every so often from a surrepti-

tious nibble at Dolly Mixture. The introduction of freshly fallen rain, particularly after a thunderstorm, seems also to give great satisfaction, and I usually make a point of servicing my aquaria shortly after these heavier downpours.

Fishkeepers often bemoan their inability to get rainwater for their charges, and ask where they are to store it even if they can collect it. The favourite trick seems to be to lay plastic sheeting in convenient shallows in the garden or in between a few spare bricks on a balcony or in a back yard. Those very civilised plastic dustbins (praise be, they are noiseless, too!) can be turned into excellent reservoirs and, since they have a lid, encourage algal build-up rather less than my open-topped storage tank. All the same, leave off the lid sometimes and let the water green up a bit. You can be fairly certain that your fishes will appreciate it, and it might also appeal to your wife. If you can, incidentally, think up any convincing stories to account for the state of your tanks to those visitors, I should be greatly interested to hear them.



In my early days of fishkeeping there were stern warnings about the consequences of allowing a dead fish to remain and decay in a tropical aquarium. Certainly I shall never forget the day when a tremendous swordtail passed away behind a large rock and generated thereby one of the most noxious situations imaginable. It nearly brought the end of my fishkeeping since my parents were then in a position to say what went. For some strange reason the like has not recurred until I lost two large angels a few months ago. Such a disaster must be expected to require immediate removal of the bodies and a careful look around the remaining occupants in case there is any evidence of disease that calls for treatment. In the case of old fish dying off there is usually nothing to be done apart from removal of the corpses; certainly they must on no account be left around as food for the survivors.

Often, though, when small fish die there is no evidence by the following morning to mark their passing, and one should not worry unduly if a neon, for example, dies and the corpse cannot be traced. Unless the tank is very small it is likely that the small amount of decomposition involved will not result in a major upset. If you keep a few of the smaller kuhli loaches you will find them first on the scene of any mortality and they could for this reason be regarded as a very cheap and sound investment, as they usually clear away most of the evidence of death. Other carnivorous species will do the same, but for me the kuhlis make the best morticians because they move

unobtrusively, silently and in a dignified fashion. Although we can dismiss some of the alarmism of yesteryear it is still wise to be on the lookout for impending fatalities. With new stock—and this should always be quarantined in special quarters—there should be no real problems since the tanks will usually be understocked anyway, in which case there will be a larger than usual pollution margin. (I am writing here for the amateur, not the trade, whose quarantine tanks will usually be full to overflowing—or non-existent.)

In established tanks one can often anticipate trouble by noting any notable change in habit of a particular fish. Most fishes have favourite 'patches' and are more often seen there than elsewhere, but if one suddenly takes up different night quarters, especially if low down in the tank, there may soon be food for the loaches. Another sinister sign is when a fish takes up position in the aerator stream and cannot maintain control of its movements

whilst in the vicinity. Some fish like danios will constantly bob in and out of the air bubbles, loving every moment of it, but it is when a fish unusually participates in this diversion that trouble may be expected.

These, then, apart from a general quietening down in demeanour, are the main signs of impending death in many of our aquarium fishes, and they quietly and we hope painlessly pass on. Where more alarming symptoms develop in old fish it is certainly kinder to destroy them than to leave them in undignified distress. In particular I think the worst way out must be the condition in which a specimen loses equilibrium and swims upside down or in circles. Old fish cannot take medication as many young ones can and it is pointless to try to bring about their recovery by the application of drugs. Better, then, to bring about quick release and to pay an immediate visit to your dealer in some way to heal the wound.



GUPPY

World

It should have been as obvious as rising damp to a building society surveyor but endowed with generations of experts who advised 'never overfeed' it became overlooked by many guppy breeders. What did? The simple fact that being the larger of the two, the female requires about four times as much food as the male, and that also applies to tank space.

That the female of the species is truly emancipated is evident by a comparison of quotes from 'Guppy Roundtable'. In August, 1969 we were told that if our tanks contained any female guppies 3 in. or more in length they should be saved for the next show.

Move on 2 years' time, the present and the same source is now advising that 4-in. fish are the in-thing, quoting cases of where smaller females are being beaten on the bench.

One inch in 2 years doesn't seem much progress. Only those who

have tried will understand just what an achievement it really is.

• • •

Feed your guppies on algae and watch them grow! Not some advertising blurb but the advice given me at a show when I enquired from one exhibitor about the diet he used to produce such magnificent fish.

By PETER UNWIN

Browsing through a second-hand book shop later, I came across the following story in a little booklet thrown into one of those pick-where-you-like for 5p trays. It reminded me of the recommended guppy diet—algae.

Back in the '30s a certain Jorgen Jorgensen heard that Scandinavia required vitamin A to add to their margarine, the latter to replace the

butter imported from Denmark. On his travels in South America, Jorgensen had learned that in some areas around Lake Maracaibo there occurred patches of *Agua opaca*, a form of algae that was rich in carotene, a yellow pigment that produces vitamin A in carrots. He cultured this plant in large, unglazed clay bowls and, when exposed to the sunlight, this algae thickened. It grew twice as fast if he introduced stale soda water.

So, if you have trouble in growing that green stuff all you need is some water charged with carbon dioxide. On reflection, are there really any fishkeepers that do have trouble in growing algae?

• • •

Can fishes generally and guppies in particular see in colour? That some fish can has been proved but whether all can enjoy full colour vision is not yet clear.

The extreme convex shape of the lens in the eye of the guppy suggests that they are near-sighted, thus limiting their range and acuity even in the clearest water. Writing on the subject, well-known guppy specialist, Midge Hill, says that if a spectrum of colours is projected into the aquarium the guppies tend to gather under the green and yellow bands of light, apparently thoroughly enjoy-

Continued on page 371

The Family ARIIDAE

Sea Catfishes

By
BRAZ WALKER

ALTHOUGH by no stretch of the imagination could the sea catfishes of the family Ariidae be considered common or usual aquarium occupants, they are at times kept by amateur aquarists as well as public aquaria. For this reason, any consideration of catfishes for aquaria cannot omit them. The distribution of the ariids is world-wide except for those areas of extreme cold, and they are of unusual interest from a number of standpoints aside from aquarium candidacy.

When the aquarist thinks of mouthbreeding (or more correctly, mouthbrooding) fishes, he usually thinks in terms of the family Cichlidae. Cichlids, generally, are remarkable for the amount of parental attention and 'concern' that is shown toward their offspring, and the process of oral incubation certainly is among the most interesting expressions of their reproductive functions.

Among catfishes, it might come as a surprise to some aquarists to find not one, but over 40 separate

species of mouthbrooding fishes belonging to this single family. In every recorded case it is the male parent who performs this task—so admirably that many human mothers might do well to take notice.

Perhaps the most amazing part of the entire procedure is the tremendous size of the eggs. Although the number of eggs may be no more than 20 or 30, depending on the size and species of the parent, when one considers that the eggs are sometimes as much as one-half inch to seven-eighths inch in diameter, again depending on species, admittedly this is a mouthful in any language. Parental protection in a typical ariid catfish lasts from spawning through the 4 weeks until hatching, plus another 2 weeks while the young are actively feeding and returning to the safety of their father's yawning mouth. During this 6 weeks' period the male fasts. For those of us accustomed to the usual gluttony of such wide-mouthed catfishes, such restraint is rather awe-inspiring.

In spite of their primarily marine nature, ariids often ascend into fresh waters or estuaries and a few species spend their lives in fresh water. Some islands such as Madagascar would be devoid of catfishes except for ariids and plotosids (family Plotosidae) which enter the streams.

Ariid catfishes, if they are attempted to be kept at all by the aquarist, are best limited to smaller specimens. Because of the almost universal distribution of the family, one or two species are usually caught by seining the shallows of bays and beaches. They can be kept with other marine species and can be acclimatised to less salty, even fresh, water. Most will subsist on the type of food ordinarily used for big-mouthed catfishes, such as lean beef or thoroughly rinsed fresh fish. The wide range of ariid appetites is perhaps indicated by their reputation among catfishermen in various parts of the world, who consider them susceptible to almost any bait.

Most members of the family Ariidae have the 'typical catfish look', which has been mentioned before. In addition to their rather ordinary external appearance, some, such as *Sciadesichthys proops*, possess one of the most curious anatomical features that could tease the imagination, for this is the famous 'crucifix fish' of South America.

When viewed from beneath, the dried and cleaned skull of the crucifix fish shows clearly the



Skull of the crucifix fish: left, seen from above; right, underneath view. (Picture in Eigenmann's *Freshwater Fishes of British Guiana*, 1912)

impression of a cross. Superimposed on the cross is the figure of a man with arms outstretched, and in some species there even appears a halo around his head. Several small bones often become loosened and remain inside the skull after drying, and when the skull is shaken they rattle. Legend says that the sound produced is that of the dice which were cast for Christ's clothing. Every bone that

can be disassembled from the skull is said to represent an artifact of importance in His passion. The other or upper surface of the skull has been said to represent the breastplate of a Roman soldier, or even a robed and hooded monk with outstretched arms. Certainly this is an imaginative bit of fish lore, but it is among the most interesting of the countless legends concerning fishes.

Have You Seen the Tanganyika Cichlids ?



Two of the cichlids from Lake Tanganyika are pictured on this page. On the left is the paddle cichlid (*Limnochromis stotigme*). Its fully grown size is not known but the specimen shown is 4-5 in. Colour overall is a deep green with golden flecks; the gill cover carries a black spot. The very long pectoral fins ('paddles') form the distinctive feature of this species, which is a fairly peaceful cichlid. Rocks rather than plants should form the tank furnishing for Tanganyika cichlids—their native lake has little vegetation and the presence of plants appears to distress the fishes. Below is the lyretail cichlid (*Lamprologus savoryi elongatus*), probably fully grown at the size (3 in.) shown. Less spiteful than many of these cichlids, this one is pink-blue overall with a lovely bright orange ocellus on the gill covers. The beautiful lyretail of this species is not evident in these newly imported specimens.

Fish photographed

by

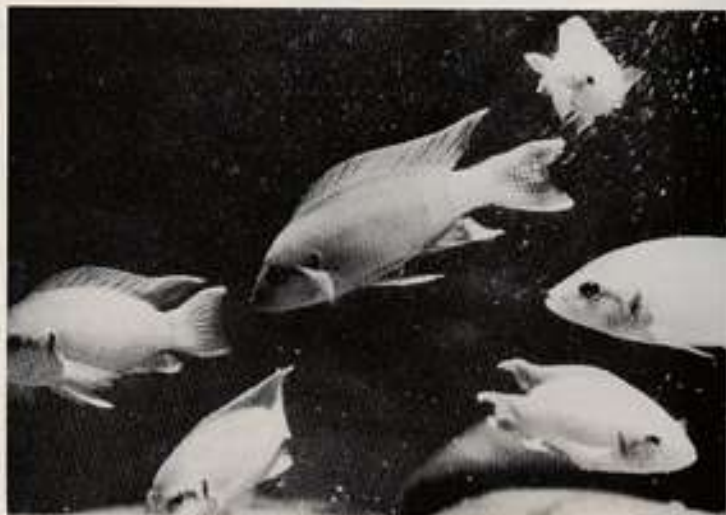
**CLIFF
HARRISON**

at

SCAN, Colnbrook

Notes supplied by

DEREK COLE



TROPICAL MARINE PROJECT — 3

Tackling a Larger Tank

By ROY PINKS

ANY mariner will tell you, I suppose, that a mere 15 gallons tank simply isn't good enough. To the beginner who has come through the sometimes nightmarish but nevertheless intensely interesting prologue to tropical marine fishkeeping, anything more elaborate could appear either as a quite impossible venture or simply the next challenge. At the stage when my small enterprise had reached apparently manageable proportions I took a look at it and concluded that when readers had heard all about my damsels and clowns—all very commonplace, these days—there would come a nasty silence for the very simple reason that I had no room for anything more unusual. This would never do. Furthermore my family began to take a hand in matters marine as they never had in matters freshwater, and I gradually realised that something more ambitious was expected of me. The appearance of a *Hemiochus araminatus* at the dealer's finally did it and I ordered a larger tank on the spot. At the current rate of progress I reckoned that the combination of my normal inertia, financial decrepitude and autumn despondency might enable the first fish to be introduced at about Christmas time.

Having made this decision I set out to test a number of the facts which had emerged from my first experiment, and in particular I was interested in the possibility of the larger tank maturing at about the same 6-8 weeks stage as the smaller one. I also wanted to try out one or two of the less tolerant beginner's fishes during the running-in period to try and establish the extent to which liberties could be taken. Clowns seemed to be reasonable candidates for this; clearly, such as butterflyfish or angels would be too expensive to risk and it would have been unreasonable in any case to subject them to conditions known to be so offensive to them. Another of my objectives was to make as decorative a feature of the tank as possible, as it would obviously be a main feature of the room. Certain of my tank furnishings would also come under scrutiny in order that maintenance could be cut to a minimum.

The size of the new tank was to be 36 in. by 24 in. by 18 in. high. Since marines are not as subject to the surface area of water formula as are freshwater fishes, a greater impact visually can be

obtained quite economically by enhanced tank heights and I could have gone to 24 in. high quite happily. This time it was a nylon-coated tank for me, though the firm Lee Reed fell from grace by fitting it with a frosted-type glass back panel. A deplorable habit at which I should have protested at the time, but such is the impatience of the aquarist that they got away with it. It otherwise came up to their high standards. I sealed the inside seams with a silicone rubber sealant as an aid to the preservation of the cement.

One of my problems with the first tank was salt deposits on the cover glass and on the outside of the tank. The high throughput of air causes so much turbulence of the water that considerable areas of the water surface are constantly covered by a myriad of bursting bubbles. The water droplets penetrate the minute spaces between the tank top and the cover glass and layers of salt deposit of varying thickness build up all over the place. I discovered that Perspex seems to repel water more thoroughly than glass, and after I had tried out a Perspex covering the rate of salt deposit visibly dropped. It is not an ideal substance, however, for it tends to bend and warp from the heat and weight of the overhead lighting, but as it can be drilled more simply than glass to enable airlines to be led to and from the tank, and as it also can be cut quite easily to accommodate feeding flaps it is worth considering. Its price is alarming, but so, too, is glass these days.

Because of the above reservations I finished up with a tank cover constructed partly of Perspex and partly of the corrugated plastic sheeting from which the undergravel filter had been made. This cover, quite a heavy affair, was tailored almost exactly to the top of the tank in such a way that a right-angled black plastic lip fitted into the opening at the tank top and helped to lead back into the water some of the surplus that had been sprayed to the undersurface of the cover by the turbulence of the filter outlets. A row of holes at the rear of the cover took the airlines, and a larger hole accommodated the heater/thermostat. I cut a hole, some 6 in. by 4 in., in the corrugated part of the cover. Another piece of corrugated sheeting an inch or so larger all round can be slid backwards or forwards over it or lifted off altogether for

purposes of feeding or introducing new stock. At a later stage I made a much larger removable panel in this area, which in itself incorporated one of these small access points. This enables a limited amount of internal servicing without removing the main cover. At the same time, to enable the latter to be lifted off at short notice the airlines were fitted with regulator taps just an inch or so away from their point of entry and this makes it possible for them to be unshipped simply by pulling the taps out of the ends of the lengths of piping leading into the tank.

In use this cover has been a great success. For some reason salt deposits seem not to build up on the corrugated sheeting even though a certain amount of water gets thrown on to its surface. This cover supports the rather heavy Grolux lighting unit I constructed, and as it is made from both Perspex and corrugated sheeting no sign of warping has become evident so far.

Because of that wretched obscured back panel in the tank I had to consider more carefully than usual what to use as background. My favourite—the piece of blue plastic sheeting rubbed with wet soap and pressed hard to the outside of the glass, to which it will thenceforth adhere and in so doing display the most fascinating patterns—was not practicable. I was thus driven to making a false back to which could be affixed bits of sea fan or what you will. This was not a difficult undertaking but it had to be a lightweight job as changes of mind about décor have to be implemented swiftly if they are ever to see light of day. This affair, some 2 in. in depth, had screw eyes inserted in the top framework. Plastic rose ties were used to secure these to the air inlet tubing taps on the tank cover and they take no time at all to remove. The rose ties, incidentally, are the type with serrated ends which fit into slots at the distant end of each tie: they are also useful for tidying up loose and sagging runs of wiring and may be used to fit it snugly to aquarium stand legs or fish house staging.

The lighting was to be from one or two 20 watt Grolux tubes and I made a casing with two switches which would enable them to be used together or singly. As an economy measure I fitted only one tube to start with, and so adequate is this single unit that I think it will stay that way. There is, of course, great debate on the matter of lighting for marine aquaria because of the effect it has on the build-up of algae, and I will leave comment on this point until later. It will suffice to say that some aquarists prefer to see lots of algae about and others cannot stand it. Since your point of view probably derives from whether you have got it or not, plain logic may not always carry the day. Later in this series the possibilities will be considered in greater detail.

I then went buying coral. Coral is something that absolutely fascinates me, and I could spend a fortune on it. Come to think of it, I probably have already. The sitting room gradually got cluttered with lumps of every shape and size, accompanied by sea fans and sea trees of varying magnitude and density. Even the children began to enquire whether there would be any room for the fishes, to which my wife sadly observed that even if there were I could hardly have any money left for their purchase. I was nevertheless indulging a whim I had that this large tank would not be one great open swimming space but a highly compartmented area—cluttered, if you like—in which natural barriers would enable the shyer fishes to find privacy from the boisterousness of the reputed bullies. My original tank had incorporated this principle and the absence of torn fins rather vindicated my attitude.

With just these few improvements I made ready for my most ambitious project yet, and there followed days and days of all those fascinating and tedious operations that precede setting-up day. Wiring, painting woodwork, giving the wrought-iron stand a double coat of clear polyurethane paint as an anti-corrosive agent, boiling and washing gravel, boiling, bleaching and soaking coral. Perhaps the most tedious operation is scaling the sea fan and trying somehow to boil it without reducing its stiffness to a state of unacceptable bedraggledness. The house reeked of that faint meaty smell of boiling coral, and my wife's preserving pan was in such constant use that the other top priority of this time of the year—bottling of the blackberries and the making of jam—nearly came into jeopardy. At long last it was all done and I had the satisfaction of seeing my tank furnishings fitting nicely into place. Obviously the extra time and work in thinking out the details for that cover had paid off and a little niggling anxiety over the undergravel filter which on this occasion I had made myself soon disappeared when I turned on the power.

At this point a rather unexpected difficulty arose. I had put my favourite Rena Super pump into reserve when I set up my first marine tank because there were limits to what one could fairly expect one pump to do. It was natural that I should have turned to this powerful and silent machine to drive the undergravel filter in the new tank, and all seemed well until on 27th August, 2 days after fully setting up, I beheld a scene of typical Arpe-disaster. The tank water was very cloudy and reeking of evil mustiness. In fact the whole room was foul with the smell and we had to open the windows to disperse it. However high I turned up the pump the air volume seemed inadequate to push the water round at what seemed a desirable rate under the circumstances. It seemed that the

third outlet pipe, together with the 18 in. depth of water, were combining to prevent the pump with too great a problem, so I rapidly substituted a Miracle Twin and directed both outlets to the new tank. This pump was even noisier than the first of its kind that I had bought and therefore joined it, remoted into the greenhouse: as a consequence a further air line snaked across the south wall of our house, but as it was of the transparent variety it is virtually invisible.

Well, the battle was then really on. Day after day the water belted around that tank and the cloudiness hardly varied. I almost considered throwing away the water and starting again, but having promised my wife half the cost of a new tankful if it ever came good I was somehow prevailed upon to let things take their course. Nitrite readings made on the water during these few days were on the high side, without any fishes being present, and the thought crossed my mind that the filter might mature on whatever had caused this trouble, rather than on the excretions of the 'starter fish'. Had this worked out it would, of course, have been considerably cheaper as well as more humane. What had caused the clouding? Even now it is not quite established. The choice lies between the sea fan and some organ pipe coral. Both had been well bleached and boiled and had received the same treatment as similar pieces in the smaller tank. On balance I think the red coral was the culprit because there were too many bits of white tissue surrounding the orifices for my liking, though one would have thought that the fierce process of sterilisation would have

rendered all these objects quite safe. However, out they came and received several hours' further boiling. The effect on the sea fan was so drastic that it has never recovered and it now resembles soggy rotten sacking and is a good deal less attractive. It will have to go.

The removal of the corals at least restored the situation so far as smell was concerned and after the new pump had run for a few hours we were able to close the windows. The nitrite level was still quite high and I introduced a quantity of live brine shrimps to assess whether there was any general form of toxicity, but as the shrimps were still there a day or so later I concluded that it was nothing more serious than a temporary overload caused by the inadequately cured corals. I suppose that the only way you can be sure of the position here is to test your coral in salt water before introducing it to the tank: by this I mean that the corals should be stood in salt water overnight and the water tested for nitrites on the following day. If there are any present the corals should be boiled and boiled again until there is a nil reading. It is a bit hard on the pocket because you will have to throw away all the salt water if you get any positive readings—it will not be of value for subsequent tests, obviously.

On 31st August I paid my wife £1.50, or such is my claim, since the water had indeed begun to clear, and by 3rd September it was passably ready to receive its first fish.

To be continued

Guppy World

Continued from page 570

ing the limelight. Under red illumination they react as if they were in the dark and slip into that torpidity akin to human sleep.

Midge concludes that guppies have trichromatic vision in that they can distinguish a wide variety of colours regardless of their brightness.

That they are not colour selective with each other is obvious to any breeder who has observed a blue guppy in a tank of reds. A connoisseur I wouldn't wish on my worst enemy!

Recent conclusions from a scientific inquiry into the feeding habits of fancy guppies were that (genetics apart) if you are to produce high-quality fish you must feed them on a

variety of foods at least eight times a day.

Despite my italics that isn't news. We have been aware for quite some time that the guppy's digestive process is such that most of the food it consumes passes through its digestive system in about half an hour. What, to me, was very saddening in the report was the statement that such feeding produced very few fish that lived to a decent age. Fourteen months was the figure quoted.

In our search for that prize-winning strain are we to ignore the welfare of the creatures over which we play God? It is but a decade since a well-known northern guppy breeder, Constance Kelly, won two consecutive years at the F.G.A.

Annual Show with the same fish—only missed doing it for the hat-trick by a narrow margin. That particular fish, a magnificent female guppy, was nearly 4 years old when it joined its ancestors and its progeny proved to be equal to her in the longevity stakes.

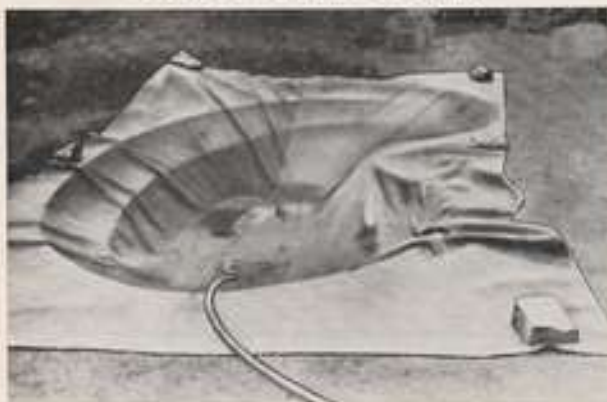
One ironical fact is that, in his researches into gerontology, the science of ageing, Dr Alex Comfort uses the guppy. He proved that ones little pets are capable of long life—are we to alter this by selfish feeding?

• • •
To: R.B. (Birmingham). The reference that you asked for in your letter is as follows: A. Comfort and Fanny Doljanski. 'The Relation of size and age to the rate of tail regeneration in *Lebistes reticulatus*.' GERONTOLOGIA, Vol. 2, no. 5 (1958). Your city library will no doubt be able to help you to see a copy of this paper.

WATER GARDENS with



Making the excavation: turf has been removed for 24 in. beyond the pool outline for paving stone edges to be laid level with the lawn. Stones are removed and sand laid on the base and sides.



Butylite sheet is draped into the excavation and weighted at the edges. Weights are eased as the pool is filled so that the liner fits snugly. After filling (below) surplus sheet is trimmed to leave a 3-4 in. flap.



By RAY DAVIES

IN recent years modern techniques and materials have brought the costs of these wonderful garden features within the reach of us all. Now, with modern superior materials, a pool can easily be constructed in one day.

A pool should be sited so as to receive at least half a day's full sun, preferably a full day, for the water lilies to flower profusely.

Try to avoid a site near trees that would pollute the water by falling leaves (a pond net is otherwise essential in the autumn to catch the leaves).

Size and shape should be in proportion to the surrounding layout. To give the best idea, lay a garden hose or rope to the shape required and view it from all angles. Adjust the outline until a suitable size and shape is achieved.

Size does play an important part in the pool balance. To achieve an attractive and clear pool a balance must be established between volume of water, surface area, plants and fishes. The minimum size we have found to maintain this balance is 40 sq. ft. surface area. Pools under this size may prove a little difficult to create this balance, and can remain cloudy and dirty looking.

A minimum of 15 in. depth is required for the very smallest pool, 18 in. for the average pool of 40-75 sq. ft. surface area, 18-24 in. for pools 75-100 sq. ft. and 24-30 in. for pools over 100 sq. ft. Depths over 30 in. should never be needed.

A good pool liner will last a lifetime, so before choosing your pool, careful consideration must be given to the different types of lining material available. The table given here will assist you in making a correct decision. Black and Stone

LINERS

Photographs by
DAVIES ENTERPRISES



Butylite are available only from Davies Enterprises of Nantwich, Cheshire.

A pool liner is a flat sheet of waterproof material. When placed in a hole and filled with water it is held in position by the water pressure and requires no fixing. The freedom of design offered by liners may tempt you to an excess of irregularities. These are possible but may be wasteful since the sheet is a rectangle. Simple shapes with sweeping curves are best, proving more economical and pleasing in design.

Calculation of liner size required is simple. The maximum length of pool = (2 x maximum depth) = length of liner. Maximum width = (2 x maximum depth) = width of liner. For example, a 9 ft by 7 ft pool 18 in. deep requires a 12 ft. by 12 ft. liner.

Marking out the area for the pool is best done as described above by using a hose or rope. With the aid of a spirit level check the levels. Any variation can be overcome by packing the lowest side of the area with soil and high spots or areas can be cut back.

Excavation can then take place, the hole being cut 3 ins inside the proposed size to allow for final trimming out before completion, but the sides should slope inwards 1 in. to every 3 in. depth. Dig down to 9 in. deep, leave a 9 in. shelf and dig down again. This will then form your marginal shelf 9 in. wide and 9 in. deep. When the required maximum depth is reached the sides can finally be trimmed to the required shape and size. The whole area is then checked for any sharp protrusions and these are removed and soft sand is worked in by hand over the sides, shelf and

base. On very stony ground newspapers or polythene can be laid as a safety factor before fitting the liner.

Place the liner over the hole and secure the edges by placing stones around it. Start to fill it with water and, as the liner is drawn into the

excavation by its weight, release any excessive tension by lifting the stones. Once it is filled, the surplus material is cut off, but leaving a 4 in. overlap. Edging stones or turf are then laid on the edge around the pool to give the finished effect.

Pool Construction Comparisons

Prices and details given below are based on an 8 ft. by 5 ft. by 18 in. rectangular pool. The cost for fibre glass and concrete are approximate only. The life quoted for materials are estimates based on current data and our own experience.

Material	Approx. cost	Estimated Life
Concrete. Including sand, cement gravel, waterproofing powder and sealant	£11.75	Depends largely on construction: 2-20 years
Butylite (Black) 11 ft. x 8 ft. liner	£10.56	50 years
(Stones) 11 ft. x 8 ft. liner - coloured stone.	£14.52	30 years
Flexilene 11 ft. x 8 ft. liner	£12.08	
Wavelock 12 ft. x 9 ft. liner (nearest available size)	£15.12	
Juralene 12 ft. x 9 ft. liner (nearest available size)	£ 8.65	
Aqualene 12 ft. x 9 ft. liner (nearest available size)	£ 7.56	
Fibre glass Prefabricated shell	£50.00	10 years
Polythene 18 ft. x 12 ft. liner (500 gauge used double)	£ 2.85	1-2 years

Butylite is a synthetic rubber widely used for reservoirs, and acid and water storage.

Flexilene is a laminated plastic consisting of nylon coated with P.V.C.

Wavelock is made up of two P.V.C. laminates reinforced with high tenacity nylon.

Juralene is a special formulation of polyvinyl chloride.

Aqualene is made up of two P.V.C. laminates.

Fibre glass. A number of prefabricated shapes and sizes of pools are available as one-piece rigid mouldings.

Polythene is a relatively thin lining material, suitable only for temporary pools.

BREEDING THE GOLDEN MALAWI CICHLID

First Make Sure You have a Pair!

By N. F. HUBERT

FIRST requisite for breeding this fish is to ensure that you have a pair! I state what appears to be the obvious because of the contrasting coloration of the two sexes. The male of the species grows to approximately 4 in. He is slim with two black and two blue longitudinal stripes. The dorsal, which is the full length of the body, is a bright yellow and the anal fin is black tinged with blue and interspersed with one or two golden dots. On the other hand the female is a slightly smaller fish, of a similar shape, but predominantly golden yellow with black and faint-blue longitudinal stripes. Her dorsal fin is striped yellow and black.

As both sexes are aggressive towards other fish, and the male towards the female, I found it essential on purchasing a pair, to place them in separate tanks or in a tank divided by a pane of glass. The size of the tanks for bringing them into breeding condition is not too important and they will thrive in tanks as small as 18 in. by 12 in. by 12 in. provided that they can see other fish. I covered the bottoms of the tanks with rocks and slates made into small caves. The ideal temperature seems to be around 75°F (24°C). Aged tap water with approximately one-third changed every 3 weeks suits this Nyasa cichlid. As for all our fishes, a varied diet was given: flaked food, chopped maggots and scraps of chopped meat.

When the fish came into breeding condition the colours on both sexes intensified, the female filled out and they started to dig in the gravel. Later experience showed that only when digging has commenced should they be placed together. Digging can often be induced by putting the fish in sight of each other. I found that the absolute minimum size tank for introducing the pair was 24 in. by 12 in. by 12 in. but ideally it should not be less than 36 in. by 12 in. by 12 in. as the courtship is extremely active. The breeding tank also had hiding places and care was taken to ensure there were places in which the female could hide without the male finding her.

Courtship commenced with the male taking up a position 2 or 3 in. in front of the female and vibrating vigorously for a second or two at a time. Whichever way the female turned, the male, with a vigorous darting movement, repositioned

himself in front of her and commenced vibrating again. After a few minutes the two fish moved alongside each other head to tail and, whilst moving in very rapid tight circles, appeared to be biting at each other's anal region. Every now and again the female broke away, laid a few eggs and put them in her mouth before taking up the circling again. It appears likely therefore that the eggs are fertilised in the female's mouth. When all the eggs were laid she darted away from the male, who viciously attacked her and would have killed her if she had not been able to take refuge in a cave that he could not get into. The female remained hidden until the male was removed from the tank 2 days later.

During the next 25 days the female appeared occasionally from her hiding place. Her mouth and chin gradually grew more distended and she refused all food. On the twenty-sixth day the fry were released from her mouth and she took no further interest in them. The fry were $\frac{1}{4}$ in. long; all 24 were exact replicas of their mother. The female was removed and feeding on brine shrimp, chopped meat and flaked food was commenced immediately. Like most mouth-breeder fry they grew rapidly and at only 2 months old they were over 1 in. in size.

The successful courtship I have described took place after 9 months of introducing the pair together at weekly intervals. Each of the previous introductions ended at some stage of the mating with the female being fiercely chased by the male. Before introducing the pair I tried both keeping them separately and also in a divided tank, but neither method appeared to be more successful than the other. Once I tried putting the male into the female's tank and to my surprise the usual pattern of the male chasing her was reversed and the male was upside down in trouble within a few seconds! This procedure was not repeated.

The real difficulties when breeding this fish are: first making sure you have a pair that are compatible and secondly ascertaining when they are ready to be introduced to each other. I can, however, assure anybody who has the patience that the sight of a shoal of these gold and black striped fry is well worth all the trouble.



BELONGING to the frogbit family (Hydrocharitaceae), *Elodea densa* comes from America, growing there over an extensive area stretching from the southern states of the U.S. to Argentina, i.e. in the tropical and sub-tropical zones. It is the tallest-growing species of the genus *Elodea*: the stems can reach a length of over 9 feet and fork along their length. Where the branching occurs roots appear. The leaves, from a light to bright green, are very narrow and lanceolate, and according to the conditions supplied for growth, may be $\frac{1}{4}$ - $1\frac{1}{2}$ in. long and up to $\frac{1}{4}$ in. wide. They are arranged for the most part in whorls of five and their edges are very finely serrated. The flowers seen in the aquarium are male flowers, white and just under $\frac{1}{2}$ in. in diameter. Female plants are not found in aquaria.

The plant consumes plenty of limey salts and because of this serves to soften the water. Though it comes from tropical and sub-tropical zones it is not a forest plant and grows in open waters where there is plenty of light and also great fluctuation of temperatures. Therefore although it requires a

Elodea densa — One of the Best

By J. ELIAS

Photographs by
RUDOLPH ZUKAL



generous amount of light it is not too exacting with respect to temperature. In fact, it grows well in both tropical and coldwater aquaria.

Its requirements for bottom medium are very modest because although it usually anchors to the bottom with its roots it receives its nutrient through the leaf surface. For this reason it can be cultivated as a floating plant without requiring rooting at all. This is one of the most unpretentious of plants.

At the top of the page the white flower of *Elodea densa* is pictured. Two cuttings (left) show the attractive whorled heads formed at the top of the stems.

FISH HOUSE TECHNIQUES

Breeding in Bare Tanks

By F. W. COLES

OVER a long period of time and after trying every possible way of fishkeeping, I eventually arrived at the system I now use in my small fish house.

It is well known that the amount of light necessary for growing plants is considerably in excess of the amount the fish themselves require, so that unless growing plants is a particular interest, it is more economical to use considerably less lighting in the fish house and dispense with plants altogether. Indeed there are fanciers who use only a general room light, or just daylight through windows, and this can be quite successful for breeding some varieties, particularly characins, which generally breed more freely when part of the tank is shaded, even in these conditions. Most of the killies respond to this treatment, too.

Many people think that breeding in bare tanks is next to impossible with some fishes, and in some special cases this may be true, but generally speaking, most varieties can be bred if proper arrangements are made. Now, as Professor Joad would have said: 'It depends what you mean by bare tanks'.

If you take a tank just as you purchase it and put it on a stand, fill it, and then put your fishes in you will achieve nothing. The first requisite when setting up a 'bare tank' is to see that the base is really dark. Placing a tank on a plywood base will certainly keep out the light from the tank below, but the base is still much too light, and if, as it usually is, it has been glazed with moulded glass there will be a multitude of reflections from the glass itself. The irregularities are on the under side of the tank, and to eliminate the reflections the best solution is to give the base a couple of coats of black paint before setting the tank up, but still put the plywood base beneath it. This will take care of any pinholes or brushmarks that may have been left in the paint.

The next thing is to cut a piece of hardboard to cover about half the length of the tank front, and hang it there with a couple of clips made from aluminium. Put a piece of 3/16 in. dowel across the darkened end of the tank and hang on to it a couple of nylon mops. Now, if the water is matured, the tank is ready for your stock fish. Under these conditions fish can be kept happy indefinitely, and with a bare tank like this, and a dark base, any uneaten food and faeces can be seen and immediately siphoned off. This is much more difficult in tanks with a gravel base, so that a bare

tank can be kept much cleaner. If all the stock tanks are arranged in this way, fishkeeping is less arduous, and servicing time is kept to a minimum.

The breeding tank should be set up in the same way, but the necessary provisions for breeding will need to be added. For egg-scatterers it is satisfactory to make a frame of 1/4 in. square wood, 2 in. less than the inside measurement of the tank each way, and to cover it with small nylon mesh (about 1/8 in.), sticking this on the wood frame with silicone sealer or impact adhesive; you will need a couple of stones, one at each end, to weigh it down. The frame should not be nailed or screwed together; as it has no stresses to bear, the corners can be put in the vice and drilled 7/64 in., and a piece of 1/8 in. dowel driven in to make a joint strong enough for the purpose. Metal should be kept out of contact with aquarium water.

For many of the varieties laying adhesive eggs, it is satisfactory to anchor three or four mops on the tank base, and hang over them a mop suspended on 3/16 in. dowel as recommended above.

For cichlids, a rather different procedure is needed. If it is wished to use plant pots it will be better to make a cradle to hold them. This is made from two pieces of flat, thin wood, with a semicircle cut out to fit the plant pot, and joined together with a piece of 1/4 in. square. This should be pegged together, as was the nylon net frame, with 1/8 in. dowel, and will be strong enough for the purpose. You will need to hold it down when placing it in position, but the weight of a terracotta plant pot will keep it in place. It is not satisfactory to try to wedge a pot in a corner, and a cradle prevents the pot from scratching the glass of the tank. It is better to remove the whole of the base of the pot; this can be done easily by 'nibbling' it away with a pair of pincers and doesn't take long, even if you are careful. Plastic pots, weighted down with a stone, can be used, but they are not as successful for another reason.

Cichlids are pit spawners largely, and many people say they cannot be bred without using a gravel base. Many varieties have been bred in bare tanks, successfully, and the fishes follow their normal procedure of depositing the eggs in the plant pot. In a gravel-based tank, they would later

move the fry to a pit they usually dig behind the flower pot. With the pot on a cradle the base of the tank is lower than the pot, and they invariably transfer the fry to the corner behind the pot as their first move. This works satisfactorily and the fish seem quite happy with the arrangement. The fry, when free swimming, can easily be seen against the dark tank base, and the situation is always under control.

With angels, a piece of green plastic, about 2 in. wide and long enough to reach from the bottom

front corner of the tank to the frame at the back, can be used. The angels will spawn on this and it can then be removed and the eggs hatched separately if required.

In all these arrangements with cichlids it is better to keep the nylon mops in the tank at the opposite end from the flower pot, to act as a refuge for the chased partner if disagreement occurs. In any case, it is better to remove the parents when the fry are a few days old, to prevent their loss if the parents turn cannibalistic.



Readers' Queries Answered

Red Sessilis

The red sessilis I obtained a few weeks ago made a very attractive addition to my tank but the stems have gradually become denuded of leaves. Is this because it has been moved and will it recover in time?

This plant, with its reddish leaves and bright red stems, should really be looked upon as an additional decorative 'highlight' to a tank rather than a plant that is going to make a great deal of growth. It requires a good deal of light and reacts very badly, by shedding its leaves, to hard water. If you wish to give the plant every advantage it would be advisable to prepare the tank in advance by gradually replacing some half of the water with clean rain-water or distilled water, obtaining some new stock of *Alternanthera sessilis* and planting it in the lightest position in the tank.

Glass Catfish

I have just purchased some glass catfish and would like to know the best conditions to keep them in as they look so delicate and I do not want to lose them. I am rather worried whether my red-tailed black sharks will frighten them too much.

It is not a good idea to keep red-tailed black sharks with glass catfish unless you have a very large (2-4 ft) well-planted tank in which

the glass fish can hide away. (It really needs placid-natured or strong-nerved fishes to cope with the continuous wild chases of a group of sharks.) Glass catfishes (*Kryptopterus bicirrhus*) are happier kept at least in pairs, and preferably in a small shoal. They tend to 'hang' in mid-water or swim slowly about the tank. Although members of the *Sisoridae* family, these catfish are not nocturnal and will not grub about for food at the bottom of the

Brackish Plants

I have been told that there are some plants that do well in brackish water and I would like to know what



Photo:

Glass catfish (*Kryptopterus bicirrhus*)

B. KAHL

these are, for my brackish water tank.

Your informant may be thinking of *Cryptocoryne ciliata* or *Lagenandra orata* but it is important to remember that they will tolerate only a very low salt content in the water. Both these plants can grow tall, up to 15-20 in., so are more suitably planted in tanks with a depth of 15 in. or more. *C. ciliata* has light to mid-green foliage and is not likely to survive the depredations of scuds if you have any in your

brackish water tank. The leaves of the *Lagenandra* are much tougher and might survive quite well.

Colour of Daphnia

I have recently lost three goldfish and I think it may be due to the water flea my local shop has been supplying. It has been a very peculiar yellow colour lately and I was a bit worried about using it but did so when my dealer said it was all right. Could the daphnia have caused these deaths?

Not because it was a yellow colour. The shells of daphnia are almost transparent and the colour showing through depends very largely on the type of food the daphnia have been assimilating. Your yellowish daphnia have been feeding on algae and vegetable matter and would be perfectly suitable for feeding to your fish. It is generally held that red daphnia are more nutritious since they contain more haemoglobin, but the main value of this special protein as nutriment is that it contains iron.

What's New?

Food for Pond Fish

AS the pond-keeper's thoughts turn seriously again to his charges, Cooper Nutrition Products Ltd. (Stepfield, Witham, Essex) are ready with a new coldwater pond fish food, **Pond Pride**, each single pellet of which, the maker's claim, provides a well-balanced meal and will float for many hours. Each pellet is composed of fish and vegetable protein, yeast products, shrimp meal and cereals, enriched with mineral trace elements and essential vitamins. The food packs are available in three sizes—minipack, standard and maxipack, and sell for recommended prices of 6p, 30p and 60p respectively.



A NEW venture of BRIGHTON & SOUTHERN A.S. is a newsletter to be given free to members and exchanged with other societies. Mr M. Whittington is the editor. Car stickers are also to be available soon. Now that the Society has changed to monthly meetings there is to be a table show at every meeting, and there is a new venue—the K. & T. Social Club, Franklin Road, Portslade. At the first meeting there, member and FBAS judge Mr David Soper lectured on feeding and the general wellbeing of fish. He stressed that fish need as varied a diet as do humans and recommended fulfilling their protein and vitamin requirements with wheat germ, dried baby foods, such as beef and vegetable, and ox heart. For those having difficulty in hatching beine shrimp or to increase the hatch generally Mr Soper recommended the addition of yeast to the water.

EALING & D. A.S. held their annual Closed Show to bring the 1971/2 season to an end. This was the chance for the shy members to try their fishes on the show bench away from the glare and occasion of an Open Show, and they made the most of their chances. Over 100 fishes were benched, including entries in the aquascape, furnished aquaria and Rift Valley cichlids classes and despite a very cold day and threat of snow all went well. Mr H. Towell, FBAS and Mr B. Baker, FBAS judged and made the award for best fish in the show to

'CAN a Society Tableau at The AQUARIUM SHOW '72 (27th-29th October at the Royal Horticultural Society Old Hall, London) be staged with a simple grouping of tanks entered for furnished aquaria and aquascape classes by the club and its individual members? The answer is yes—obviously it is the overall display that determines the winners in the Tableau section but a Society wanting to utilize the Tableau to compete in the Classes Aa, Ab, Ad-Af, Ah and Ai is free to choose to do so, and the judging of these classes is of course carried out just as if the entries were benched in any other way. It is advisable to make application for your Tableau at an early date, however.

the *Monoactylus argus* entered by Mr J. Healey.

MR Dick Richards, secretary of RHONDDA A.S., sends us the following news of his Society. "A vote of thanks is given to Doc Embling, our retiring minute secretary, and at the same time a welcome to his replacement, Mr Tony Chick. In addition a new member has been elected to the committee, Lyn Davies, the editor of our club magazine aptly called the 'Beta-Mag'—not only is it 'better' but we aim to make it the best. Our membership is still growing; at the last count it was 60. Without a doubt our junior section is the best in Wales, having their own show secretary and in the main organising their own affairs. A warning here to other show secretaries—this lad Colin Gardiner is good and knows his fish! May we take this opportunity to wish every success to the C.N.A.S. and to the Welsh Open Show in August. And in passing, our club contains at present all 'workers'—instead of telling the committee what they should have done they get along and do it."

ROTHERHAM A.S. faced power cuts and bad weather on the day of their third Open Show but the event proved the most successful yet, with 761 entries from 160 exhibitors and a total of 32 societies taking part. The best fish in the show was a *Tilapia marii* entered by Mr A. M. Kinsey of Independent A.S., London.

Detailed results were as follows:

Platy: 1, Mr G. Hopkinson (Independent); 2, Mr C. Ward (Doncaster); 3, Mr R. Sherke (Mt Pleasant, Gateshead). Mollies: 1, Mr J. Igoe (Sherwood); 2, Mr C. Shipman (Georham); 3, Mr R. Shanks (Swoncliffe). 1, Mr F. Cooke (Brighton); 2, Mr T. Douglas (Hall); 3, Mr and Mrs Broadhead (Huddersfield). Guppies: 1, Mr D. Moxley (Halesowen); 2, Mr R. Bowers (Independent); 3, Mrs B. Blackburn (Sherwood). A.C.V. livebearers: 1, Mr R. Bowers; 2 and 3, Mr J. S. Hall (Aireborough). Small barbs: 1 and 2, Mr P. Cichin (Independent A.S.); 3, Mrs Rhodas (Great Sta). Large barbs: 1, Mr A. Burrey (Castleford); 2, Mr and Mrs J. Dinnard (Sheffield); 3, Mr D. Sewell (Sherwood). Small characins: 1, Mr and Mrs E. Stanton (Sheffield); 2, Mr R. Bowers; 3, Mr A. Hudson (Huddersfield). Large characins: 1, Mr D. Sewell; 2, Mr J. A. Whiteley; 3, Mr R. Bowers. Toothcarps: 1, Mr G. Thickerson (Castleford); 2, Mr and Mrs Bades (Cromwell); 3, Mr P. Cooke, Sharncliffe and Interc. 1, Mr D. Shaw (Rotherham); 2, Mr P. Hazlow (Darby Hagers); 3, Mr and Mrs E. Stanton, Rotherham, minnows, danios: 1, Mr and Mrs E. Stanton; 2, Mr D. Jackson (Dukeries); 3, Mr W. Downing (Sherwood). Corydoras: 1 and 2, Mr D. Sewell; 3, Mr N. Jackson (Worsnop). A.C.V. catfish: 1 and 2, Mr R. Bowers; 3, Mr M. Pitterson (Georham). Loaches: 1, Mr J. Robertson (Middletown); 2, Mr and Mrs Bowers (Middletown); 3, Mr I. Rowbottom (Huddersfield). Dwarf cichlids: 1, I. & B. Haptonstall (Castleford); 2, Mr D. Sewell; 3, Mr D. Robertson (Derby Hagers). Large cichlids:

1. Mr A. M. Kinny (Independent A.S.);
 2. Mr E. Rumbottom (Hyde); 3. Mr D.
 Robertson, Angles; 4. Mr and Mrs Blades;
 5. Mr and Mrs Kivington (Doncaster);
 6. Mr D. Sewell, Fighere; 7. Mr and Mrs
 Cohen (Crawford); 8. Mr and Mrs Kivington;
 9. Mr D. Robertson, A.O.V. anabernib;
 10. Mrs Rhodes (Four Star); 11. Mr and Mrs
 Kivington; 12. Mr D. Sewell, A.O.V. tropical;
 13. Clark Bros. (N. Staffs.); 14. Mr D.
 Kewsey (Bradford); 15. Mr R. Harlow
 (Derby Regent).
Breeders livebearers: 1. Mr G. Thick-
 broom; 2. Mr G. Gillings (Crawford);
 3. Mr N. R. Gibson, Breeders anglery;
 4. Mr and Mrs Cohen; 5. Mr A. Corbin
 (Sellington); 6. Mr and Mrs J. Gobe
 (Crawford); 7. Mrs livebearers; 8. Mr G.
 Thickbroom; 9. Mr and Mrs Dains
 (Doncaster); 10. Mr and Mrs Kivington.
Pairs anglers: 1. Mr F. Martin (Adlyton);
 2. Mr J. G. King (Doncaster); 3. Mr K. Ellis
 (Sellington).
Goldfish, comets: 1, 2 and 3. Mr J. S.
 Hall (Aireboat), Shubunkins, fancy goldfish;
 4. 2 and 1. Mr J. S. Hall, A.O.V. coldwater;
 5. Clarke Bros.; 6. Mr J. S. Hall; 7. Mrs
 Dwyne (Sheffield); 8. Mrs Jane; 9. Mr J.
 Robertson (Mr Plessey); 10. Mr B. Robinson
 (Huddersfield); 11. Mr A. Ward (Rotherham);
 12. Piers; 13. Mr D. Ariss (Rotherham);
 14. Mr M. Kilham (Sheffield); 15. Mr J. A.
 Whaley (Aireboat).

The Society apologises to any not receiving schedules on time—these were unfortunately late in arriving from the printer. Members also wish to record their thanks to York & D. A.S. members for their efforts in tracing the Best Fish in Show trophy.

SINCE the beginning of the year there has been an excellent entry in the monthly table shows of the MANCHESTER SECTION of the FANCY GUPPY ASSOCIATION. In January there were 106 entries and major awards were made as follows: best in show and best breeders, Mr Malcolm Delingpole, with a fine team of albino females. Mr Delingpole also took the best award for the female with a superba. The best male award went to Mr J. Peck (delta tail). The February meeting was very well supported with quite a contingent of the new LANCASTER SECTION members present and everyone enjoyed the entertaining talk given by Mr Ron Trench on foods and feeding. There were 81 entries in the table show—best in the show and best male awards went to Mr D. Glenn. Mr Alan Charlton took the best female award with a superba and best breeders award went to Mr T. Hallett (pair of bottomwords).

OLD friends and past members of the GOLDFISH SOCIETY OF GREAT BRITAIN will be very welcome at the July quarterly meeting of the G.S.G.B. which is being held on 20th July at 2.0 p.m. at the Conway Hall, Red Lion Square, Holborn, London, W.C.1. The speaker will be Mr H. Berger and members are hoping to welcome many visitors.

FEDERATION



NEWS

Forthcoming Championship Class Shows Eligible for the 1972 Supreme Championship

Championship Fish Classes at Forthcoming Shows

1st April	Runnymede A.S.	R*	Platy
2nd-3rd April	Tottenham & D. A.S.	D*	Cichlid
9th April	Stockton-on-Tees A.S.	Db*	Apistogramma etc.
16th April	Medway A.S.	Ba*	Barbs
22nd April	Thurrock A.S.	G*	Tropical catfish
22nd April	Independent A.S.	P*	Guppy female
29th April	Uxbridge A.S.	Da*	Angels
7th May	Roehampton A.S.	Dc*	Rift Valley cichlid
7th May	Ilfracombe & D. A.S.	Ya*	Tropical marine
13th May	Southend, Leigh & D. A.S.	S*	Mollie
21st May	Yeovil & D. A.S.	Nb-m	Pairs
28th May	Corby & D. A.S.	H*	Corydoras & Brochis
4th June	Half Moon A.S.	X.O-T	Breeders
11th June	High Wycombe A.S.	R*	Danio & W.C.M.M.
17th June	Riverside A.S.	T*	a.o.s. Livebearer
24th June	Anson A.S.	V*	Twintailed goldfish
29th June	Gosport & D. A.S.	Ea*	Fighters
2nd July	Exeter & D. A.S.	Yb*	Coldwater marine
8th July	Basingstoke & D. A.S.	Cb*	Nannostomus & Poecilibrycon
22nd July	Port Talbot & D. A.S.	W*	a.o.s. Coldwater
5th-12th August	Portsmouth A.S.	Eh*	Colisa etc.
6th August	Tonbridge & D. A.S.	L*	Loach
12th August	Bracknell A.S.	J*	Rasbora
19th August	S.P.A.S.S.-Kingston	U*	Singletailed goldfish
26th August	Plymouth A.S.	No-t	Pairs
2nd September	Bothal Green A.S.	O*	Guppy male
3rd September	Wellingborough & D. A.S.	B*	Barbs
10th September	Weymouth & D. A.S.	XB-M	Breeders
16th September	Hounslow & D. A.S.	F*	Egg-laying toothcarps
24th September	Torbay A.S.	Ca*	Hypheosobrycon etc.

* Winners of Federation Championship Trophies in classes for single fish automatically become eligible for the Supreme Championship Trophy Competition (to be staged at The AQUARIUM SHOW '72 at the Royal Horticultural Society's Old Hall, London, S.W.1, 27th-29th October). Six awards are made at this Competition.

NO less than 12 new affiliations to the Federation, from north-east England and one from Scotland, have been obtained as a result of a personal visit by chairman Mr R. E. Eason and Mr C. A. T. Brown to Newcastle. This was reported to a crowded Assembly of delegates last month that included representatives from Colne and Wales. An innovation reported for shows was use of the small letter 'y' suffixed to Class capital letters to denote Junior Classes (not applicable to furnished aquaria classes). A proposed set of rules for the judging of single marine fish show entries drawn up by the BMAA has been approved by the Federation and it is hoped that these will be coming into use. Mr Ron Kerridge was announced to be the show secretary for The AQUARIUM SHOW '72 and Mr David Warts is assistant show secretary; other members of The AQUARIUM SHOW '72 FBAS show committee are Mr C. A. T. Brown (chairman), Mr W. R. Sherwin (committee secretary), Mr A. Blake, Mr T. Glass, Mr F. Glyn (for G.S.G.B.) and

Mr F. C. Tomkins. The Federation's list of donated Perpetual trophies has been extended by the addition of the Bracknell Plaque for Rasboras. At the March Assembly FRAS Certificates of Merit were awarded by the Council to Mr Stan Conell in recognition of the fishkeeping skill represented by his numerous successes on the Show bench with a single *Ctenopoma kingleyae*, and to Mr Maurice Carter for similar skill represented by five show seasons of successes with a *Botia sidthimunki*. Together with the announcement of the retirement from the Speakers' List of Mr H. N. Allies of Torquay the thanks of the Federation for his past services were recorded and wishes for a long and happy retirement were expressed at the meeting.

LOUGHBOROUGH & D. A.S.'s fifth annual presentation dinner and dance proved a great success. Mrs J. Stock, the president's wife, presented the year's awards to the following:

Chapman shield for the most points gained at table shows in 1971, Mr G. Taylor. A black moor owned by Mr G. Taylor was also judged the best fish of the year. Breeders egglayers: 1, Mr G. Taylor; 2, Mr B. Street. Breeders livebearers: 1 and 2, Mr M. Walker; 3, Mr D. Keeley. Furnished aquaria: 1, Mr D. Wood; 2, Mr G. Lindsey; 3, Mr G. Taylor. Amateurs: 1, Mr T. Parry; 2, Mr M. Walker. A.V. livebearers: 1 and 2, Mr B. Street; 3, Mr M. Walker. Barbs: Mr D. Keeley. Catfish and loach: 1, Mr D. Wood; 2, Mr D. Tyler; 3, Mr G. Lindsey. Cichlids: Mr G. Taylor. Characins: 1, Mr M. Walker; 2, Mr T. Parry; 3, Mr D. Tyler. Pairs: 1 and 2, Mr M. Walker; 3, Mr D. Keeley. A.O.V.: 1, Mr D. Wood; 2, Mr G. Lindsey; 3, Mr G. Taylor. Goldfish: 1, 2 and 3, Mr G. Taylor. Rasboras, danios, minnows: 1 and 2, Mr B. Street; 3, Mr G. Lindsey.

MID-SUSSEX A.S. felt privileged to have Dr N. Carrington as their guest speaker recently, since as managing director of Inter Pet, one of Britain's leading manufacturers of aquatic equipment, Dr Carrington is singularly well qualified to talk about fishkeeping techniques. Everyone, from beginner to expert, was able to learn more about their hobby, and many interesting points were raised during the question period including a full technical explanation of the influence various types of lighting arrangements can have on the growth of plants and baby fishes.

BECAUSE of the success of last year's Breeders Show, **EAST LONDON A. & P.A.** plan to stage an even larger show this year on 7th October with 12 fish breeders classes and 5 furnished aquaria and plant classes. There are 51 trophies, and plaques for the first three places as well as prizes of equipment as last year. Judges will be Mr Ed. Nicholl, Mr Cyril Brown, Mr Pete Ginger and Mr Jock Wilson. Benching will be available from 8.0 p.m. Friday, 6th October to 9.0 a.m. Saturday, 7th October and stewards will be on duty throughout the night. Schedules will be available shortly from Mr F. Vicker, 13 Irons Way, Ramford, Essex.

Many present were also surprised to learn that duckweed tends to absorb calcium, thereby producing softer water at negligible cost.

Mr R. Elms of the FGA praised the high standard of the fish he had been asked to judge. Class winners were: male guppies: 1, 2, 3, Mr D. Soper; juniors, Miss Bridget Soper. Female guppies: 1 and 3, Mr B. Williams, 2, Mr D. Soper. Guppy pairs: 1, Mr B. Williams; 2 and 3, Mr G. Leech; juniors, Miss Judith Soper. The Novices Special award was won by Mr P. Banks, who attended the meeting despite injuries received in a recent accident. A silver spoon was presented to Mr B. Williams for the best fish in the show.

MAGNIFICENT plants and disease-free fish will abound in the tanks of members of **HOUNSLOW & D. A.S.** who have been fortunate in attending lectures on these subjects by Mr R. Forder of Uxbridge and Mr J. Thorne. Mr Forder outlined the methods used to simulate the plants' natural growing conditions and the water condition needed to bring some of the rarer plants into bloom. Mr John Thorne, vice-president of the Society, who was an enthusiastic amateur fishkeeper and is now turned professional, was able to view the problem of fish diseases from both the hobbyists' and the dealers' points of view; his listeners appreciated the very clear descriptions of various signs and symptoms of disease displayed by an ailing fish and the detailed instructions given for treating it.

BISHOPS CLEEVE A.S. table show results recently have been as follows:

Team of four egglayers: 1 and 2, Mr N. Dooly; 3, Mr A. Heels. Plants: 1, Mr I. Hawkins; 2, Mr R. South; 3, Mr P. Greenwood. A.O.V. tropical: 1 and 2, Mr N. Dooly; 3, Mr P. Tattersfield. Guppies: 1, Mr P. Greenwood; 2, Mr M. Ridgop; 3, Mr A. Heels. Livebearers: 1, Mr N. Dooly; 2 and 3, Mr P. Greenwood.

The Society now meets at The British Legion Club on the first Wednesday in the month.

A PARTY numbering 41 people boarded the coach for the trip organised by **NOMAD A.C.** to visit the tropical fish breeding establish-

GOLDFISH SOCIETY OF GREAT BRITAIN members are visiting the Isle of Wight on 29th-30th April. The visit is primarily to stage an exhibition of the basic and popular varieties of goldfish, but also to enjoy a social evening with Isle of Wight A.S. members. The committee of the G.S.G.B. cordially invite all friends and relations of members to join the party. For further enquiries, please phone the assistant secretary of the G.S.G.B., Mrs Marguerite Dudley, at 01-540 3662.

ment in Lincolnshire run by Mr Tom Faithful, who will be known to many through his association with Faithful Fisheries. Nomad had invited members from Redhill & Reigate A.C., and Carshalton and Sutton A.S. to join them, and although the coach did not arrive until 12.15, through no fault of the driver the Nomad organiser hastens to explain, the party had a most enjoyable 4 hours being shown various aspects of commercial fish breeding and browsing around close on 2000 tanks containing many varieties of fishes in various stages of development. All concerned wish to offer their sincere thanks to Mr Faithful and his associates who run the farm.

WHITLEY BAY A.S.'s first inter-club show, with their neighbours **BLYTH T.F.S.**, was judged by Mr W. Cummings and Mr G. Fraser. The Frank Coleman Challenge trophy, introduced in honour of Whitley Bay's recently retired secretary, was the prize, and the home team won the trophy by 2039 points to 1512. The red-tailed black shark entered by Mr R. Stuart of Whitley Bay was awarded the best fish in the show title. The Society also at this meeting welcomed five new members, one of whom is their first lady member; and it has also been decided that the Society shall affiliate to the FRAS.

Winners of the classes at the inter-society show were:

Furnished jar: Mr D. Glynn (WB). Goldfish: Mr N. Buglass (BU). A.V. fighter: Mr K. Stevenson (WB). African cichlid: Mr J. T. Burns (WB). Small cichlid: Mr N. Buglass. Large cichlid: Mr J. Dooly (WB). A.V. labranch: Mr J. T. Burns. A.V. barb: Mr R. Stuart (WB). A.V. characin: Mr B. Ainsley (BU). Angula: Mr R. Ainsley. A.V. platy: Mr W. Howards (BU). A.V. swordtail: Mr J. T. Burns (WB). A.V. mollie: Mr N. Buglass. A.V. guppy: Mr R. Robinson (WB). A.V. caribbe: Mr M. Rodgers (WB). A.V. loach: Mr R. Stewart (WB). Sharks and lobsters: Mr R. Stuart (WB). Rasboras and danios: Mr D. Sharp (BU). A.O.V.: Mr D. Sharp (BU). Breeders pairs, egglayers: Mr M. Rodgers (WB). Breeders pairs, livebearers: Mr D. Sharp. Breeders egglayers: Mr G. Emmerston (WB). Plants: Mr J. T. Burns.

In Brief . . .

... THE coldest night of the winter did not deter 54 members of **EAST KILBRIDE A.C.** from attending when Mr Steve Naismith spoke on Corydoras catfish. Mr Naismith judged the table show; awards were made to the following class winners: Seniors, Corydoras, Mr J. Queen; a.o.v. catfish, Mr I. McClaren. Juniors, Corydoras, K. McKenzie; a.o.v. catfish, J. McLaughlan.

... AN average attendance of 60 at meeting nights of **SUFFOLK A. & F.A.** has caused a change of venue to the YMCA Hall, Norwich Road, Ipswich (second Monday of each month). John Chapman, junior member, won in the table show class for coldwater breeding pairs and Mr G. Richardson in that for tropical breeding pairs.

... A SLIDE show and tape by Mr C. A. T. Brown on 'Judging Fish' was greatly enjoyed by members of **STEVENAGE A.S.** At this meeting the quiz was won by Mr Fenimore. A talk on filtration by Mr G. S. Adams of Hermitage Tropicals, Hitchin also proved popular.

... A RECORD number of 37 attended the February meeting of **WEYMOUTH & D. A.S.** to watch a demonstration by Mr Tom Hatton on 'The Furnished Aquarium'. Mr K. Forrester arranged a 'Twenty Questions' quiz with Mrs P. Carter, Mr A. Billington, Mr T. Jones and Mr A. Worth on the panel. Table show winners (16 entries) were: male guppies, Mr A. Worth; female guppies, 1, 2 and 3, Mr T. Jones.

... THE discussion inaugurated by the secretary on general fishkeeping topics aroused much interest amongst **PRIVATEERS A.S.** (Shipley, Yorks.) members and lasted the whole 2 hours available. Secretary Mr F. W. Cules reports that it was most encouraging to see so many new members and to find them expressing their views alongside the more experienced aquarists present.

... MR W. HAM of **BRISTOL A.S.** gave many useful tips to fellow members when lecturing on 'One man and his pond'. He advocated a site in full sun for water lilies, which should be planted in baskets or pots, and suggested the background should also be considered as it provided colour by reflection. Claiming to be old-fashioned when stocking the pond he personally preferred gold otfe, golden tench and goldfish.

... **TOTTENHAM & D. A.S.** have been completing arrangements for their Silver Jubilee Open Show on 26th and 27th April but this did not prevent their enjoying the interesting meeting at which Mr K. Massey discussed 'The Fish House'—to be pursued further since Mr Massey has agreed to a return visit—and Mr H. Vinali spoke as a retailer of aquatic requirements.

... OF special interest to new members was the talk by Mr John Wheeler of Bradford-on-Avon to **YEOVIL & D. A.S.** on many aspects of fishkeeping including the conditioning of fish for the show bench. Established members too picked up many hints for the forthcoming show season. Judge Mr S. Langdon awarded first place in the table show class for a.v. catfish, loach and eels to Mr T. Hunt. Disappointment of the evening was the disqualification of the best fish, entered by Mr A. Rendell, since it had been shown in a sweet jar.

WITH the increasing popularity of Nishiki-ko during recent years, a few stalwarts, anxious to exchange views on the successful keeping of these beautiful Japanese fancy carp formed THE BRITISH KOI-KEEPERS SOCIETY. From a modest beginning less than 2 years ago, and as evidence of the wide interest aroused by enthusiasts, the membership of the Society now exceeds one hundred, and it may well be one of the largest specialist societies in the country.

Newsletters are sent to all members—containing articles on quarantining, feeding, breeding etc., and many useful ideas are exchanged.

At least two meetings are held annually in London. New members are welcome and details of membership will be sent upon application to the secretary, Mrs H. Allen, 1 Anthony Close, Francis Gardens, Peterborough, PE1 3XU (phone: Peterborough 67997).

... AT the recent **KEIGHLEY A.S.** meeting Mr Alec Firth of Bradford led a general discussion on fishkeeping and answered members' questions. Winners in the table show classes (33 entries) were: any pair, Mr Sagar; a.o.v., Mrs Beckett; novice a.o.v., Mr Hart; junior a.v., Master Cutting.

... **HAMPSTEAD & D. A.S.** members thoroughly enjoyed the meeting at which Mr T. Glass presented his talk and slide show on killifish. The table show for characins, rasboras, danios, minnows attracted 10 entries in each class.

IS your Rift Valley cichlid a potential Supreme Champion Fish for 1972? If so make haste to enter it in the FBAS Championship Class Dc for this group of fishes (see page 527 of 1971 for March), which this year is on the schedule of the ROEHAMP-TON A.S. Open Show (7th May—see 'Dates for Your Diary').

... LAST year was one of consolidation and expansion for **SOUTHAMPTON A.S.** with well-attended meetings to hear first-class speakers and record entries in table shows. Local trader Mr Derek Jones was unanimously elected as the new chairman. Mr Jones has given a slide show, with commentary by several members.

... **CARSHALTON & D. A.S.** thank all those who attended their annual dance and made it such a success. The club have recently enjoyed a talk by Mr Frank Tomkins, (Mr J. Begbie won in the a.v. tropical fish class in the table show).

... MR DEREK JONES provided members of **NEW FOREST A.S.** with an enjoyable evening's entertainment with his talk and colour slides. Slides of fish spawning, including Siamese fighters and angel fish, of set-ups for breeding other varieties, of fish at Belle Vue, and a series devoted to cichlids enabled the audience to pick up many useful tips.

... NEW member Mr Stockley won in the catfish and loach class at a recent meeting of **DORCHESTER & D. A.S.** (2, Mr Taylor; 3, Mr Christopher), when members enjoyed the second lecture given by Mr Billington on setting up an aquarium.

... OLD friends and rivals from Reading were welcomed by **DIDCOT & D. A.S.** at a 12-a-side match, judged by Mr D. Hancock. The match resulted in a draw (913 points each). (1, Mr R. Turner, Didcot, male guppy, 80 points; 2 and 3, Mr R. Drummer, Reading, 791, 79).

... MEMBERS wanted! New Society **UNITED A.S.** welcomes new members at meetings. See Meetings and Changes of Officers in this issue.

... **WELBECK A.S.** is a new Society formed in Castleford. Meetings are held on the third Wednesday of the month in a private room at the Royal British Legion Club, Welbeck Street, 7.30 p.m. and secretary Mrs J. E. Asquith extends a cordial invitation to anyone interested. People with children are

welcome. Societies holding open shows are invited to send schedules to her at 32 Lower Oxford Street, Castleford, Yorks WF10 4AE.

... FORMED only in October 1971, **SOUTH SHIELDS A.S.** are now 46 members strong. Meetings are held fortnightly at The Neptune Hotel, South Shields.

... **ILFORD & D. A. & P.S.** learnt a great deal from Mr Bernard Pye's lecture and slides on sword plants and cryptocorynes. Mr Seaman was awarded first and second place in the miniature furnished show jar competition (3, Mr M. Perry). The Society meet at St Lawrence Church Hall, Hamilton Avenue, Barkingside and a lecture is provisionally arranged for Monday, 10th April.

... THIS year is a special one for **BRADFORD & D. A.S.**—their twenty-fifth anniversary. The Society are holding their annual inter-

society show on 1st April and the entrance fee includes unlimited entries and a supper, plus an auction.

... **TORBAY A.S.** juniors are challenging the seniors strongly at table shows. At the competition for swords, danios, and minnows, junior entries outnumbered the seniors by 11 to 7. Winners were: seniors, Mr T. Woolley, Juniors, swords: 1, and 2, Master R. Snow; 3, Master C. Bragg. Juniors, danios and minnows: 1, Master C. Bragg; 2, Master Coleman; 3, Master Snow. At this meeting Miss Watley from Paignton Zoo gave the lecture.

... **BRISTOL T.F.C.** welcomed many new faces at their February meeting. This featured a quiz on the lines of 'University Challenge', devised by Mr P. Lewis and R. Lawrence with slides by Mr G. Churchill. Plans for the Society's 3-day Open Show in June are now well advanced.

Badge of the Month



NAMES of the Patrons of the **Bishops Cleeve A.S.** will be recognised at once by aquarists: Dr Herbert Axelrod (U.S.A.) and Dr Gunther Sterba (Germany). Badge of the club is a silver replica of the red-tailed black shark. Started in January 1969, official founding of the Society was in April 1969. Up to the end of 1971 it was the boast of the Society that they had never lost an interclub match. Meetings are held on the first Wednesday of each month, 7.30 p.m., at the Labour Club, Royal Well Bus Station, Royal Crescent, Cheltenham. Secretary is Mr P. Stone, Waverley, 44 Ashchurch Road, Newtown, Tenkesbury, Glos.

Dates for Your Diary

Dates preceded by ★ are of Shows to which FBAS Championship Classes are allocated.

★1st April. **RUNNYMEDE A.S.** Open Show. Fochford School, Ashford, Middlesex. Details: Mr K. Smith, 21 St Anne's Avenue, Staveley, Baines, Middlesex.

★12nd-17th April. **TOTTENHAM & D. A.S.** Silver Jubilee Open Show. Haringey Sports Council Drill Hall, High Road, Tottenham, London, N.17 (opposite Spurs Ground). Schedules: Mr K. Mamer, 72 Westward Road, South Chingford, E.4 (01-547 7811).

3rd April. **SOUTHAMPTON & D. A.S.** Open Show. Avenue Hall, Southampton. Schedules: Mr M. Maschridge, 26 Wakefield Road, Botolph, Southampton.

4th April. **HOUGHTON & D. A.S.** Open Show. Philadelphia Workers Hall, Herringston Burn, Co. Durham. Schedules: Mr C. A. Ewright, 27 Longacre, Houghton-le-Spring, Co. Durham.

9th April. **SHEFFIELD & D. A.S.** Open Show. Granville College, Granville Road (nr. Railway Station), Sheffield 1. Schedules: Mr F. Toyne, 10 Babes Crescent, Sheffield 10.

★9th April. **STOCKTON-ON-TEES** Open Show. St Peter's & Paul's School, off Durham Road (A177). Schedules: Mr M. Marshall, 15 York Crescent, Billingham, Teesside.

19th April. **G.S.G.B. A.G.M.** Coway Hall, Red Lion Square, Holborn, London, W.C.1.

16th April. **WARRINGTON A.S.** Open Show. Bell Hall, Oxford Lane, Warrington, Lancs.

★16th April. **MEDWAY A.S.** Open Show. St John Fisher School, Ordenshire Street, Chatham, Kent (4 min. Chatham Station).

Schedules: Mr J. Marshall, 97 Dragen Road, Chatham, Kent (phone Medway 637112).

★22nd April. **INDEPENDENT A.S.** Open Show. The Public Hall, Ilington Town Hall, Upper Street, Ilington, London, N.1. Schedules: Mr E. Edip, 83a Colneyhatch Lane, London, N.10.

★23rd April. **THURROCK A.S.** Open Show. Park School, Bridge Road, Grays, Essex. Tropical, coldwater, furnished aquaria, pairs breeders classes. Schedules: Mr D. C. M. Durrant, 172 Trinity Road, Southend, Essex; phone Southern 608770.

23rd April. **YORK & D. A.S.** Open Show. Folk Hall, New Eastwick, York. Schedules: Mr P. Booth, 8 Saxon Place, Harworth, York.

23rd April. **MIDLAND AQUARISTS' LEAGUE SHOW.** Sports Centre, Granby Street, Loughborough. Open Classes: a.v. cichlids, a.v. anabantids, a.v. herps, a.v. characins. Refreshing, noon to 2.30 p.m. Details: Mr V. Perry, 447 New Ashby Road, Loughborough, Leics.

23rd April. **FREELANCE A.S.** Open Show. St Stephens Hall, Surrey Square, London, S.E.17. Details: Mr J. Stamp, 72 Redman House, Last Street, S.E.1; phone 487 4966.

★19th April. **UXBRIDGE & D. A.S.**

Open Show. G.P.O. Motor Repair Depot, Willow Tree Lane, Yeading Lane, Yeading, Herts, Middx. Schedules: Mr N. V. Lee, 48 Alredale Road, Ealing, London W34 5B).

29-30th April. **G.S.G.B. Visit to Isle of Wight A.S.** All friends and relations of members invited. Enquiries: Mrs M. Dudley, 195 South Park Road, Winkfield, S.W.19 (phone 01-449 3661).

30th April. **BLAKEBOROUGH A.S.** Open Show. Coopers, J. Blakeborough & Sons Ltd., Brighton. Details to follow.

30th April. **COVENTRY POOL & AQUARIUM SOCIETY.** Open Show. Folshill Community Centre, Folshill Road (A444), Coventry. Details to follow.

6th May. **AQUARISTS FILM SHOW** (M. Carel and M. Wain) organised by

London's Fifth Annual Exhibition of Fishkeeping The AQUARIUM SHOW '72

Friday 27th October to Sunday 29th October
at the Royal Horticultural Society's Old Hall, London S.W.1

All enquiries to the Show Organiser,

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7th May, DEKERS A.S. Open Show. The Windsor Portland Technical Grammar School, Spacken Hill, Woking. Schedules: Mr M. Woodley, 20 Park Street, Woking, Surrey.

7th May, ROEHAMPTON A.S. First Open Show. Alton Parish Hall, Alton Road, Rushampton, London, S.W.13. Details: Mr T. Lambourne, 7 Wholford Court, Ploagh Road, London, SW11 4AX (phone 61-242 0225).

12th May, SOUTHBEND LEIGH & F.A.S. Open Show. St Clements Hall, Leigh-on-Sea. Show secretary, Mr R. D. Orford, 8 Elmham Chase, Leigh-on-Sea, Essex.

12th May, TROWBRIDGE & D. A. & F.A.S. Open Show. Nelson, Hadon Girls School, Trowbridge. Schedules: Mr W. S. Burton, 17 Poleham Road, Trowbridge, Wilt.

12th May, BASS Meeting. Follows Lecture Hall, London Zoo, Regents Park, 2.0 p.m. All welcome. Tickets from Mr F. Kees, Highcliff, Old Hill, Woking, Surrey.

14th May, HULL A.S. Open Show.

14th May, MERSEYSIDE A.S. Open Show. The British Legion Club Ltd, Holywell Hall, 3 Cromwell Avenue, Liverpool L8. Details: Mr B. T. Hall, 114A Roughton Edge, Her. Central, Form, Liverpool L8 1RY (phone: 291-486 8013).

14th May, DERBY REGENT A.S. Open Show. Sherwood Foresters Recreation Centre (Normanton Barracks), Cannon Road (A5111), Derby (Dulver R.A.C. sign), Show secretary, Mr R. G. Hallow, 18a Mansfield Road, Derby (phone 443242).

15th May, LEICESTER FISHPKEEPER'S CLUB Fishkeeping Exhibition. St Mark's Church Hall, Belgrave Road, Leicester. Details: Mr D. Freeman, 20 Sheffield Street, Leicester LE2 0GN.

15th May, NORTHWICH & D.A.S. Open Show (AMIDAB). Venue announced later. Details: Mrs D. J. Thorne, 28 Whitgate Road, Winsford, Cheshire; phone Winsford 228.

15th May, YEovil & D. A.S. Open Show. The School Hall, Church Street, Marock, nr. Yeovil. Full details later. Show Manager: Mr D. Phang, 5 Hill Terrace, Bowentown, Marock, Somerset.

15th May, CROYDON A.S. Open Show. St Philip Games Reception Centre, Moorland Avenue, Croydon, Surrey. Details: Mr A. J. H. Smith, 3 Hindhead Way, Wallington, Surrey.

17th-18th May, FGA INTERNATIONAL GUPPY OPEN SHOW. Globe Farm Community Centre, Globe Farm Road, Stockfold, Birmingham. Open to viewing, Sunday 17th, 1.4-2.0 p.m. Details: Mr D. R. Beacham, 17 Pedmore Close, Woodrow Street, Redditch, nr. Birmingham.

18th May, BOSTON A.S. Open Show. Balfour's Theatre, Sweeney Road, Boston, Lincoln. Details: Mr S. Noble, 174 Wood Farm Road, Boston, Lincoln.

18th May, CORBY & D. A.S. Open Show. Corby Civic Centre. Schedules: Mr A. Snow, 176 King Street, Kettering, Northants.

18th June, ACCRINGTON & D. A.S. Open Show. St John Ambulance Drill Hall, Bull Bridge, Accrington. Schedules: Mr S. Walsh, 131 Laneswick Road, Blackburn, Lancs.

18th June, HALF MOON A.S. Open Show. Details: Mr K. Grundey, 6 Robson Street, Haverton Hill, Billingham, Teesside.

18th June, GKN POND & AQUARIUM SOCIETY (augured) Open Show. GKN Centre, Salisbury Street, Darlington, Staffs. Entertainment for all the family. Schedules: Mr K. Rowley, 195 Wolverhampton Street, Darlington, Staffs.

18th June, LOUGHBOROUGH & D. A.S. Open Show. Loughborough Sports Centre, Granby Street, Loughborough. Details: Mr T. H. Perry, 447 New Ashby Road, Loughborough, Leics.

18th June, BOURNEMOUTH A.S. Open Show. Kinson Community Centre, Pelsham Park, Kinson, Bournemouth. Schedules (After 1st May): Mr J. V. Jeffery, 20 Brearley Avenue, Southbourne, Bournemouth, BH5 4JF. No entries accepted at door.

18th June, LINCOLN & D. A.S. Open Show. Details: Mr H. Kuhn, 44 Scorey Street, Lincoln.

18th June, LLANTWIT MAJOR A.S. Open Show. Llantwit Major Town Hall. Details: Mr A. Robertson, 44 St Mary's Avenue, Barry, Glam.

18th June, BISHOPS CLEEVE A.S. Open Show. Tythe Barn, Evesham Road, Bishops Cleeve, Cheltenham, Glos. Further details: Mrs M. Scriver, 27 Warden Hill Road, Cheltenham, Glos.

18th June, HIGH WYCOMBE A.S. Open Show. Lane End Hall, Lane End, High Wycombe, Bucks.

18th June, THORNE A.S. Open Show. The Grammar School. Details: Mr H. C. Jewison, 54 Hawthorne Road, Thorne nr. Doncaster; phone 512041.

18th June, W.K.E.R.A.S. Open Show. The Town Hall, High Street, Colnshill. Details (after 1st April): Mr R. J. Tromana, 27 Moshall Road, Kingshurst, Birmingham; 011-786 7343.

18th June, RIVERSIDE A.S. Open Show. St Saviours Church Hall, Cobbold Road, off Auker Road, London, W.12. Schedules (later): Mr M. Goss, 3 Bealby Court, Plantation Road, Amersham, Bucks.

18th June, SOUTH SHIELDS A.S. First Open Show. Details: Mr G. Petterman, 234 South Eldon Street, South Shields, Co. Durham NE3 1AL.

18th June, SALISBURY A.S. Open Show.

18th June, GLOSSOP A.S. Open Show. The Education Centre, Talbot Street, Glossop. Details: Mrs M. Beasley, 6 Water-side, Hadfield, Hyde, Cheshire.

22nd-24th June, BRISTOL TROPICAL FISH CLUB. Open Show. Congregational Church Hall, Newton Street (off Stapleton Road), Bristol 2. Schedules: Mr B. Lawrence, 28 Southbridge Park, Eastville, Bristol BS4 6BR.

24th June, ANSON A.C. Open Show. Details to follow.

14th June, MID-HERTS A.S. Open Show. Held in conjunction with Cell Buses Fete, Cell Buses Hospital, St Albans. Details: Mr C. S. A. Withers, 15 Charnwood Road, St Albans, Herts.

15th June, ALFRETON & D. A.S. Open Show. Adult Education Centre, Alfreton Hall, Alfreton. Details: Mr B. Hicking, 15 Meadow Close, Eastwood, Notts, NG6 3DQ.

21st June, GOSPORT & D. A.S. Open Show. Crofton Community Association, Southdown, Gosport. Details: Mr P. Hayward, 216 Locke Road, Park Gate, Southampton.

22nd July, CASTLEFORD & D. A.S. Open Show. Carleton Community Centre, Carleton, Pottersfract, Yorks. Details: Mr B. Stevens, 72 Falcon Drive, Love Lane, Castleford, Yorks (or phone Mrs Gates, Pottersfract 3323).

22nd July, EXETER & D. A.S. First Open Show. Kennelwood Village Hall, Kennelwood, nr. Exeter. Booking by 14 noon. Schedules: Mr W. F. Dye, 14 Bessworthy Close, Exeter EX2 4LB; phone 2547.

22nd July, NORTH WARWICKSHIRE A.S. Open Show. The Settlement, Kingstanding Road, Kingstanding, Birmingham. Details: Mr T. Snow, 108 South Road, Edington, Birmingham.

22nd July, LYTHAM A.S. Open Show. Lowfield Gardens Pavilion, Lytham, Lancs. Details: Mr D. Wright, 13 Cambridge Road, Ansdell, Lancs.

26th July, BASINGSTOKE & D. A.S. Open Show. Central Hall, Basingstoke. Schedules from Mr M. Strang, 19 Loddon Court, Neville Close, Basingstoke, Hants.

28th-29th July, ROMFORD & BEACON-TREE A.S. Open Show (Daggerham Town Show). Central Park, Daggerham, Essex. Schedules (later): Mr D. G. Kerr, 14 Lymwood Drive, Collier Row, Romford, RM3 0QT (phone 70-67804).

22nd July, FORT TALBOT & D. A.S. Open Show. Y.M.C.A., Fort Talbot, FHAS Bales, 11 judges. Schedules (later): Mr M. John, 30 Golden Avenue, Sandfields, Fort Talbot.

10th July, G.S.G.R. Quarterly Meeting. Conway Hall, Red Lion Square, Holborn, London, W.C.1.

27th-28th August, PORTSMOUTH A.S. Open Show. Y.M.C.A., Community Centre, Twyford Avenue, Portsmouth. Fish entered 5th, judged 6th, public 7-12th. Schedules: Mr J. Stillwell, 34 Salcombe Avenue, Copner, Portsmouth.

10th August, TONBRIDGE & D. A.S. First Open Show (provisional date).

9th-12th August, CYMRU NATIONAL A.S. Open Show. T.A. Drill Hall, Cardiff. Booking 2th and 10th. Details: Mr H. Gervill, 21 Gabaia Road, Llandaf North, Cardiff.

12th August, HARLOW A.S. Open Show. Details: Mr P. Mardock, 21 Brook Lane Field, Harlow, Essex.

22th August, BRACKNELL & D. A.S. Open Show. Friarwood Community Centre, Friarwood Court Road, Bracknell (opposite Admiral Cunningham Hotel). Schedules: Mr L. Jordan, 62 Fernbank Place, Ascot, Berks (phone: Winkfield Row 3405).

12th August, NORTH STAFFS. A.S. Open Show. Details later.

22th August, SOUTH PARS AQUATIC (STUDY) SOCIETY & KINGSTON & D. A.S. combined Open Show.

20th August, BEDWORTH A. & F.S. Open Show. Nicholas Chamberlaine School, Bulkington Road, Bedworth. Schedules: Mr T. Pagen, 74 Lister Street, Arlborough, Notts.

20th August, OLDHAM & D. A.S. Open Show. Warrath Park, Oldham. Details: Mr E. Birchwood, 50 Inverness Avenue, Blackley, Manchester 9.

24th August, PLYMOUTH D. A. & F.S. Open Show. Plymouth Y.M.C.A. Details: Mr J. Ruddle, 30 Durham Avenue, Lipson, Plymouth, Devon.

2nd September, BETHNAL GREEN A.S. Open Show. Details to follow.

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22nd September. **YATE & D. A.S.** Open Show, Newmans Centre, Yate, Chipping Sodbury, Glos. Schedule: Mr M. Ewery, 114 Sandridge Park, Yate, Bristol (phone: Chipping Sodbury 313641).

22nd September. **LUCAS A. & P.S.** Open Show, Joseph Lucas Ltd., Green no. 4, Spring Road, Half Green, Birmingham 28. Schedule: Mr G. H. Roberts, 30 Charles Road, Solihull, Warks.

27th September. **WELLINGBOROUGH & D. A.S.** The Drill Hall, Wellingborough. Schedule: Mr D. Buchanan, 14 George Street, Wellingborough.

27th September. **WHITLEY BAY A.S.** Open Show, Empress Ballroom, Whitley Bay, Northumberland. Show schedule available later.

29th September. **WEYMOUTH & D. A.S.** Open Show, Small Sidway Hall. Details: Mr E. R. Jones, 17 Ludlow Road, Weymouth, Dorset.

10th September. **NUNEATON A.S.** Open Show, Friary Youth Centre, Abbey Street, Nuneaton. Details: Mrs P. Dinkin, 1, Goswell Drive, Harwell, Leicester (phone East Shilton 42581).

10th September. **BRIGHTON & SOUTHERN A.S.** Open Show, The Marquee Centre, Marston Road, Hove, Sussex.

13th-16th September. **BRISTOL AQUARISTS SOCIETY** Open Show, St Michael's Parish Hall, Bishopston, Bristol. Details: Mr H. C. B. Thomas, 2 Grove Park, Bristol BS6 4PF.

16th September. **HAVANT & D. A.S.** Open Show, Devereil Hall, Purbrook, Havant. Details: Mr V. B. Hunt, 120 London Road, Witley, nr. Portsmouth, Hants.

16th September. **HOUNSLOW & D. A.S.** Open Show, Hounslow Youth Centre, Cecil Road, Hounslow.

21st September. **G.S.G.B.** 1972 Convention. Venue to be decided.

24th September. **NORTHAMPTON & D. A.S.** Open Show. Details to follow.

24th September. **OSRAM A.S.** Open Show, Barrington Hall, Refuge Street, Oldham, Lancs. Details: Mr J. E. Shors, 22 Refuge St, Shaw, Oldham, Lancs.

24th September. **TORRAY A.S.** Open Show, Torquay Town Hall. Details to follow.

21st October. **EALING & D. A.S.** Open Show, Northfields Community Centre, Northcroft Road, London, W.13.

27th October. **BASS** Meeting, Fellows Lecture Hall, London Zoo, Regents Park, 2.0 p.m. All welcome. Tickets from Mr F. Keza, Highcliff, Old Hill, Woking, Surrey.

7th October. **EAST LONDON A. & F.A.** Open Breeders Show, Ripple Road School, Barking, Essex. Breeding from 8.0 p.m. 6th October—9.0 a.m. 7th. Schedule from: Mr F. Vickor, 13 Irons Way, Romford, Essex.



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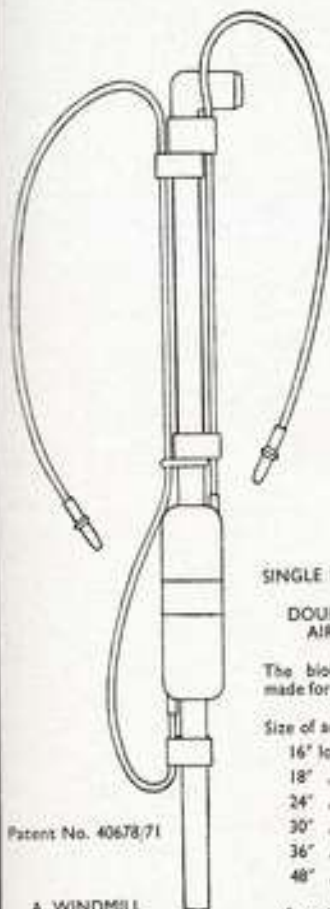
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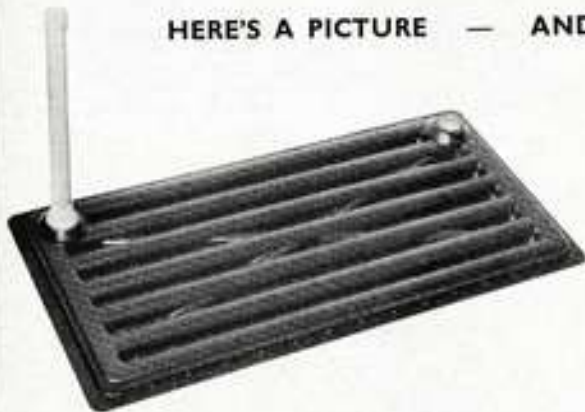
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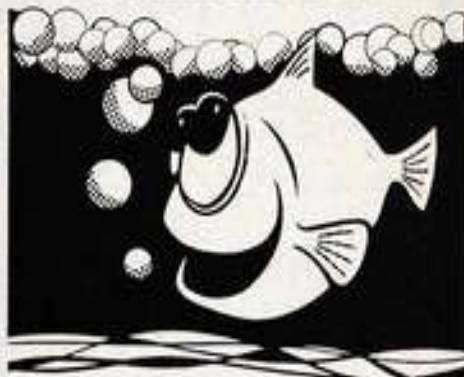
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CLOSED ALL DAY SUNDAY AND MONDAY

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

TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £7.35, insulated container and carriage £1.50. Coldwater minimum order £3 plus £1.25 tax and carriage. Plants by post (minimum order £0.50) please add £0.25 post and packing.

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