The Aquarist

and Pondkeeper

SEPTEMBER 1965

MONTHLY
Vol. XXX No. 6

TWO SHILLINGS AND SIXPENCE

QUEENSBOROUGH FISHERIES

SEE OVERLEAF FOR FURTHER INFORMATION

SPECIAL PLANT COLLECTIONS (post only)

All post enquiries: 111 Goldhawk Road, W.12. 2s. post and packing on all collections

TROPICALS

No. 1 10 plants including Dwarf Lily Cryptocoryne Wissaria etc. — £1

No. 2 (1 Vallisneria, (1 Myriophyllum, 3 Micro Sagittaria, 6 Ludwigia, 6 Elodea Densa — £1

No. 3 (2 Vallisneria, 6 Myriophyllum, 6 Ludwigia, 6 Elodea Densa, 6 Bacopa, 1 Amazon Chain Sword, 1 Portion Hair Grass — £1

No. 4 1 Nymphus Stellata, 1 Giant Hygrophila, 1 Aponogeton, 1 Wissaria, 1 Giant Sagittaria, 1 Cryptocoryne, 1 Indian Fern, 1 Portion Hair Grass — £1

No. 5 6 Vallisneria, 6 Myriophyllum, 6 Hygrophila, 6 Elodea Densa — 10/-

No. 6 1 Portion Hair Grass, 1 Portion Clover, 6 Micro Sagittaria, 6 Bacopa — 10/-

Cultures of pure Infusoria for your Fry — 5/-

AQUARIUM OR POND

No. 14 (2 Sagittaria, 6 Myriophyllum, 6 Ludwigia, 6 Honeywort, 6 Hornwort, 1 Portion Rissle, 3 Portions Hair Grass — £1

No. 15 50 Plants for your Aquarium—Value 30/- — £1

No. 16 6 Vallisneria, 6 Moneywort, 6 Elodea Densa, 3 Hornwort, 3 Portions Hair Grass — 10/-

TROPICAL OR COLD

No. 17 Giant Amazon Sword Plants 6-8 inches — 7/6

No. 18 Water Lettuce Very beautiful plants — 2/6 or 5 for 10/-

No. 19 Water Hyacinth 6-8 inches Floating Plant — 7/6

No. 20 Spatterdock — 3/6

No. 21 10 large bunches of oxygenating plants for your pond — £1

No. 22 Selection of oxygenating plants & Marginals Value 35/- — £1

Live Daphnia	2/-
Tubifex	1/6 2/6
Microworms	3/-
Whiteworm (Post Free)	3/-
Pond Snails	6d. ea.

SUNDAYS AND THURSDAYS AT WRAYSBURY

SPECIAL OFFERS

For Example

Neon Tetras	8 for £1	Bacopa	12 for 5/-
Harlequins	8 for £1	Amazon Chain Swords	4 for 5/-
Angels	8 for £1	Indian Fern	3 for 5/-
Swords	4 for 10/-	Cryptocoryne	2/6 each
Zebras	4 for 10/-	Giant Hygrophilla	2/- each
Widows	4 for 10/-	Water Wisteria	2/- each
Sagittaria	12 for 5/-	Wilhisii	2/6 each
Ludwigia	12 for 5/-	Cordata	2/6 each
Hygrophila	12 for 5/-	Haemotiana	2/6 each

and many others bargains

OPEN 10a.m. to 6p.m.

Special News

See Page IX

We are specialists in aquarium installations. All sizes and styles to customers' own specification carried out. We have many displays set up in our showrooms. Why not call and let us quote.

INTER-PET STAINLESS STEEL HOME AQUARIA SET. 12 gns.

BOW AQUARIUMS

36in. × 12in. × 15in. bow-fronted aquarium with wrought iron bookcase stand £19/19/- complete.

48in. × 12in. × 15in.—29 gns.

Penny bronze, black & gold, and cream. Also plain stands

STANDS

18 × 10 × 36	—	37/6
24 × 12 × 36	—	47/6
30 × 12 × 36	—	52/6
36 × 12 × 36	—	57/6
48 × 12 × 36	—	67/6

BACKING PAPERS

STRATA ROCKWORK
SEA & SHORE
BLUE SKYS
SAND & SHELLS

24in. long × 20in. high. 2/6 per sheet, or 1/3 per foot. *(post free)*

THERMOSTATS

Coomber Externul	34/-
Springfield Externul	25/-
Springfield Int. (Adj)	15/-
Springfield Int. (Adj)	30/-
Lyng	
Int. (Adj)	15/-
Int. (Adj) "Popular"	10/-
"Popular" with neon indicator	12/6
Rena (with Neon)	21/-
"Tu-Ri" Sentinel	26/6

THERMOMETERS

	each
Mercury	6/6
Glass	6/6
Plastic Backed	6/6
Spirit Blue Glass	5/-
"Tu-Ri" Dumpy	6/6

FILTERS

"Windmill" Plastic Outside Filter	19/6
"Windmill" Biological Aquarium Filter 12/6,	15/-
"Windmill" Reggent Inside Filter	10/-
Corner Filter	8/-
Air Lift	2/6
"Slim Jim" Outside Filter	17/6
"Kleer King" Outside Filter	22/6
Bottom Filter	8/3
Ornamental Rock Filter	17/6
Uno Polyfilter	3/6
Geo-Weld Bubble-up	35/-

AERATORS & PISTON PUMPS

	each
Monsoon	21/-
	24/-
Fairy	27/6
Star	36/-
Rena	50/-
Zoobeka Total	75/-
Hy-flo Junior	107/6
Hy-flo "A"	130/-
Hy-flo "B"	165/-
Hy-flo "C"	250/-

HEATERS

	each
"QUEENSBOROUGH" 25w., 40w., 60w., 75w., 100w., 120w., 150w.	10/-
Rena (75—200w.)	10/-
"Tu-Ri" Flexible Heaters (100w.)	19/-
"Tu-Ri" Thermostatic Heaters, 100w. and 150w.	36/-
Priest-matic	34/6
Inter-Pet Thermostatic Heater 22/6 and	29/6
Heater Holders	2/-

REMEDIES, etc.

Halamid	5/6
Lagatine	1/9
Diversolve	2/6
Brossom White Spot Cure	2/-
Sea Salts	1/6

SEDIMENT REMOVERS

	each
"Windmill" Air Rejectors	10/-
"Windmill" Hand Rejectors	15/-
Fishtail	3/-
Syphon Tubing	7d. ft
Hand Type Plastic	4/6
Swirl Away	46/8

PLANTS

	each
Vallisneria Spiralis	9d.
Elodea Densa	9d.
Hygrophila	9d.
Bacopa	9d.
Sagittaria natans	9d.
Sagittaria micro	9d.
Vallisneria torta	9d.
Ludwigia	9d.
Myriophyllum	9d.
Cryptocoryne Beckettii	2/-
" *Willisi*	2/6 and 5/-
" *Cordata*	2/6 and 5/-
" *Haerteliana*	2/6 and 5/-
Water Wisteria	2/6
Giant Hygrophila	2/6
Giant Sagittaria	2/6
Najas Microdon	2/6
Amazon Chain Sword	2/6
Duckweed per portion	1/-
Riccia per portion	2/-

FOODS

"Queensborough" Tropical Fish Food	2/6 and 2/6
Exotic Flakes	1/6
Hykro Flakes	1/-
Brostaxx	1/6 and 2/6
Brossom Fryguin	1/6
Liquifry Nos. 1 and 2	2/6
Infusyl	2/6
Elite	2/- and 4/6
Dried Daphnia	Our 6d.
Ground Shrimp	own 1/-
Fish Food	pack 1/6 in 3 sizes
Ants Eggs	6d.
Wardley's Trout Pac.	
7 kinds of food	8/6
Hi-Glow	4/6
Bird	2/6
G. Bartmanns	3/6
Foodex	3/-
Supremix	2/6
Terramin Flake (all sizes) 1/10, 2/-, 6/6,	22/6 and 70/-
Suregrow	1/- and 2/-
(dry food)	1/3
Vitakraft 1/10, 6/9, and	22/6

LIVE FOODS

Brine Shrimp Eggs	2/6 and 4/6
Cultures of Neat Worm 1 oz.	7/6
" " 2 oz	13/6
White Worm	3/-
Micro Worm	3/-
Tubifex worms	1/6 and 2/9

BOOKS

Tropical Fish in the Aquarium	17/6
Aquarium Plants	36/6
Freshwater Fishes of the World	84/-
Diseases of Fishes	15/6
All about Tropical Fish	77/-
Encyclopedia of Tropical Fishes	63/6
Electricity in your Aquarium	8/6
Illustrated Dictionary Of Tropical Fish	67/6
Exotic Tropical Fishes	150/-
Alfy P.H. Books	2/- each
The Book of the Garden Pond	16/6
A Manual of Aquarium Plants	17/6
Garden Ponds & Fish	12/-
Pond Life	6/-
Aquariums & Fishponds	5/6
Exotic Aquarium Fishes W. T. Innes	102/6

Postage included

SUNDRIES

	each
Breeding Trap	15/-
Sockets Knob or Shank	4d.
" Double	6d.
Planting Sticks	1/3
Dry Floating Rings	1/-
" Squares	1/6
Hykro (4 in one) Feeder	2/3
Worm Floating Feeders	1/6
Worm Cradle with Socket	1/6
"Windmill" Diffuser Stones	1/- to 1/6
"T" Piece	1/-
Aerator Tubing Rubber	1d.
Plastic	4d.
4 Way Piece	1/-
Cleaners	1/-
Carbon	1/-
Glass Wool	1/2
Nylon Wool	1/6
Testing sets	18/6 and 30/6

Post 1/9 extra

Hykro Leak Sealer 2/-

FULLY-GLAZED AQUARIUMS

Pressed Steel			Angle Iron		
Aluminium					
Inches	*Tank H'd Refl.*		*Inches*	*Tank H'd Refl.*	
12 × 6 × 6	10/6	— 6/6	24 × 12 × 15	57/6	27/6 8/6
14 × 8 × 9	13/6	— 7/-	30 × 12 × 15	77/6	32/6 —
16 × 8 × 8	15/-	— 7/6	36 × 12 × 15	97/6	38/6 —
18 × 10 × 10	22/6	15/- 8/-	48 × 12 × 15	137/6	48/6 —
24 × 12 × 12	52/6	21/- 8/6			

CARRIAGE EXTRA

Please add 1/6 extra postage on appliance orders up to 10/-; 2/- up to 20/-; 2/6 up to 30/-. **Glass, China and Shells sent at purchasers own risk.**

QUEENSBOROUGH FISHERIES

111 GOLDHAWK ROAD, SHEPHERD'S BUSH, W.12
(1 minute from Shepherd's Bush Market)
Telephone: SHE 2730
Hours of Business: MON. to SAT.— 9 a.m.-6.30 p.m. CLOSED THUR.

QUEENSBOROUGH HOUSE, Ferry Lane, Hythe End, Wraysbury Nr. Staines
Telephone: WRAYSBURY 2005
Sundays and Thursdays only from 10 a.m. to 4 p.m.

16 PICTON PLACE, LONDON, W.1
(1 minute from Selfridges)
Telephone: WELBECK 0438
Hours of Business: MON. to FRI.— 9.30 a.m.-6 p.m. SAT. 9.30 a.m.-5 p.m.

ALL POSTAL ENQUIRIES TO GOLDHAWK ROAD ADDRESS

The AQUARIST
AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"

THE BUTTS, HALF ACRE, BRENTFORD, MIDDLESEX
Telephone: ISLeworth 6221

PUBLISHED MONTHLY

SUBSCRIPTION RATES

The Aquarist will be sent post free for one year to any address for £1 15s. 0d. Half-yearly 17s. 6d. Canada, U.S.A. $5.00 yearly; $2.50 half-yearly.

QUERIES

Postal replies are made to all specialised queries accompanied by a stamped, addressed envelope. *This privilege is afforded only to registered readers and direct subscribers.* Subscription forms can be obtained on application. In all cases letters should be addressed to the Editor.

Correspondence with intending contributors is welcomed.

MSS. or prints unaccompanied by a stamped, addressed envelope cannot be returned, and no responsibility is accepted for contributions submitted.

The Editor accepts no responsibility for views expressed by contributors.

Contents

VOL. XXX No. 6 1965

A Criticism of Fish Breeding

by A. BURCH

THE successful breeding of fish is often thought to be the ultimate goal of every aquarist. It is the means by which every fish-keeper is popularly judged. Why has fish breeding become all-important to the aquarist's hobby? What rewards can be gained from breeding that cannot be obtained from the maintenance of a single community tank?

This trend from the small fish-keeper to the experienced fish breeding club member might be perfectly healthy as far as the hobby itself is concerned—but does not this fact indicate that there might be something rather wrong with the aims and ideals of the aquarist's hobby? For it cannot really be doubted that the local club is responsible for encouraging extensive breeding as a means by which it can perform its natural but perhaps not altogether desirable function as judge of the members' relative skills. I think perhaps I had better not try in this context to condemn as a whole the existing relationship between the hobby and its following of clubs; rather I will try to deal only with breeding as an extension of the aquarist's hobby.

The beginner first attempts fish breeding from what might—for want of a better word—be called general curiosity. He does, I imagine, want to see his fish breed for much the same reasons as those for which he took up fish-keeping in the first place; though what exactly those reasons might be is far too involved a subject for me to attempt to answer here.

The first problems which the freshly graduated fish breeder will come across is the rather inevitable fact that breeding produces more fish. What is he to do with these fish once they are old enough to be demanding large quantities of extra space? I am only making a calculated guess but I would suggest that few aquarists are able to sell all the fish they produce. To say the least, the inexperienced fish breeder will probably soon find that it is far easier to breed fish than it is to sell them. The wholesalers supplying the fish to the dealers will not willingly forsake the reliable commercial breeder for the fluctuating amateur market with its disease and transportation difficulties.

The aquarist could, of course, kill off his unwanted fish, but apart from the emotional conflicts arising from the

destruction of his well-loved fish, it does rather destroy the point of breeding in the first place; the trouble goes through hardly seems worth it. How can his enthusiasm, arising from the creation of life, withstand the need to destroy it again when the young fish become too demanding?

The aquarist facing this solution to his problem of an excessive fish population would, I imagine, soon despair and give up keeping fish altogether.

It might be that the aquarist attempts to keep all his young fish. This is probably the best short term solution for the aquarist who faces this dilemma. It soon becomes necessary, however, to provide more space for his growing stock and the price of new aquaria and their maintenance will deal a crippling blow to enthusiasm already shocked by the appearance of so many, seemingly identical, young fish. Fish breeding will be associated in his mind with the production of large numbers of fish which have to be kept until old age finally relieves the fish-keeper of his irksome responsibility. Also as it is usually the more uninteresting type of fish which the beginner finds the easiest to breed, I can imagine nothing more likely to kill the beginner's 'spirit' than the boredom and sense of anticlimax arising from the adequate rearing and subsequent housing of the 60 or 70 offspring of the more 'decorative' egglayers.

When considering the pleasure to be obtained from the simple observation of a species in an aquarium there seems to be an optimum number of individuals which it is desirable to have—too few and you don't see them often enough or you can't see their behaviour as a group, too many and they lose their significance as individuals and become submerged in a shoal (this effect is only too noticeable in any large collection of fish; for example, the aquarium of the London Zoo).

This problem of dealing with large numbers of offspring may have disillusioned many aquarists; but it also created the fish-breeding specialist who has been able to solve the problem of space by dealing with only one species or group of fish. Thus have the guppy breeders solved their problem with special ease since they have adopted a species which may be changed with breeding—a factor which reinforces their interest in breeding. So, also, have other breeders who have turned to those fish which are not easy to breed and the achievement of breeding is rare and troublesome enough to maintain their interest in the subject. (In addition they find it comparatively easy to sell their fish because the market for uncommon fish is not easily saturated when such fish can be bred only rarely.) This probably accounts for the large numbers of fish species which are readily available—there is a constant demand for any new species which is difficult to breed, and any new species which appears is firmly established before it is discovered that it is easily bred after all.

I think therefore there is a need for recognition both by aquarists and their clubs that the reasons why a man keeps fish are more important than his actual achievements, when judged according to the traditional criteria of success in fish shows and in breeding records.

How to Keep Puffers and other Brackishwater Fishes

by W. HERING

DO you belong to the small group of lucky aquarists who can keep these fishes for years without difficulties? Or is your mortality rate so high that you have to buy more every few months to give it another try?

If you are a member of this second group, which in my experience is in the majority, it will perhaps pay you to consider keeping them the way I do. The most popular brackishwater fishes today are: *Tetraodon fluviatilis*, *T. palembangensis*, *Scatophagus argus* and *Monodactylus argenteus*. The two last mentioned present the least trouble. The two puffer species are more difficult to keep. Except for *Monodactylus*, none of these fishes occurs in our coastal waters here (Cape Town), but we have comparatively a good selection of other puffers instead, belonging to the family Tetraodontidae, Diodontidae and Lagocephalidae, and all these fishes can be kept in fresh water or in water of a low salinity. *Tetraodon fluviatilis* and *T. palembangensis* are common inhabitants of estuarine waters of Malaysia, but occur also as landlocked populations in fresh water far from the sea, to which they never migrate. According to my information most of these fishes are caught in brackish waters along the coast, thus saving the cost of long transport to port and aerodromes. Till the time of shipment they are kept in natural brackish water. Then they are transferred into fresh water, sometimes with added salt, sometimes without. No wonder that quite a number are already in a bad shape before they reach your tank. But if you are lucky, you may unknowingly become the owner of puffers caught in fresh water. In this case you probably have no problems at all and can give good advice to your unlucky fellow aquarists, which will not help them very much!

It has been said that brackishwater fishes must be kept in a hard, alkaline and slightly saline water. For this reason it is commonly advised to add some table salt to the tank. Nothing could be more wrong, as most of them are not dying because of the low salinity, nor do they care much about hardness and alkalinity. In the majority the high mortality is due to ammonia and phenol poisoning.

The higher the alkalinity of the water the more are the fishes in danger of ammonia poisoning. In a slightly acid water no such poisoning can occur, as ammonia is immediately converted into ammonium salts.

Generally fishes can stand a high amount of ammonium but not of ammonia. Non-acclimatised puffers are especially sensitive. If for instance ammonium salts are present in the water and you fill up the tank with alkaline tap water, resulting in an increase in the overall pH value, ammonium converts back into ammonia. This is one of the reasons why aquarists of the old school have been so afraid to change the water.

In a water of pH 6 there is no free ammonia present, all of it being in the ammonium form. At pH 7, 1 per cent of the ammonium forms ammonia, at pH 8, 4 per cent becomes converted and pH 9, 25 per cent is in this form.

Imported puffers may respond to an amount as low as

This brackishwater species is the 'scat' Scatophagus argus. It is of the variety possessing red blotches over its back and sometimes incorrectly described as a separate species (Scatophagus rubrifrons)

0.05 milligrams of ammonia per litre with increased breathing; this can be a sign of the beginning of ammonia poisoning, in which case increased aeration is of no value. To check whether this increased breathing is due to lack of oxygen, I just add 4 drops of a 15 per cent solution of hydrogen peroxide per gallon of water. If the fish continues to breath heavily for longer than 35 minutes after this treatment ammonia poisoning is indicated. Lowering of the pH value by one unit may then bring good results, if it is not too late. In long-continued ammonia poisoning it is extremely difficult to cure the fish. On average, 60-70 per cent of fishes of those not recovering 2-3 hours after reducing the pH value will die. Ammonia is a blood poison which destroys the haemoglobin of the red blood cells, the carriers of the oxygen in the fish.

A second poisonous factor is phenol and its derivatives. Even in a well-kept tank traces of phenol can be detected 5 to 8 hours after feeding the fishes. In small quantities it does not affect freshwater fishes, but brackishwater fishes are very sensitive to its presence. Scats, for instance, never come to tolerate it.

Phenol, as well as ammonia compounds, are eventually oxidised in the filter etc., to nitrate. If a run-in filter is employed, the formation of nitrate from decomposed organic materials takes some time. The shortest time I measured was 5 hours, the longest 68 hours, depending naturally on many factors which are too numerous to mention in this article. In the meantime the intestines of the fishes readily absorb the poison. Part of it will be excreted again, another part is oxidised in the body forming melanin, which may give the characteristic external signs of poisoning by blackening the white belly of the fish. Phenol is a slow-acting nerve poison. Signs therefore are: nervousness and convulsions, the fish darting wildly around the tank and has frayed fins and stops feeding.

Scats are especially sensitive. They may become so agitated that they ram their heads against rocks and glass panes and even shoot down at high speed to bury their heads deep in the sand. In one case I observed that the head was swollen nearly double its size with deep cuts and bruises. After analysing the water I found that it contained nearly 1 milligram of phenol/litre, curiously not produced by the decomposition of organic materials but by the use of a two-component resin containing phenol to render the steel frame and bottom of the tank non-corrodible. (All metal parts of a tank with brackish water fishes must be protected just the same as with sea-water tanks.) To try to remedy such a disorder by adding salt is therefore futile. The fish must be placed immediately into fresh water of the same pH value and the same salt content, if any. To employ ozone as an oxidising agent is therefore an advantage. Nitrogenous compounds are oxidised in minutes to ammonia and an accumulation of phenolic derivatives is inhibited. Naturally ammonia has still to be converted to nitrate by bacteria in a filter. I hope that one day a convenient resin will be found to neutralise ammonia chemically, making a biological filter obsolete.

A third disorder, which I call 'pressure disease', is well known to aquarists: with bent tail fin and a black-grey colour, the fish drifts helplessly through the water, does not feed and eventually dies. Naturally all three diseases may occur simultaneously and often do.

In pressure disease the tissues and blood of the fish are flooded with water because of the osmotic effects produced by the difference between outer (aquarium water) and inner (body fluid) media. It is a sign of too short acclimatisation and is entirely the fault of the aquarist. The process of osmotic regulation in brackish water fishes is complicated and the nature of this mechanism is very little known. In simple words it could be explained as follows: A fish in sea water loses water constantly by osmosis (its body fluids are more dilute than sea water). They replenish this loss by swallowing large amounts of sea water. In their intestines the salts in solution in the sea water and of the food are absorbed and excessive salt is excreted by special acidophil cells in the gill epithelium, called 'chloride' cells. Freshwater fishes practically do not drink water. Instead of the chloride cells they have mucous filaments in their gills which can absorb water and salts from the outer medium. Excessive water and salt is excreted through the

kidneys. If one puts a sea-water fish in fresh water he does not stop his habit of swallowing water. Brackish-water fishes behave like marine fishes, but when transferred to fresh water they stop drinking this and slowly their chloride cells degenerate and (let's say) 'water cells' appear, as in freshwater fishes.

The art of acclimatising sea or brackishwater fishes to freshwater is therefore to synchronise the dilution of the salt water with the gradual disappearance of chloride cells and the formation of 'water cells'. In most marine teleosts this is impossible to perform, although many survive in water with the addition of 0.5 to 1 per cent of sea water, provided that the remaining salts are present in physiological proportions. Tap water can disturb these proportions; our Cape Town water is particularly unsuitable in this respect. I therefore have to use either rain or distilled water as a diluting agent. To cure a fish of the pressure disease is simple, but tedious. I put him back into a tank which contains 1200 millilitres of sea water to 2 gallons of fresh water. In this tank he stays about 14 days. Then I start from the beginning as described later in this article. A very boring affair. The acclimatisation of brackishwater fishes takes some time; how long depends on the species. Scats and monos respond very quickly. For the puffer species mentioned, which are more or less already accustomed to fresh water, I need 18 days to one month. The longest time, up to 4 months, is required by *Lagocephalidae*, *Tetraodon* and *Diodon*. The critical point for these fishes is the water density of 1.003. Diluting the water further, to 1.000, must be done pycnometrically. But even then the danger is not over, as the fishes may absorb any kind of salt in solution to counteract the hydrolysis of the blood, even if these salts are poisonous for them. To prevent this, I use a simple trick. I feed the fishes with food soaked for half an hour in sea water, either natural or artificially produced. This food they get two or three times daily for the first four weeks. Then I slowly decrease this amount. If common salt or table salt is used for this purpose the fish would eventually die.

If I acquire some puffers, I observe whether they have a white belly and whether they swim actively around. However, this is by no means a sign that I have received healthy specimens. In fact, I calculate that four out of ten animals are diseased. At home they are first put in a darkened tank containing (for each 2 gallons of water), 600 millilitres of sea water and two drops of a 5 per cent methylene blue solution. In this tank they stay for 8 hours without food. From this quarantine they are put in the same mixture without the methylene blue. The tank contains no plants, no gravel and has no filter but a dark bottom (black paper under the glass) and some stones for hiding. Temperature is 70° to 75°F (23°C), and light aeration is given. In this water they stay for six days, but the water is renewed every second day. They are fed as usual.

For the next six days the water contains 300 millilitres of sea water and for the last six days 150 millilitres of sea water per 2 gallons. Then the fishes are transferred to a well-established tank with plenty of plants containing in 2 gallons 60 millilitres of sea water. In this tank they are slowly accustomed to a lower pH value. I decrease this value weekly by pH 0.5 to pH 6.5-7. At the same time I start giving the fish the sea water-soaked food. In this tank they stay for 1 or 2 months. Then they may be transferred to a tank with other tropical fishes without any salt water added.

Freshwater fishes liberate something in their tank water which is totally foreign to brackishwater fishes and may give them a nasty shock. Therefore, before placing the fish into such a tank, the water is removed and filled up with fresh water which must have the same pH value as the water in which the puffers were kept.

I cannot stress the point too much: acclimatised brackish-water fishes are extremely sensitive to any sudden changes in the pH value, never mind in what direction. They may not show it at once, but a month or so later you may have a sick animal. It is far better to introduce freshwater fishes into the tank of puffers than vice versa.

I never entirely stop giving them the salt food, but how often and how long depends on their general state of health. In any case, salt-fed animals are better in colour and grow far quicker and are more immune to attack from fungi.

Newly acquired scats I put immediately into a tank containing 60 millilitres of sea water per 2 gallons for 1 month and start to feed them with salted food immediately. They like clear and clean water. As soon as the water gets old and dirty and has a strong Tyndall effect, they lose appetite and colour. They need some plant food. But one must be careful: most terrestrial plants have an acid reaction; water plants, especially marine algae, have a neutral or alkaline one. Food with an acid reaction makes sea and brackishwater fishes short-lived. The aquarist can easily check the pH value of the food, especially dry food, by pouring over the crushed food some distilled water. Take a pH reading first after 10 minutes and again after 5 hours. Food with an acid reaction is best not used. My scats get *Ulva* (sea lettuce) exclusively. Even in a dry state the sea lettuce keeps its valuable mineral salts and vitamins, and in the water its leaves unfurl again in their old splendour, impossible to distinguish from fresh ones.

Monos, which we catch in sea water, are acclimatised to fresh water as follows: 24 hours from a density of 1.025 to 1.012; 24 hours from 1.012 to 1.006. In this water I leave them for 1 week. Then I put them in a 1.003 water for 48 hours and finally in fresh water.

My acclimatised brackishwater fishes are kept in water of permanent hardness 1.5 to 2 D.H. and temporary hardness 1.5 D.H. (1 D.H. = 1.34 Clark degrees = 17.8 parts per million as calcium carbonate). Chloride content is 15-25 milligrams/litre (calculated as sodium chloride); pH 6.8-7. Conductivity: 175-300 Siemens micron at 64·4°F (18°C). Phenol: traces. Ammonia: traces to 0.02 milligram/litre. Nitrate: 5-15 milligrams/litre. Temperature: 75°F (24°C). Subdued light. Water is changed, 25 per cent every 14 days.

Brackishwater fishes, except *Monodactylus*, are heavy feeders when kept in fresh water. Their body is not so much interested in the food itself but in the salt it contains. In more saline water they lose their appetite and feed normally. When they reach the age of about 5-6 years they become more salt-demanding, which can be satisfied by liberal feeding of sea water-soaked food.

ABOUT THE POND THIS MONTH

Avoiding Troubles and Exhibiting

by A. BOARDER

ABOUT this time of the year all the fishes in the pond should be healthy and in the best of condition. It is usually in the spring that goldfish become susceptible to attack by fungus. In all my years of fishkeeping I do not remember having any goldfish suffering from this complaint after May, although I have, in fact, had no trouble with this disease for many years and am not certain why this is. One thing I can say is that I have had no fresh fish in the pond, neither do I ever give any live food from a natural pond. I do not suggest that this is the reason why my goldfish have been trouble-free but I think that it could have considerable bearing on the problem.

For live foods I use only garden worms and white worms (enchytrae), and as these do not come from water I have no fears that I may be introducing any pests or diseases with the food. A point worth mentioning in connection with this matter is that I try to keep my fish healthy throughout the winter. It is when they are in a bad condition at the beginning of the season that they are liable to be attacked. As long as a fish is healthy it has a good covering of protective mucus. This prevents the entrance into the body of the fish by any pests or germs.

Use Nets Carefully

It is often the careless handling or netting of a fish that can cause trouble later on. The mucus can be removed in patches if the fish is treated carelessly. I have had enquiries from angling clubs about roach being covered with fungus disease in their waters. I have suspected that much of the trouble has been caused by the methods of angling. In most club waters it is the practice to return all fishes caught as soon as they have been weighed or measured. The roach is a fish with an abundance of mucus, which easily comes off on the hands when the fish is handled. I have also known some anglers use a cloth to hold the fish whilst the hook is removed. It can be realised how easy it would be for the spores of fungus disease to get a hold on any fish that was so treated, especially as the fish would be rather distressed by having been caught which would lengthen the period of time taken for the replacement of the mucus.

At this time of the year the pondkeeper might like to exhibit some of his best fishes. I know that some aquarists and pondkeepers do not believe in showing their fish, but this is a belief I do not agree with. If it were not for the exhibiting of the fancy goldfish there would be no standards by which the strains could be kept true. Just imagine what the dog world would be like if no shows were held and the particular breeds of dogs were not bred true for exhibition purposes as well as for other reasons. It would not be many years before most of the breeds became so inter-mixed that no true strain would exist.

The true enthusiast will be happy to be able to exhibit his best fish, not perhaps with the intention of winning money prizes but to give him the satisfaction of knowing that the fish he is breeding are of a good standard. It is also true that any strain of fancy goldfish which had won prizes would be of much more value than any cross-breds. Not that the true aquarist worries much about whether he makes any money out of his hobby, but there is always a market for good fish and a satisfaction of being able to breed something extra good.

Starting to Exhibit

The uninitiated might wonder how to make a beginning at exhibiting his fishes. This is quite understandable as many people have no idea that goldfish and their varieties are exhibited and are bred to standards supplied by the Federation of British Aquatic Societies. The first thing an intending exhibitor should do is to join a club or society. Most towns have a club within reach and if one does not exist within easy reach then the aquarist should make enquiries in his district with the intention of forming a club. Sixteen years ago there were upwards of 400 clubs in Britain and I know of some which had a membership of one hundred and a waiting list of several prospective members. I remember many happy hours at my club, and anyone can obtain a mine of information by attending the lectures etc., and by conversing with other members.

After about 1950 many clubs started to lose members and today, although there has been something of a revival, there are not nearly as many clubs as there were then. I believe the introduction of more television about that time had a lot to do with the falling off of attendances. This is a debatable point I know but it is a fact that the lack of interest in many clubs coincided with the popularity of television.

Now that much of the novelty of television has worn off I expect that more interest will be taken in aquarist clubs and the hobby generally. It is not difficult to form a new club and anyone sufficiently keen can do so. The best way to make a beginning is to get the help of the local newspaper. I have always found these to be very helpful and usually willing to insert a primary notice in their paper. All those interested would soon communicate with the originator and a meeting could be called. From then on it is easy to make a start with a new club. *The Aquarist*, too, will gladly insert a notice of the intended formation of a club.

The intending exhibitor would be well advised to show his fish at a club table show before entering for an open show. He would then learn something about the method of showing and could obtain information on the merits of his fish. I think the most important factor to remember is that only the very healthy fish is the one likely to gain a prize unless in very poor company. The fish in good condition is the one that shows off to advantage. The colours are always better and the fish shows off its qualities to a greater extent than a fish out of condition. To those who have never exhibited a fish I recommend them to try their luck; I am certain that they will never regret having taken the step.

Fig. 1. Vesicular basalt (Argyle). The fine-grained structure is due to the quick chilling of the original molten magma. Tiny holes resulted from steam or gas in the cooling material (×2½)

Know Yo

THE IGNEOUS ROCKS

by H. J. VOSPER

(Photographs by the author)

MOST aquarists have a fund of general knowledge concerning the majority of fishes and plants maintained in aquaria, and whereas the water content perhaps may come mainly from the ordinary household supply, nevertheless many aquarists make themselves familiar with simple aspects of water testing. But the other common factor of decorative aquaria—the rockwork, which supplies much of the attraction of the design, is sadly neglected and indeed the knowledge held by many fishkeepers is often quite fallacious.

Let us then consider the rocks, since they are truly an important part of the furnished tank and should be of sufficient interest to warrant a little study.

Rocks are many and varied and there are no distinct sections which might be described, as groups, as being wholly attractive and useful to aquarists. Therefore each specimen must be accepted or rejected on its own particular merits. Some that are useful are less than visually attractive; some are ornamental or perhaps well-coloured and malleable (such as ochreous clays), but would be disastrous in aquaria. Which brings us to what is perhaps the only real general guide, that soft rocks are dangerous—to which comment attention will be drawn in due course.

Classification of Rocks

The following notes are designed to assist aquarists to provide basic identification of rocks purchased or found during their travels, but are necessarily somewhat oversimplified and for this I trust that geologist readers will accept my excuses.

Except for quartz (silicon dioxide, silica), the pure minerals have been ignored for simplicity's sake. Under the heading of 'chemical sediments' are to be included organic materials such as coal, again as a matter of simplicity. The sources from which particular rocks may be obtained are quoted at the end of each section but these are merely for general guidance and one should refer to the maps and literature, which will be suggested in due course, for finer details of the occurrences of particular rocks.

Fig. 2. Biotite granite (Aberdeenshire). Coarse-grained but of fairly even texture: clear quartz, whitish feldspar and abundant black mica (biotite) make up this specimen (×2½)

Fig. 3. Porphyritic granite (Devon). Large crystals of creamy feldspar in a finely grained ground mass indicate a quickened chilling after an initial slow cooling (×2½)

Rocks — 1

The world on which we live is composed of rocks, some hard and some soft, and the outer crust is the only part about which Man has any considerable knowledge. This crust is composed of a great diversity of materials arranged in an almost endless number of combinations, but they can be divided into three major groups, each according to the nature of their origin: (1) igneous rocks; (2) sedimentary rocks; (3) metamorphic rocks. Further sub-divisions are based upon such factors as the texture, the mineral constituents and the size and arrangement of the mineral particles.

Igneous Rocks

These are formed by the cooling and solidification of the extremely hot, molten material (the magma) which is held under great pressure below the hard surface of the globe. The magma is often composed of an incredible mixture of materials, and, when it cools, as it does when a weakness appears in the surface and permits the magma to rise up within the already solidified crust, then the chemical elements combine to form crystalline particles which we term minerals.

If the magma rises quickly and bursts forth as a volcano then it also cools quickly and the lava then forms solid rocks such as volcanic glass, frothy scoria and pumice or the dense and fine-grained rocks of the basalt/felsite groups (see Fig. 1). Magma which does not reach the surface cools more slowly, often under pressure, and in such cases the crystalline particles can grow in size. Additionally, those combinations of elements that have a high melting point will crystallise and grow quickly, other combinations will grow more slowly.

In some igneous rocks the minerals may have chanced to crystallise at approximately one and the same time and the separate mineral grains reach comparatively the same size, which conditions are to be found in the granites (see Fig. 2). However, in a slowly cooling magma it is possible that feldspar and certain other minerals may have reached a large size when, quite suddenly, the magma is cooled abruptly, with the result that the remaining elements grow to only a small size. The resultant solid rock has a uniformly grained ground mass in which are to be seen larger particles of some minerals and such a condition is known as a porphyry or porphyritic granite (see Fig. 3), a form which can be considered one of the visually more interesting of the granites.

From this can be gauged the importance, in classification, of the size and character of the contained minerals and it can be realised that these points depend largely upon the nature and rate of solidification.

Quartz

Although quartz (silica) is one of the most common minerals and many rocks contain large quantities of this substance, some rocks contain very little and a few have none at all—so we may bear in mind the fact that the mineral content of the rocks is an important feature of their classification. At the same time it must be noted that it is impossible for the average person to determine the chemical constituents of any particular specimen, so reliance must then be placed upon the factors previously noted, plus some aspects of the colour of the rocks.

Quartz is an abundant mineral frequently found as a massive intrusion or as minor veins in other rocks (see Fig. 4). It is extremely hard, usually milky white in colour or stained by various impurities to reds, browns, yellow etc. Some varieties are semi-precious (amethyst and onyx for example).

Fig. 4. Quartz (Wester Ross). The massive vein of milky quartz (centre) has intruded into a 'rent-' or 'tear'-faulted gneissose rock. Regions of high volcanic activity in the past are excellent centres for collection of igneous and metamorphic rocks.

The uninitiated may confuse massive vein quartz with equally massive calcite, which is also to be found as veins in limestone, but quartz is very considerably harder and it cannot be scratched with a knife whereas calcite scratches easily.

Granites

Granites are coarse- to medium-grained, usually light in colour but not invariably so, and normally of a fairly even texture. They are composed of quartz and feldspar, plus mica, hornblende or a mixture of both. The quartz

Fig. 5. Lava (Wester Ross). Here felsitic lava is intrusive among banded gneissose rocks, the differing structures and textures—one of a flowing character and the other somewhat massive—being shown in this view.

may be clear, smokey or milky and it has a glassy appearance (its lustre). The feldspar may be whitish, creamy, pink or reddish, very occasionally yellow; the cleavage (broken) surfaces will sparkle. The mica may be the colourless or silver-white muscovite or the black biotite, although both forms may be present. If the mica particles are large enough they will flake off in typical fashion when the point of a knife is applied and probably pin-head size particles are the smallest that can be observed readily without the aid of a lens. Hornblende, less often present, is dark green to black and does not have a micaceous cleavage (Fig. 2).

Granites in which mica is an important fraction will be named after the type present, i.e. muscovite granite, biotite granite or even muscovite biotite granite when the two are present in nearly equal proportions. Hornblende granite is so named when that material is visible. Porphyritic granite, as was recorded above, defines those granites in which quartz or feldspar crystals or both are comparatively large and the other minerals are much smaller, but not so small as to deserve the term 'fine-grained', for in such case the rock would be a rhyolite porphyry (see below).

Syenite resembles granite but there is little or no quartz present.

Salt and pepper rock, a usually greenish black or dark grey igneous material, has the light and dark particles very evenly arranged and quartz is most often absent.

The large particles of quartz and so on in porphyritic rock are termed phenocrysts. If quartz and feldspar are the chief phenocrysts in a fine-grained ground mass then the material is a ryholite porphyry but when quartz is absent it is termed a trachyte porphyry.

Lava

This is the material which flows out of volcanoes and other vents and which since it cools quickly, has a texture that is very fine-grained or glassy. The fine-grained rocks of igneous origin are classified as basalts or felsites; the latter are dense and light-coloured (Fig. 5), the colours ranging from grey through pink to darkish red and they may be light-green, yellow, brown or (less often) white. Basalts are similar rocks which vary from dark green to black in colour, and they may also exhibit a porous structure (vesicular basalt, see Fig. 1).

If the constituents of the rock have cooled in such a manner that they have formed an almost completely undifferentiated mass of glassy appearance then true volcanic glass (obsidian) may be present, almost invariably black or brownish-red. Pitchstone, which has a resinous rather than a glassy lustre, is normally brown or greyish-black.

Pumice is the frothy, greyish rock with a porous structure due to the presence of gas in the igneous material.

Volcanic ash or tuff is a very common igneous rock composed of solidified ash mixed with small particles, usually being green but always light in colour.

British Sources of Igneous Rocks

(Lava, basalts, tuff, granites, intrusions and allied)

N.E. Scotland (parts)
N. Central Scotland
Renfrew, Kirkcudbright, Ayrshire etc.
Westmorland
Northumberland
Yorkshire
Derbyshire (part)
Leicestershire (Charnwood Forest)
Herefordshire
Gloucestershire
Monmouthshire
N.W. Wales
W. Pembrokeshire
Cornwall
Devonshire

Next article: the sedimentary rocks.

PLANTS FOR THE FISH HOUSE

"Wandering Jews"

by B. WHITESIDE

FOR easily grown pot plants, kept for their attractive foliage, the tradescantia family is a useful choice. Zebrina is another name for the wandering Jew, but tradescantia is the better-known name. Plants come in a variety of leaf sizes and colours, all of which are attractive additions to the fish house.

One of the most attractive is *Tradescantia zebrina pendula*, a creeping or trailing plant which has mauve and silver striped leaves with purple undersides. The plant is very easily rooted from stem cuttings about 6 in. long, having their lower leaves removed after being cut beneath a leaf node. These may be rooted in an ordinary potting compost or in jars of water. *T. zebrina pendula* likes a well-drained compost and may be watered freely in summer, with a weekly feed of liquid fertiliser and an occasional spray of water to freshen the leaves. Watering should be less frequent in winter. The plant likes a light position out of direct sunlight.

When the plant becomes too long or straggling, the tips of growing shoots should be pinched out to encourage branching growth. This method is also used with *T. tricolor*, a plant with smaller leaves striped with white and bluish pink. Plants with variegated foliage need more light than do most green-leaved plants. Should a plant with coloured leaves produce an all-green shoot, this should be removed at once or the plant will devote its energies to the development of the green portion, to the detriment of the variegated portion.

T. fluminensis is a variety with medium sized bright green leaves. This plant is a rampant grower even under adverse conditions. I have heard of this variety actually being used as an underwater aquarium plant, being rooted normally in the air and then planted in the aquarium gravel. The plant finally grew to the top of the tank and trailed over the frame and down the outside. Not having tried this plant as an aquatic myself, I would not recommend its indiscriminate use without a test trial in, say, a small aquarium stocked with cheaper guppies.

As an indoor decoration, plants of tradescantia can be attractive if placed round the home aquarium and allowed to trail over tank frames and stands. Plants are cheap to buy and are so easily propagated that, from one plant, many more can be produced.

Fishes of the CONGO

by A. VAN DEN NIEUWENHUIZEN

Translation by A. KLEE

IN the southern portion of the Congo, well into Katanga between Jadotville and Elizabethville, lies an extended bog or marsh. This marsh is irrigated in one portion by links to flowing water, but in other portions the moisture content of the land is completely dependent upon weather conditions. The dry period in this area of Katanga extends from May to October, the rainy season from November to April.

bottom from May to November, undergoing extreme changes in temperature: the dry periods begin with temperatures of 75°F (23°C) during the day, dropping to 36°F (2°C) at night! In parts of this region, even slight frosts can occur. The temperature starts to climb again in July. In the extended marsh, when the ground is already cracked, the first change is seen in the colour of landscape becoming a reddish-brown. In August, it is

Photo: A. van den Nieuwenhuizen

A male Nothobranchius brieni from the marsh described in the article

During the latter, large pools and ponds can be found everywhere, varying from 5 to 32 feet in diameter and from 12 to 60 inches in depth. These pools come into existence as a consequence of rainfall. The rainy season starts in the middle of October or early November with the onset of localised thunderstorms, which release from ½ to ¾ inch of rain within a short while. During and after these thunderstorms, the temperature rises to a level even higher than that in the hot summer months. Air temperatures vary from 66° F (19°C) in the shade to about 91°F (33°C) in the sun. These temperatures fall but slowly. In December, about 5 inches of rain falls; in February and March, about 12 inches each month; in April, more than 3½ inches. Within the rainy season then, an average of 47 to 51 inches of rain is seen.

As soon as the rainy season commences life begins anew in the flooded marsh. For example, as the pools fill with water the eggs of *Nothobranchius brieni* hatch. More will be said later about the breeding of this fish. It is really a wonder that these eggs hatch out at all, since they lie on the hot (86°F, 30°C), in September it is wet and hotter and in October the thermometer reads an average of 91°F (33°C). Although the sun burns continually, the first leaves appear upon the trees. At the same time, in October, the first thunderstorms arrive and, in December, all brown coloration has disappeared and the countryside is green once again.

In December, specimens of *Nothobranchius brieni* from ¾ to 1½ inches in length frolic about in the newly created pools. They are collected in areas with heavy growths of *Nymphea* and *Ottelia* which make it impossible to pull a net through to catch fishes. In February, these plants are in full bloom. According to data supplied by the Grainduege family, *Ottelia cauteptile* (?) is found in this region. One also encounters much *Salvinia* and *Utricularia*. In the larger ponds and streams, the water pest *Eichhornia crampes* is found.

Water temperatures of the smaller ponds can be relatively high. In the middle of March, for example, the water surface gave a temperature of 77°F (25°C) in the morning

Fishes of the Ga

The Graindorge family on their way into the marsh during the rainy season. The landscape is not flat but is broken up by alternating stretches of grass and woods (between which lay ponds and pools)

Photos

An irrigation stream near [illegible] In this stream Aplocheilichthys [illegible]

Here is a trap almost 10 feet high, constructed of bamboo. The native youngster shown is 5 ft. 2 in. tall

Nymphaea, an undetermined species of water lily, is an enormously robust plant

e Congo *(continued)*

E. Gruenberg

the Union Miniere Co.
Anphilius and Barbus

Throughout this extended marsh, many of the pools can scarcely be seen in the distance and they are discovered only by trampling through the area. In this pool fishing for Nothobranchius is done with mosquito netting

and 81°F (27°C) at midday. At the 30 or 40 inch depth, these temperatures were a few degrees lower. In May, the mercury drops quite considerably. At the surface of the remaining water, not yet evaporated, the temperature stood at 69°F (21°C) and a few degrees lower in places where the water was still a yard deeper. These temperatures were measured at about noon.

Hardness and pH of this water was determined in one of the laboratories of the Union Miniere Company. The former was very low: in March it was 0.5 DH; in May it was somewhat harder, 2 to 5 DH. Water reaction varied from pH 6.3 in March to pH 7.0 in May; in other words, slightly acid to neutral. These results held also for water from the irrigation streams in the same region. In these waterways many species of *Barbus* were caught, together with species of *Clenopoma*, *Amphilius*, *Aplocheilichthys*, small *Synodontis* and others in addition. The water in the marsh and irrigation streams is usually so clear that the fishes can easily be seen swimming and sometimes it is even possible to recognise the species. In other streams, however, this is impossible since the water in them is turbid almost all the year round, decreasing somewhat in turbidity by the middle of the dry season.

In catching *Nothobranchius* and other fishes, one learns that the young are mostly to be found in open water, while the adults are mainly found under the overreaching thick plant growths along the banks. In the pools and small ponds of the marsh it is possible to make catches using just the hand. In fact, it is forbidden to catch them with mosquito netting since the former Belgian Government had strong regulations regarding irresponsible fishing. The minimum mesh size therefore is a bit less than 1¼ inches, but the aquarist generally cuts corners here. That these regulations are necessary to preserve the value of the fish resources is evident from the fact that the populace of Central Africa disposes of great quantities of fish. In 1958, for example, while 9,578 tons of fish were taken from Lake Tanganyika, 130,377 tons were caught in the Congo! This explains why fish hatcheries have been established all over, to expand the production of fishes.

Two types of nets are used by natives to catch their fishes; one is operated by a single scoop of the hand and the other is supported by cork floats and is thrown over the entire width of a large pond. The latter type

To catch aquarium fishes, a large, three-sided mosquito net must be employed. The end not containing a supporting slat (left) is drawn through the small pool. When the net is lifted, the fishes are recovered from the mud. This method is especially useful when the pools begin to dry

Fishes of the Congo *(continued)*

A pair of Nothobranchius brieni (male closest to the camera) in breeding mood

Photo: A van den Nieuwenhuijzen

snares many *Tilapia* species, especially *Tilapia melanopleura*, a fish well known in the aquarium world. In addition, much use is made of large traps constructed of bamboo, varying in size from the smallest, 20 inches in length, to the largest, over 10 feet in length. One of the illustrations proves this to be no fishy story! Large *Tilapia* are caught in these enormous baskets and the fish are transported after first being dried. Then they undergo further treatment in the form of additional drying and smoking. A smaller trap is used for fishing in the marsh itself. For this purpose, a small causeway is dug between two ponds and a trap set within it. Frequently, they simply dam a pond across, into which the trap is dug in. Next to traps and nets, spearing is commonly used for catching fishes, especially towards the end of the rainy season and beginning of the dry. At this time, the water velocity in the pools slackens and many of the fishes are collected or left behind in the mud. *Tilapia* especially, finding themselves trapped, are easily speared. During the flood periods, the whole marsh region is laced with interconnected water courses, giving these large fishes access to this area.

The accompanying photographs afford a visual impression of the region as a whole and show the methods used for catching fishes. A number of interesting aquarium fishes originate from this area, more about which will be said in future articles.

The Leopard Catfish *(Corydoras julii)*

Photo: A. Feyaerts

AN attractive tropical catfish of the *Corydoras* group is the one known as the leopard cat. A large number of black spots, arranged in pleasing patterns over the body, dorsal, anal and caudal fins, are responsible for the popular name. It does not grow much over 2 inches in length, and imported specimens are usually only about half this size. Sexes can be distinguished only in mature fish, the female showing a much deeper and rounder under surface, so that the would-be breeder needs to obtain several young specimens in the hope that a pair will show themselves as the fish grow. However, although this species has been bred in aquaria, it cannot be relied upon to breed. For the fish to achieve their full breeding size quickly it is advisable to keep them in a separate aquarium, since in community tanks the bottom-dwellers like the leopard catfish often fail to get adequate amounts of food.

When a pair of the catfish seem ready and mature the breeding tank can be prepared. It should be about 20 in. by 12 in. by 10 in. and freely planted with clumps of Sagittaria or Amazon sword plant. The temperature of the water should be lowered to around 75°F. This may seem in contrast to normal breeding tank preparations. It is advisable to add methylene blue to the water to give it a tinge of blue. This will protect the eggs or fry from destruction by micro-organisms.

The pair should be introduced into the tank together. After exploring their surroundings hastily they should commence spawning. The female is observed swimming in close proximity to the male. Then she puts her mouth to his vent and receives sperms. She carries the sperms to a pre-chosen site, and, here she deposits, maybe, five eggs, whilst she lies in an upside down position. The sperms are deposited over the eggs. She returns to the male and the action is again repeated until perhaps 300 eggs have been laid. Once the pair are seen to be swimming separately, both male and female should be removed from the breeding tank.

The eggs do not hatch until 5 or 6 days later. By this time, numerous eggs will have died. The remainder, which may total around 50, however, will hatch and the fry grow surprisingly rapidly. They thrive well on *Tubifex* worms and dried food.

M. M. Clark

AQUARIST'S Notebook

by P. M. FULLER

THE beauty of fishes is now no longer confined to the aquarium; if one so desires, it is possible to buy wall-papers, adhesive sheeting, tiles, dress materials and even plastic cushions decorated with themes taken directly from the fish tank. Ever popular among the designers are fancy goldfish, especially veiltails and angels, swordtails and zebra fish. Recently I asked a designer the reason for the popularity of piscine motives. "From the designer's point of view they are ideal", he replied, "being particularly colourful, and possessing a simple, streamlined shape ideal for repetition in, for example, wall-paper. Also fish themes are popular with the public—and not only for the bath-room either".

* * * *

Wandering beside a trout stream in the Hampshire village of Longparish, I noticed in a nearby school playing field a weather vane which appeared of great interest; instead of a usual design the vane was made in the shape of a fish, which proved attractive, practical, and appropriate; and it struck me how adaptable the fish shape is. As the Japanese print-makers have shown, whilst it is among the simplest shapes to be found in the animal kingdom, it is also one of the most beautiful. Fish are not cursed with ugly appendages such as fully formed mammalian limbs!

* * * *

Recently I wrote about the stone loach as being an interesting fish for the coldwater aquarium; perhaps easier to find, and often easier to keep, is *Cottus gobio gobio*, better known by its popular names of bullhead and miller's thumb. This interesting species is usually to be found in shallow streams, where it either hides among the stones or lies motionless on the river bed, waiting for its food to be brought to it by the current. Easily captured because of its sluggish habits, it is readily adaptable to aquarium life and as it is naturally a solitary fish, there is no necessity to provide a large tank to house several specimens. The usual requirements for native fishes: clean, if possible running water, thorough aeration and a plentiful supply of natural foods (water fleas, larva of caddis fly etc.) should not be ignored.

* * * *

The reason why aquatic animals will suddenly descend on an area *en masse* is still not fully understood; often it is to do with winds and currents, sometimes to the seasonal migration of the animal in question. In a French village, I have seen the remarkable sight of a shoal of sand eels, members of the Ammodytidae family, and not true eels at all, come to ground, to the delight of the local population who went out in force with buckets and hoes to dig them out. Three summers ago the south coast of England was 'invaded' by cuttlefish, which were washed up on the beaches in their hundreds. Similar 'attacks' by shoals of jellyfish, drifting with the waves, are also frequently reported; but last month, in the south of England again, one of the most pleasant invasions ever occurred when a vast shoal of mackerel came into the shallow waters. Amateur fishermen were casting long-lines with several hooks, and getting amazing results. The professional fishermen, however, were extremely perturbed by the low price their catches were receiving in the markets.

* * * *

I have written before of the suprising lack of Greek tortoises in Greece; however, I must record their frequent occurrence in the neighbouring country of Turkey. Outside the towns, one sees them everywhere. In southern Turkey, a place where comparatively few tourists go, I questioned some young Turkish boys about them. They told me they captured them to make soup and to obtain the shell, and it was only with much difficulty that I could dissuade them from demonstrating their technique on a nearby specimen.

They told me that when English people came they often took one away with them to keep it as a pet. "What about the Germans, the Frenchmen and all the other tourists," I asked, "don't they take them too?" "Oh no", was the reply, "only the English!" Apart from land tortoises I also came across numerous specimens of terrapins in the streams and rivers, ranging from the size of a penny upwards. One didn't even have to go off the beaten track to find them; sometimes ditches by the side of the main road would be crowded out with small terrapins, all wallowing in the mud.

* * * *

I began this 'Notebook' with an item on the fish in popular art; perhaps it is therefore fitting to conclude with one on the fish in serious art. I wonder how many aquarists know the paintings of Arcimboldo, the Milanese painter of the sixteenth century. Although best known for his flower portraits, he also painted several heads entirely constructed out of fishes. Sometimes I wonder if they aren't portraits of over-enthusiastic aquarists!

OUR EXPERTS' ANSWERS TO TROPICAL FISH-KEEPING QUERIES

My local dealer has some of the spectacular-looking *Monodactylus sebae* for sale. Is this species as easy to care for as the better-known *M. argenteus*?

Provided that the specimens available are in good condition and feeding well, they should not be at all difficult to keep in captivity. Nevertheless, we presume you are aware that this fish, like *M. argenteus*, does not always flourish unless it has a small quantity of sea salt added, after it has settled down, to its aquarium.

Please give me some information on the anabantid called *Trichopsis pumilus*.

T. pumilus is native to South Vietnam and, it is said, surrounding areas of south-east Asia. It attains a little over 1½ in. in length, and mature specimens develop most beautiful metallic tints, greens and blues predominating. It is one of the so-called croaking gouramis, an appellation derived from the fact that during courtship both sexes sometimes emit croaking sounds. As a rule, *T. pumilus* builds a bubble nest among the plants growing near the surface of the water, which should be rather shallow, but not infrequently it prefers to spawn direct on the bottom. It is not difficult to breed but does not produce large broods. A temperature in the middle seventies to low eighties (°F) suits it best. It flourishes well in old, slightly acid water, and is easy to feed on any live or dried food small enough to be swallowed. The female is not so sparkling in appearance as the male, and her anal fin is rounded posteriorly. If introduced into a community tank, the fishes *T. pumilus* is associated with should be as quiet living and as inoffensive as itself.

Why does the ordinary three-spot gourami bear the same scientific name as the blue and the opaline gouramis?

The blue gourami is only a Sumatran colour variation of the silvery grey to silvery olive three-spot gourami (*Trichogaster trichopterus*), which is quite widespread over south-east Asia. The opaline gourami was produced in Texas several years ago by a clever breeder who presumably, mated together different forms of *T. trichopterus*, and subsequently succeeded in establishing a true-breeding, distinctively patterned strain.

I have a pair of zebra fish, the female of which shows almost habitually distended sides, yet she never lays eggs. Can you give me any reason for this?

First of all, does the male show any marked interest in the female? If the male is not sexually potent, or is insufficiently interested (at the present time, anyway) to chase her around no eggs will be laid. Sometimes, however, eggs are scattered and immediately eaten without the owner of the fish being aware of it and, then, a few days later, the female will be ripe for spawning again. Furthermore, as a mature female is larger bodied than a male of similar length and age, she will always show much fuller sides after every feast of live food. Your best plan, if you want to breed these fish, is to separate the sexes for a while, and then put them together again in a properly set up breeding tank. If they don't spawn soon after, repeat the procedure, or try her with another lively male.

How much cement will I need to glaze a tank frame measuring 24 in. by 12 in. by 12 in.?

You will need at least 3 lb. of cement to do the job properly.

I have spawned the cherry barb twice within the last 3 months, but I cannot keep many of the hatched-out fry alive for more than a day or two. I feel certain they die of starvation. What food do you recommend to get the fry past the difficult stage?

Many queries from readers of The Aquarist are answered by post each month, all aspects of the fancy being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

You need very small Infusoria supplemented with green water. You can obtain this—water discoloured by microscopic floating algae—by standing a jar or two of tap water in a sunny window. As soon as the fry have made some growth, keep them well supplied with such eatables as microworms, brine shrimps and finely powdered dried food. Proprietary tubed liquid fry food is now used by many breeders of egg-layers.

Photo: L. C. Mandeville

A group of well-rounded cherry barbs

I am new to the hobby of tropical fishkeeping, and some of the books give the most wonderful word-pictures of the colours of certain fishes. Yet when I visit dealers and see some of these fishes swimming in their tanks, they seldom seem to resemble the descriptions in the books. Do writers, generally speaking, exaggerate the colours of the fishes they describe?

Sometimes, yes. But you must remember that lots of fishes do not always show their colours to the best advantage in dealers' tanks. Lack of plant life, too much light flooding a pale background, or the wrong sort of lighting over a pale compost, tends to give many species a washed-out appearance. But the same species placed in aged water well stocked with plants will often outshine the descriptions given in the books.

I have seen some beautifully marked *Aplocheilus lineatus* in a dealer's shop but have been told by an aquarist friend that they are too predacious and savage to keep with other fishes. Is this true?

A. lineatus is better behaved in a community tank than many fishes normally kept there. For one thing, the fish keeps itself to itself and does not go around taking pieces out of other fishes' fins. Another thing, it does not bully other species unmercifully. All the same, it is a predacious species, and will swallow any fish small enough to be swallowed without any difficulty, that is to say taken in at one or two quick gulps. Therefore, it is recommended to keep it with the bulkier bodied tropicals, or fishes of about its own size.

our readers write

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.

Address letters to The Editor, *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex

Blanket Weed

IN the May issue of *The Aquarist* there was an article by Mr. N. H. Bennett on green water and blanket weed. I found the article interesting, particularly in regard to blanket weed. However, I do not agree that blanket weed is as difficult to eradicate as suggested in the article. The methods suggested probably produce results but I have found a much simpler solution which can be done quickly.

First make a concentrated solution of Condy's crystals (potassium permanganate). When all the crystals are dissolved add sufficient of the solution to colour the pond water evenly. After a day the water will clear but the blanket weed will still be there. However, if the Condy's crystals have started to work it will be dying. Observe the pond for a week and then treat it again. I do think a part change of water just before the second treatment is a good idea but I do agree it would make the water greener if the water was green beforehand. This treatment does not cure green water.

It should be quite apparent after the second treatment that the blanket weed is breaking up and dying. If necessary, after another 2 weeks, repeat the treatment but I doubt if it will be necessary.

The advantage of this treatment is that provided that an overdose is not given fish and plants will be unaffected. The only disadvantage is that should the pond contain small fry, the Condy's crystals will kill the natural Infusoria and food in the pond and so starve the fry. Knowing this, of course, means you should feed any fry with made foods until the pond is back to normal.

I have found that this treatment really works.

S. E. MILLER,
President, Aquarium Society of N.S.W.,
Sydney, N.S.W., Australia.

It should be mentioned that manganese compounds remaining in water after treatment with potassium permanganate can be poisonous to fishes. There is a danger if a pond is repeatedly dosed with permanganate without changes of water that poisonous concentrations will be reached by accumulation of the manganese compounds.—EDITOR.

A Good Catch

YOUR July issue contained the contribution "Can you make a good catch?"

This brought to mind an incident some time ago when my large community tank was infected with disease. All my fish died except for a red-tailed shark. This I was determined to save as it was an excellent specimen.

I drained the tank so as to clean it out and put the shark into a bowl on the draining board until I had finished the job. There it stayed for some time with me making periodical checks to see if the temperature was right.

On my last visit to the bowl I was just in time to see my Alsatian, standing with her front feet on the draining board, gobble the shark out of the bowl in one quick action.

This taught me two things. Never to leave my fish uncovered, and never to let my dog near them, since she, at least, can make a good catch!

JOHN LINDSEY,
Scunthorpe, Lincs.

Elimination of Hydra

WITH reference to the query about a tank infested with *Hydra* (*The Aquarist*, June), I would like to pass on the following information on how we have dealt with this pest. Also I wonder if the same method could be used for other problems.

For this method you need a 4½ volt battery (the flat dry-cell type). Connect two wires to the contacts and bare about ½ inch of wire at the other unattached ends. These bared wire ends are placed in the tank and left for about 4 hours. During this time it will be noticed that the *Hydra* seem gradually to shrivel up.

I have tried this method over the last 3 months with batches of quite young fish and while the treatment was going on in the molly tank some youngsters were born, and appear to be not affected.

This method has also been tried among some of our club members as a way to rid a tank of snails, but the treatment in this instance was repeated after 2 days as the snail eggs did not seem to be affected.

A. W. SKINNER,
Birmingham 24.

British Marines

MAY I be permitted to add a word or two to Mr. A. J. McLean's article encouraging the maintenance of British marine aquaria (*The Aquarist*, July)?

Until a few months ago, when I cloned down the last of my tanks, I kept British marine creatures quite successfully in old angle-iron tanks, which received no especial treatment whatsoever and readers who might consider

experimenting with our own littoral fauna need not worry too greatly about turning a freshwater angle-iron tank over to this branch of the hobby without coating the frame etc. Except in the early days and when I might be temporarily overstocked, I did not use aeration or filtration. With careful feeding (the only rule I myself found necessary) I did not suffer from either water or sub-surface gravel "going off".

In 1962, in the journal of a small geological society (strange as it may appear!) I recorded my findings on minimal quantities of fresh sea water suitable for maintaining various marine animals, and it may be of use to note that I then found that for most common species of anemone one pint of such water was necessary for one individual, except for the plumose anemone (*Metridium senile*), which required two pints. The container in each case to be of such size that the depth of water never exceeded the length of the sides, while narrow-necked jars were to be avoided owing to the need for a flow of air across the surface. (H. J. Vosper: (1962) J. Freelance Geol. Ass., II, 36.)

In the article in question an excellent line drawing by, I expect, our old friend Brightwell, illustrates this plumose anemone, a species not mentioned in the text, but I think we should note that although beautiful this species is not perhaps one for the beginner. I have found it does not always take readily to pieces of solid food and the animals seemed to prefer plankton or meat juices. Possibly Mr. McLean has some suggestions on this point?

Of the species mentioned, although the dahlia anemone (*Tealia felina*) is readily recognised by the short and thick tentacles and its generally large size, I see by my notes that I have mainly found it in the retracted condition, in which case it can be easily overlooked owing to the shelly debris and so on which adheres to the column as camouflage. When completely retracted this anemone may be about the diameter of a small saucer and little thicker! A hard, rubbery object most unlike an animal.

Regarding *Cereus pedunculatus*, occasionally called the lobed anemone even though such a common name might better be applied to the plumose, this can be confused with certain *Sagartia* spp., but not if one remembers the great number of tentacles of the latter (over 300 usually). *Cereus* may also be found in rock-pools and under overhangs etc. and I do not think Mr. McLean intended to convey that it can only be found in muddy conditions.

On my next point I am afraid I must cross swords with your contributor, in the matter of the specific characteristic of the snakelocks anemone (*Anemonia sulcata*). All the readily available literature, it is true, claims that the snakelocks cannot retract its tentacles, but several years ago (when experimenting with differing tank conditions) I recorded this species as appearing to retract its tentacles under certain conditions of temperature, food and water. Before further examining what I thought was a fresh aspect of the creature I commenced a more thorough search of the literature and immediately found that Stephenson himself had recorded this fact in both aquaria and under natural conditions (T. A. Stephenson: (1935) *Ray Soc.*, II, 128). Therefore I think we should state that *A. sulcata* very rarely retracts the tentacles, but when it does they are withdrawn and concealed by the inturned collar and the animal then very closely resembles a green or grey-green beadlet anemone in contracted state. Seldom now visiting the sea shore, and not keeping animals in aquaria, I would be grateful to hear of anyone photographing this comparatively rare phenomenon.

Mr. McLean draws attention to the waste matter and it is worth noting that the waste is extruded as a "mucous wrapped lump" from the single orifice or mouth, so that the removal of such waste is thereby simplified. I found it essential to remove this waste almost at once to avoid pollution and that it was expelled by the animals between something like 1 and 6 hours after feeding.

Much has yet to be learned of various aspects of the breeding cycle of the anemones, but some reproduce by fragmentation, some by budding or the young may be born alive. It is something of a shock when one first finds dozens of tiny anemones flooding a tank, but these can be reared successfully—and it is surprising how large a piece of flesh can be ingested by the often minute scraps. Incidentally, size has little or no bearing on the age of anemones since this characteristic depends upon the food supply: to be brief, they can grow smaller.

H. J. Vosper,
London, S.W.16.

WITH reference to Mr. A. J. McLean's article (*The Aquarist*, July), the method I have found very good for keeping dust out of tanks, is to use a self-adhesive foam plastic draught excluder. I place it all along the top edges of my tanks and rest the glass on the foam plastic strip, which stops the water from the glass running down the tank sides.

T. Hurlock,
Rochford, Essex.

Fin Rot

I WAS most interested to read Mr. D. G. Crisp's letter headed Fin Rot (*The Aquarist*, July) as I have used phenoxetol for this trouble for some years with 100 per cent success. I use 1 teaspoon to ¼ pint of water and stir till cloudy and stir on till clear and add this liquid to 10 gallons (24 in. by 12 in. by 12 in.).

I have also noticed that this has cured a black molly with "pop-eye" and on two occasions fighters have recovered from scale protrusion.

I have also tried acriflavin with success on velvet disease but only in bare and unplanted tanks.

Recently I have heard that a substance call malachite green is of great value for velvet, fungus and a number of other non-parasitic disorders. The person who told me was not sure of the dose, but as a guide gave a dose range as 1-2 grains to 4 gallons of water.

He also said that salt could be used in combination with this cure and extended the potency in stubborn cases.

I would appreciate any further information that either you or any other readers can give.

I have also heard that this is used in place of methylene blue for the protection of cichlid spawn during the incubation period by continental breeders.

J. A. Croft,
London, N.14.

In our experience malachite green must be used with greater caution than is necessary with methylene blue. Reported cures of fungus in coldwater fish by treatment with malachite green give the dose as 1 in 200,000 (about 0.35 grain/gallon), and the dyestuff has also been used in the presence of 0.25 per cent salt.—Editor.

Angels and Dried Foods

I WAS surprised and delighted to find that my angels had grown enormously during my absence from home at school. There are only two angels housed in an 18 in. by 10 in. by 10 in. tank with three rosy tetras and one male Siamese fighting fish.

The sides of the tank are covered with light blue hardboard and so is the back, thus only the front is left clear. The greatest surprise was that they had been fed on dried food alone (admittedly I have what I consider to be the best seven makes of dried foods, these are arranged in a rota throughout the week). The tank is densely planted and my fish are always swimming around with their fins

sect. I would be very interested to hear of like success with angels on dried foods.

R. SLOCOCK,
Harpenden, Herts.

Angel Death

I HAD a large angel which moped, refused to eat and 'coughed' as if it had an internal infection. Suddenly I found it dead. Examining it, I found four pieces of gravel down its throat, and a piece of narrow shell was across the entrance to its stomach. No wonder it would only take *Daphnia*! I think the cause was panic. They get into corners when the tank is siphoned, and then panic and 'dive' into the gravel. This one must have done just that, and got a mouthful of gravel, which went further back inside it. Moral—don't panic your angel fishes—ever.

A. RUTH,
Redhill, Surrey.

Floating Plants

COMMONLY used in aquaria are plants which, although the aquarist may not realise it, possess some unusual characteristics in the plant world. Three notable ones are fairy moss (*Azolla*), duckweeds (*Lemna*) and bladderwort (*Utricularia*).

The term fern is often wrongly applied to certain plants, but *Azolla* is a true fern. In common use as a floating plant in tropical aquaria, it possesses no roots and obtains its food from the water in which it floats. Bladderwort is another floating plant with no roots.

Duckweeds of the *Lemna* species are unique in that they bear the smallest known flowers of any flowering plant. The flower consists of a single gynoecium (female part) and a single stamen (male part). The flower, when present, can be seen on the upper surface of a duckweed plant. All three plants are easily kept in aquaria and are quick in multiplying if suitable lighting is present. This is especially so with duckweed, which grows so quickly that it usually needs to be partly cleared from the water surface at regular intervals.

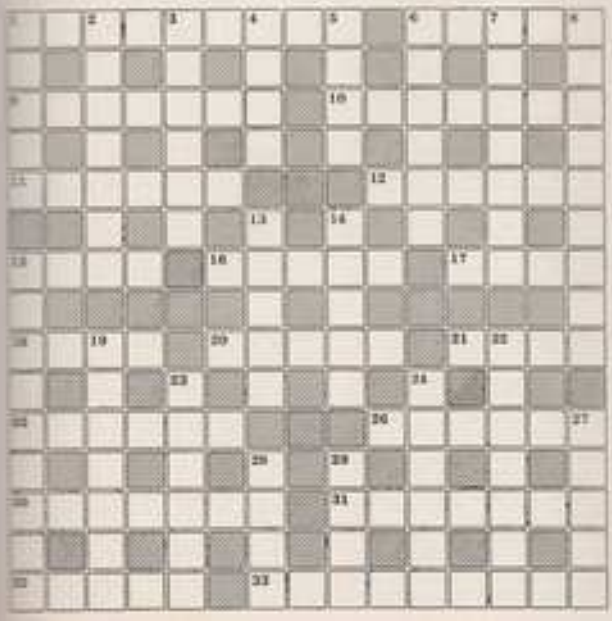
There are a number of reasons for keeping these floating aquatic plants. They help to complete or enhance the aquatic scene; they supply shade for submerged plants such as the *Cryptocoryne* which dislike intense illumination; they are often used by bubble-nest builders to help support the nest; they remove small quantities of dissolved minerals from the water and they provide cover for newly hatched fish fry.

Lesser bladderwort has fine green stems, the leaves of which are modified into small bladders or traps which capture minute water creatures. Forming a closely woven mass of threads, the plant provides protection for young fry from hungry adult fish.

These attractive water plants, although small in size, have characteristics which make them notable in the plant kingdom and which make them useful and decorative in the home aquarium.

B. Whiteside

The AQUARIST Crossword Compiled by L. BRADLEY



CLUES ACROSS

1. Is this 2 down in Pannonia? (9).
6. See 15 down.
9. A communication (7).
10. Whether the weed or the sport it usually ends with a fish (7).
11. O.K., rest around, but don't forget he makes up the fire (8).
12. Belonging to the tribe (8).
15. Small fly whose larva is good fish food (4).
16. Sweet little greatcoat (5).
17. Hall (4).
18. Slow change for the birds (4).
20. Another name for 16 down (5).
21. The rat must have a fine one for catching *Daphnia* (4).
25. Water enclosed by coral island (8).
28. Tape made from silk or cotton (8).
30. Darling what a worm you turn into (7).
31. Infectious disease of cattle (7).
32. Tango (anag.) (5).
33. Outer layer of skin (9).

CLUES DOWN

1. Aquaria to fish? (5).
2. Genus of tropical fish belonging to Cyprinidae (7).
3. Marked (6).
4. Second hand (4).
5. Lowest of tides (4).
6. Not the game hunted in 7 down but could be members of the barb family (6).
7. Hunt it for game (7).
8. Pineapple-flow (solve) (5, 4).
13. The side that is very edible (5).
14. Gem of a gourami (5).
15 & 6 across. *Hemigrammus erythrozonus* (9, 5).
19. Needed if insulating the aquarium (7).
22. A wonder (anag.) (3, 4).
23. This bark is *Barbus schuberti* (8).
24. A penny ... of fish (6).
27. Claimed by the Chancellor of the Exchequer (5).
28. If you have not got one then you cannot finish this crossword (4).
29. Hailed as transport (4).

Solution on page 111

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 15th of the month preceding the month of publication.

THE August Newsletter of the **Bradford District A.S.** contains quite an amount of information on forthcoming club activities and also the result of the July Table Show which was as follows:

Coldwater: 1 and 3, Mr. L. Booth; 2, Mrs. M. Firth. A.O.V.: 1 and 2, Mr. L. Haley; 3, Master D. Butterfield. Table show placings: Mrs. M. Firth 13 points; Mr. J. R. Smith 12 points; Mr. A. W. Cripps 11 points; Mr. H. Greenwood 11 points; Mr. J. Hooper 11 points.

The secretary is Mr. D. Carr, 42 St. Pauls Road, Shipley, Yorks., and new members can be assured of a warm welcome.

* * *

THE July meeting of the **Dundee A.S.** was attended by 31 members and friends. The table shows were Scott trophy: guppies and loaches, and the judges were W. Cockburn and J. McGloughie respectively. The results were: Guppies: 1 and Bruce cup, W. S. Russell; 2 and 3, W. S. Russell; 4, Brian Craig. Loaches: 1, Miss E. Davidson; 2, Brian Hill; 3, Ian Braid.

The programme which followed was by fellow-member Ferg. McNaughton and took the form of an illustrated talk on how he had enclosed his tanks in showers and built them in. This proved to be most instructive, amusing, and entertaining.

* * *

AT the July meeting of the **Ilford & District Aquarists' and Pondkeepers' Society** a 'Criss Cross Quiz' was the main event of the evening. All members present were able to take part in answering questions on aquaria, subjects, and not least the younger element who did extremely well.

The July Table Show was for three classes and the results were as follows:—Mollies: 1, Mr. Jackson (black lyretail); 2, Mr. Brill (black); 3, Mr. Sansom (green lyretail); 4, Mr. Sansom (black sailfin). Barbs: 1, Mr. Hartley (tiger barb); 2, Mr. Davidson (cherry barb); 3, Mr. Davidson (rosy barb); 4, Mr. Lustig (schubvert barb). Single tail pond fish: 1, Mr. Berger (common goldfish); 2, Mr. Berger (Bristol shubunkin); 3, Mr. Brill (sarasin); 4, Mr. Berger (common goldfish).

At the Dagenham town show which was held during the same month, the society won the furnished aquaria competition for the third year in succession, and Mr. Berger won the award for the best fish in the show with a black moor. He also won three awards for goldfish, and Mr. Brill won third and fourth place in the labyrinth section.

The society's annual pond competition also took place in July and the winners were:—1, Mr. Berger; 2, Mr. Brill; 3, Mr. Brabon and Mr. Cook. There were eleven entries this year.

At the annual general meeting the officers elected for twelve months were:—President, Mr. V. Price; vice-presidents, Mr. L. Jarvis and Mr. J. Nott; chairman, Mr. A. Stebbing; vice-chairman, Mr. M. Brill; treasurer, Mr. M. Brill; asst. treasurer, Mr. L. Smith; secretary, Mr. R. Ruth; asst. secretary, Mr. V. Price; show secretary, Mr. H. Berger; present social secretary, Mr. L. Smith; librarian, Mr. K. Ellis; committee members: Mrs. Ruth, Messrs. Cook and Saunders; auditors: Messrs. Davidson and Dixon.

Anyone interested will be welcome to attend future meetings, held on the second Monday evening of each month. Details are available from the Secretary, Mr R. Ruth, 13 Dunstall Road, Dagenham.

AT the South London section of the **F.G.A.** meeting for July a tape recording by Mr. W. G. Phillips was heard "On breeding guppies," which was of great interest especially to the newer members.

The results of the table show were as follow: Swordtail males: 1, A. Jamieson (70 pts.); 2, Mrs. J. Summers (58 pts.). A.O.V. males: 1, F. Baker (76 pts.); 2, F. Baker (73 pts.); 3, T. Hibbert (69 pts.). Roseths females: 1, H. Harris (82 pts.); 2, B. Montilla (74 pts.); 3, F. Baker (71 pts.). A.O.V. females: 1, A. Jamieson (73 pts.); 2, A. Fox (70 pts.); 3, A. Jamieson (68 pts.). Breeders males: 1, A. Jamieson (75 pts.); 2, A. Goodall (74 pts.); 3, F. Baker (72 pts.). Breeders females: 1, F. Baker (6th pts.). Breeders pairs: 1, A. Goodall (76 pts.); 2, Mrs. J. Summers (71 pts.). A gold star was won by Mr. A. Goodall and silver stars were won by F. Baker, H. Harris and A. Jamieson.

* * *

AT the August meeting of the **Altrincham and District A.S.** the main item of the evening was a furnished aquaria competition for members which was won by Master Dickenson.

The specified class in the month's table show was won by Mr. R. Lister, second being Mr. R. Hampson and third Mr. E. Emms. The A.O.V. class was won by Mrs. Dickinson as also was the novice class. Future events include a "behind the scenes" visit to Belle Vue Aquarium.

* * *

IN July **Blackpool & Fylde A.S.** had a very entertaining slide lecture by Mr. David Jones of Morecambe on "Life on the sea shore". The slides were excellent for their quality and Mr. Jones gave a witty and informative commentary to match.

Also, the members held a treasure hunt organised by Mr. J. Taylor and Mr. H. Pendleton. Nine cars filled with members and their families were led a winding goose chase through the Fylde. The route sheet was in rhyme giving 14 clues to be answered before they reached the treasure chest. Mr. A. Mather proved to be the Captain Kidd of the club outing.

The 15th annual open show will be held on Sunday, 24th September. The show will be held at the Pearson School of Dancing, 67 Station Road. Show schedules can be obtained from the Show Secretary, Mr. J. Taylor, 32 Westby Avenue, Blackpool.

* * *

THE **Nottingham Tropical Fishkeepers** re-opened the club after the summer recess.

At our recent Committee Meeting we discussed a new programme including lectures, films and colour slides which has now been arranged and a new list of table shows has been sent to all members. Mr. D. F. Farris has been appointed show secretary and any information regarding future shows should be addressed to him at 37 Harkstead Road, Bestwood Park, Nottingham. All visitors and new members are invited to join at future meetings. For further information, please contact the secretary, Mrs. H. Farris, 37 Harkstead Road, Bestwood Park, Nottingham.

* * *

MEMBERS of the **British Aquarists' Study Society** are reminded that the annual general meeting and congress will be held at the lecture hall of the Zoological Society of London, Regents Park, on Saturday, 2nd October, at 10.30 a.m.

At the congress, which will start at 3 p.m., Mr. Roy Skipper will give a paper on the "Breeding the Symphysodon Discus," and Dr. Greenwood of the Natural History Museum will speak on "Lung Fishes and Other Labyrinths".

The second spring meeting took place at the Belle Vue Zoo, Manchester. B.A.S.S. members were taken on a conducted tour of the Zoo during the forenoon by Mr. R. Legge, Curator of the Zoo, who, at the afternoon session gave a talk on his methods, new ideas, and future plans for the excellent Aquarium. Members were privileged to see a wonderful display of tropical and coldwater fishes, both marine, and freshwater. During the reception, members were introduced to representatives of the Northern Federation. Members who attended came from as far apart as Portsmouth and Southampton up to Yorkshire, including a coach from London.

* * *

AT the annual general meeting of the **Wimbledon A.S.**, held in July, the following officers were elected. Chairman, Mr. R. Braithwaite; treasurer, Mr. P. Bedford; show secretary, Mr. J. Hill; press secretary, Mrs. F. Wood. Meetings are held on the second Thursday of each month at the Working Men's Club, Station Road. New members will be warmly welcomed. For further information please contact the Secretary, Mr. G. Berry, 82 St. Helens Street, Elsecar, nr. Barnsley, Yorks.

* * *

THE month of July proved to be a busy one for members of the **Newport A.S.**, the annual competition for furnished aquaria having been held, in addition to the usual fortnightly meetings.

At the first meeting of the month society member Mr. Jim Wall spoke on the subject "Glazing an Aquarium", and gave a practical demonstration which provided many tips for the would-be do-it-yourself enthusiast.

The results of the table show held the same evening for cichlids and swordtails, judged by Mr. Ivor Taylor of the Barry A.S., were as follows:—Cichlids: 1, Master Nigel Jobe; 2, Mrs. M. Burgess; 3, Mr. M. J. Parry. Swordtails: 1, 3 and 4, Mr. Ralph Harris; 2, Miss Gail Griffiths. At the second meeting members enjoyed a slide lecture on "Killifishes", which were hired from Mr. A. Robbins of Co. Down, Northern Ireland. The results of the home aquaria competition judged by the secretary of the South Wales Tropical Fish Study Group, Mr. R. Dennis Johns, were as follows:—Small aquariums (tanks up to and including 2 ft. in length): 1, Master Nigel John; 2, Mr. J. Burgess. Large aquariums (over 2 ft. in length): 1, Mr. Ralph Harris (society president); 2 and 3, Mr. J. H. Wall.

Keen satisfaction is felt within the society at the outstanding success of certain members at the recent annual show of the Llanwrtyd Major A.S. Of the six premier awards, three were won by Newport members. Society president, Mr. Ralph Harris, in addition to receiving plaques for best fish in show, best breeders' team (livebearers) in show, was also successful in obtaining a further two firsts, two seconds, two thirds, and two fourth awards. Junior member, Master Clive Pemberton, for the second successive year was awarded the plaque for best junior exhibit in show. Particular class Master Pemberton took first, third and fourth places. His father, Mr. C. A. W. Pemberton, received second place in the class for Siamese fighting fish.

Further particulars of all the society's activities, which are many and varied, can be obtained from Mrs. A. Salmon, 18 Glaisher Road, Christchurch, Newport, Mon.

* * *

AT the annual general meeting of the recently formed **Wimbledon & Merton Aquarist Club**, the following were elected as officers for 1965/66—Chairman, Mr. R. Dudley; vice-chairman, Miss P. Stickley; treasurer, Mrs. I. Jones; secretary, Mr. C. J. Harrison, 29 Salcott Road, Balham, S.W.12.; show secretary, Mr. D. G. Crisp, 193 Broadway, Wimbledon, S.W.19.

THE monthly meetings of the **N.E.L. A.S.** recommenced on Wednesday, 8th September. The meetings are held in the National Engineering Laboratory, East Kilbride, on the second Wednesday of each month until May, 1966, and new members are welcome.

* * *

THE annual table show of the **Yeovil & District A.S.** was once again a great success, with entries well up to average. Prizewinners were:—Goldfish: 1, W. Reeves; 2, G. Gilland; 3, N. Steiner. Bristol shubunkins: 1, 2 and 3, S. Langdon. London shubunkins: 1, V. Collins. Fancy coldwater fish: 1 and 2, V. Collins; 3, W. Reeves. Pearl or rosey fish: 1 and 2, V. Collins; 3, W. Reeves. Breeders' coldwater 1964: 1 and 3, S. Langdon; 2, V. Collins. Labyrinths: 1, A. Nicholls; 2, T. Perry. Male fighters: 1 and 2, N. Steiner. Barbs: 1, G. Gilland; 2, L. Pilkington; 3, M. Bryant. Characins: 1, T. Perry; 2, G. Gilland; 3, N. Steiner. Cichlids: 1, N. Steiner; 2, T. Perry; 3, L. Pilkington. A.O.V. egglayer: 1, T. Perry; 2, G. Gilland; 3, N. Steiner. Catfish: 1, G. Gilland; 2, D. Phinn; 3, A. Nicholls. Shellies: 1, A. Nicholls; 2, L. Pilkington; 3, C. Burrell. Male guppies: 1 and 2, D. Phinn; 3, T. Perry. Female guppies: 1, G. Gilland; 2, A. Nicholls. Swords and platys: 1, T. Sharp; 2, D. Phinn; 3, T. Perry. Breeders' egglayers 1965: 1, N. Steiner; 2, T. Sharp. Breeders' livebearers 1965: 1, G. Gilland; 2 and 3, T. Perry. Best coldwater fish in show: S. Langdon. Best tropical fish in show: G. Gilland. Best livebearer in show: A. Nicholls. Exhibitor with most points: G. Gilland. Most points in coldwater section: V. Collins. The judges were Mr. R. Morley and Mr. B. Coombs.

* * *

THE results of the **Freelance A.S.** open show were as follow:—Class 1: 1, T. Gillman (Bethnal Green), red platy; 2, G. Greenhalf (Kingston), Berlin sword; 3, J. Stewart (L.T.E.), spade sword; 4, S. Sears (E. Dulwich), red-eyed red sword. Class 2: 1, J. Cobden (Catford), veiltail; 2, G. Greenhalf (Kingston), black veiltail; 3, T. Asquith (Catford), veiltail; 4, D. Woodward (Hounslow), veiltail. Class 3: 1, T. Gillman (Bethnal Green), tiger barb; 2, D. Woodward (Hounslow), cherry barb; 3, J. Cobden (Catford), tiger barb; 4, L. Ayres (Croydon), tiger barb. Class 4: 1, T. Gillman (Bethnal Green), anomalochromis anomalochromis; 2, J. Miller (Chelsea), blind cave; 3, R. Thorne (Hounslow), black widow; 4, B. Prior (Ireland), blind cave. Class 5: 1, C. Fullerman (Clapham), firemouth; 2, A. H. Gale (Dulwich), aphyosemion cameroni; 3, F. G. Glynn (Clapham), marble cichlid; 4, D. Thorne (Hounslow), severum. Class 6: 1, Mrs. Castle (Dulwich), giant danio; 2, G. Greenhalf (Kingston), acanthrus; 3, R. Partridge (Cranford), rubrum boraptanum; 4, L. Cobden (Catford), orange stonerod. Class 7: 1, J. Cobden (Catford), aphyosemion wallifer; 2, A. Howes (Freelance), aphyosemion lineatus; 3, A. H. Gale (Dulwich), firemouth panchax; 4, A. Howes (Freelance), aphyosemion lineatus. Class 8: 1, R. Cooper (Kingston), corydoras aeneus; 2, D. Woodward (Hounslow), corydoras paleatus; 3, G. Greenhalf (Kingston), corydoras julii; 4, I. Stemp (Redhill & Reigate), corydoras aeneus. Class 9: 1, K. Foot (Kingston), striped mind cat; 2, S. Sears (Dulwich), synodontis sp.; 3, R. Thorne (Hounslow), synodontis sp. Class 10: 1, M. R. Thomas (Freelance), male red fighter; 2, L. Ayres (Croydon), fighter; 3, Mrs. M. Darlow (Clapham), red male fighter. Class 11: 1, J. Cobden (Catford), keri gourami; 2, R. and G. Mumford (Freelance), colisa chuna; R. Thorne (Hounslow), dwarf gourami; 4, A. Brittain (Freelance), keri gourami. Class 12: 1, J. Cobden (Catford), red tailed black shark; 2, G. Greenhalf (Kingston), red finned shark; 3, L. Ayres (Croydon), bala shark; 4, Mrs. Dunston (Dulwich), red tailed shark. Class 13: 1, B. Crisp (Wimbledon & Morton), Bristol shubunkin; 2, B. Crisp (Wimbledon & Morton), goldfish; 3, W. R. Tee (Catford), veiltail; 4, G. Owen (Catford), comet-tail koi. Class 14: 1, M. R. Thomas (Freelance), corynocoryas retrospiralis; 2, M. R. Thomas (Freelance), Amazon sword; 3, J. Stewart (L.T.E.), pigmy Amazon sword; 4, M. R. Thomas (Freelance), vallis. Class 15: 1, T. Beasley (Freelance), amazon cat; 2, D. G. Allen (Bethnal Green), zebra barbs; 3, S. Sears (Dulwich), keri gourami; 4, A. Riley (Worthing), neons. Class 16: 1, M. R. Thomas (Freelance), red-eyed red swords; 2, R. and G. Mumford (Freelance), black hyfin swords; 3, D. Woodward (Hounslow), vallisa; 4, M. R. Thomas (Freelance), moon platys. Class 17: 1, J. Stewart (L.T.E.); 2, R. Thorne (Hounslow); 3, F. Baker (Freelance); 4, R. Thomas (Freelance). Female guppies: 1, G. Goodall (F.G.A.); 2, Sherwin; 3, G. Goodall (F.G.A.); 4, Mrs. Thorne (Hounslow). Male guppies: 1, A. Goodall (F.G.A.); 2, A. Gale (Dulwich); 3, A. Goodall (F.G.A.); 4, Mrs. Thorne (Hounslow). Breeders: 1, A. Jamieson (Freelance); 2, G. Goodall (F.G.A.); 3, F. Summers (F.G.A.). The Alan Jamieson Cup for best fish in the show: J. E. Cobden (Catford), red tailed black shark. Club championship: 1, Freelance A.S.; 2, Catford A.S.; 3, Kingston & District A.S.; 4, Hounslow A.S.

* * *

RECENTLY the **Rugby A.S.** held a table show and quiz.

The judge made comments on the entries before the announcement of the winners, which were:—Livebearers: pairs: 1 and 3, R. Deacon; 2, R. Fox. Livebearers: breeders' class: 1 and 2, Mr. and Mrs. Pearce; 3, R. Deacon. Any other variety: pairs: 1 and 3, R. Fox; 2, H. W. Stevenson.

* * *

THE first annual open show of the **Gorton and Openshaw A.S.** was held recently. Judges were Mr. Bloom (F.N.A.S., and Mr. Linsley (F.N.A.S.), and there were 289 entries. The results were as follow:—Livebearers: Guppies: 1, Mrs. Wolstencroft (Heywood A.S.); 2, Master P. Knowles (Workington); 3, Miss Lindley (F.G.B.S.). Mollies: 1, M. Davis (T.A.B.); 2, M. Davis (T.A.B.); 3, Mrs. Dennis (Workington). Platys: 1, Mrs. Dennis (Workington); 2, Mrs. P. A. Nicholls (Ouram); 3, Mr. Mawson (Workington). Swordtails: 1, P. Clarke (Garforth); 2, Mrs. Dennis (Workington); 3, M. Davis (T.A.B.). Anabantids: Fighters: 1, Mr. Mawson (Workington); 2, Mr. Sergeant (Warrington); 3, P. Clarke (Garforth). A.O.V. anabantids: 1, Mrs. Dennis (Workington); 2, L. McCourt (Gorton and Openshaw); 3, B. Gardner (Stretford). Cichlids: Dwarf: 1, Mr. Hawkinson (Portland); 2, L. McCourt (Gorton and Openshaw); 3, A. Wilkie (Stretford). Angels: 1, B. Gardner (Stretford); 2, A. Wilkie (Stretford); 3, B. Hughes (T.A.B.). A.O.V. cichlids: 1, Mrs. P. A. Nicholls (Ouram); 2, L. McCourt (Gorton and Openshaw); 3, S. Knowles (Workington). Large characins: 1, M. Davis (T.A.B.); 2, A. Wilkie (Stretford); 3, J. Leonard (Gorton and Openshaw). Small characins: 1, Mrs. Dennis (Workington); 2, B. Hughes (T.A.B.); 3, T. Lindley (F.G.B.S.). Large barbs: 1, Mr. Dennis (Workington); 2, M. Davis (T.A.B.); 3, L. McCourt (Gorton and Openshaw). Small barbs: 1, Mr. Mawson (Workington); 2, K. Riley (Nottingham & District); 3, F. Gregory (Ouram). Labeo's and sharks: 1, B. Hughes (Belle Vue); 2, A. Wilkie (Stretford); 3, J. Smith (Blackpool). Tooth carps: 1, F. Gregory (Ouram); 2, A. Seabright (Belle Vue); 3, Mrs. Dennis (Workington). Carps and minnows: 1 and 3, M. Davis (T.A.B.); 2, Miss Lindley (F.G.B.S.). Catfish: 1, B. Hughes (T.A.B.); 2, L. McCourt (Gorton and Openshaw); 3, G. Ballyernan (Nottingham & District). Loaches: 1, M. Davis (T.A.B.); 2, Mr. D. Bone (Nelson); 3, Mr. Brown (Heywood). A.O.V. tropical: 1, B. Hughes (T.A.B.); 2, M. Davis (T.A.B.); 3, J. Leonard (Gorton and Openshaw). A.V. coldwater: 1, W. H. Smith (Stretford); 2, Mrs. Wolstencroft (Heywood); 3, C. Noble, Jr. (Gorton and Openshaw). Juniors: 1, Miss L. Shore (Ouram); 2, Master P. Hodgkinson (Gorton and Openshaw); 3, Master P. Knowles (Workington). Pairs: Livebearers: 1, Mr. Dennis (Workington); 2, J. Hayes (Blackpool); 3, Mr. Kilner (Heywood). Egglayers: 1, Mrs. T. Lindley (F.G.B.S.); 2, Mr. Lindley (F.G.B.S.); 3, J. Smith (Blackpool). Breeders' livebearers: 1, Mr. Dennis (Workington); 2, M. Davis (T.A.B.); 3, Miss Lindley (F.G.B.S.). Egglayers: 1, J. Smith (Blackpool); 2, A. Wilkie (Stretford); 3, Mr. Dennis (Workington). Best fish in show: Mr. B. Hughes (T.A.B.), 92 pts. Best exhibit in show: J. Smith (Blackpool), 93 pts. in breeders, egglayers.

* * *

THE month of August saw the start of a new trend in the activities of the **Newport A.S.** At the first meeting of the month members went "out and about", on a daphnia/treasure hunt, organised by Mr. and Mrs. Colin Salmon. Following a keenly fought contest the winners were announced as being the car party of Messrs. Banfield and Davy.

At the following meeting Society member Mr. Ron Silcox spoke on the subject, "Electricity and the Aquarist". The result of the Junior Table Show for egglayers and livebearers held the same evening was as follows:—Egglayers: 1 and 4, Master Clive Pemberton, 2, Master Nigel John, 3, Master Richard Phillips. Livebearers: 1 and 4, Master Philip Pemberton, 2 and 3, Master Clive Pemberton. The Society has a flourishing Junior section, which has its own representation on the Committee, and its own troubles. Any interested young people are invited to communicate with Mrs. Ann Salmon, 18, Glamorgan Road, Christchurch, Newport, Mon., who will be pleased to forward further details.

The Society is shortly commencing publication of its own magazine, and any persons who would like to contribute an article(s) etc., for publication are asked to forward same to T. G. Wall Esq., 3, Wyeverne Rd., Newport. The Third Annual Dinner of the Society has been arranged for Saturday, 11th December, at the Trafalgar Arms Hotel.

* * *

RECENTLY at a meeting of the **Cardiff A.S.** a tableshow was held. The results being as follow: Livebearers: 1, Mr. P. Battista (Platy); 2, Mr. P. Battista (Molly); 3, Mr. J. Barnes (Platy). Catfishes: 1, Mr. J. Barnes (Bronze); 2, Mr. C. W. Gorwell (Julii); 3, Mr. C. W. Gorwell (Albino). The judge at this meeting was Mr. W. D. Songhurst from Bridgend.

At the following meeting, a Quiz was organised by Messrs. T. Haines and N. A. Counsell. This proved very interesting and beneficial to all taking part. At the August Tableshow, the judge was Mr. G. Lewis from Newport and the results were as follow: 1, Mr. P. Battista (Thick-Lip Gourami); 2, Mr. C. W. Gorwell (Blue Acara); 3, Mr. G. Tucker (Thick-Lip Gourami); 4, Mr. N. Counsell (Blue Gourami).

The raffle prizes at this meeting were won by Messrs. G. Tucker and C. W. Gorwell.

Meetings are held on the second and fourth Thursday of each month at the Olde Arcade Inn, Church St., Cardiff, commencing at 8.00 p.m. Visitors and new members can be assured a warm welcome and details can be obtained from the Hon. Secretary, N. A. Counsell, 29, Llanmaes Rd., Gabalfa, Cardiff.

Crossword Solution

H	A	R	L	E	Q	U	I	N	■	T	E	T	R	A
O	■	A	■	V	■	S	■	E	■	I	■	H	■	N
M	E	S	S	A	G	E	■	A	N	G	L	I	N	G
E	■	B	■	D	■	D	■	P	■	E	■	M	■	E
S	T	O	K	E	R	■	■	■	T	R	I	B	A	L
■	■	R	■	D	■	D	■	P	■	S	■	L	■	F
G	N	A	T	■	H	O	N	E	Y	■	S	E	M	I
L	■	■	■	■	■	V	■	A	■	■	■	■	■	S
O	W	L	S	■	L	E	E	R	I	■	M	E	S	H
W	■	A	■	G	■	R	■	L	■	K	■	A	■	■
L	A	G	O	O	N	■	■	■	F	E	R	R	E	T
I	■	G	■	L	■	C	■	T	■	T	■	D	■	A
G	R	I	N	D	A	L	■	A	N	T	H	R	A	X
H	■	N	■	E	■	U	■	X	■	L	■	U	■	E
T	A	G	O	N	■	E	P	I	D	E	R	M	I	S

Petfish
554, Garratt Lane, S.W.17
Telephone: Lakeside 2805
Closed Wednesday. R. C.T.P.AA. R.&A.

South Western Aquarists
2, Glenburnie Road, Trinity Road,
Upper Tooting, S.W.17
Telephone: Balham 7334
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

Tachbrook Tropicals Ltd.
244, Vauxhall Bridge Road, Victoria, S.W.1
Telephone: Victoria 5179
(Open all week except Sundays).
WR. C.T.P.AA. R.&A.

LONDON (West)

Aquapets
17, Leeland Road,
West Ealing, W.13
Telephone: Ealing 2748
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Owen Reid's, Aquarium Dept.
12, Spring Bridge Road, Ealing Broadway, W.5
Telephone: Ealing 3259
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

NORTHAMPTONSHIRE

The Aquarium
192, Wellingborough Road,
Northampton
Telephone: Northampton 34610
E.C.D. Thursday. R. C.T.P.AA.

The Pet Shop
120, Kettering Road,
Northampton
Telephone: Northampton 38841
E.C.D. Thursday. R.C.T.P.AA.

OXFORDSHIRE

The Goldfish Bowl
9, East Avenue, Cowley Road,
Oxford
Telephone: Oxford 41825
E.C.D. Thursday. W.R. C.T.P.

STAFFORDSHIRE

Walsall & Wolverhampton Aquatics
46, Stafford Street, Walsall and
147, Horsley Fields, Wolverhampton
Telephone: Walsall 21783 and Wolverhampton 24147
E.C.D. Thursday.
W.T. AA. R. C.T.P.AA. R.&A.

SURREY

Aquapets
1, Grand Parade,
Tolworth
Telephone: Elmbridge 0678
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Thameside Tropicals and The Pet Shop
Brassey House, New Zealand Avenue,
Walton-on-Thames
Telephone: Walton 24076 R. C.T.P.AA. R.&A.

SUSSEX

Dowding, Conrad A.
1, St. John's Terrace,
Lewes
Telephone: Lewes 3970
E.C.D. Wednesday. Open until 8 p.m. Fris. & Sats.
R. C.T.P.AA. R.&A.

Preston Aquarium
44, Beaconsfield Road, Brighton
Telephone: Brighton 681602
(Open all week). R. C.T.P.AA.

Regency Pets Aquaria (Prop. R. A. Bassett)
23, Surrey Street (outside Brighton Station),
Brighton
Telephone: 29940 R. C.T.P.AA. R.&A.

WARWICKSHIRE

The Coventry Aquarist (Prop. W. Dymond)
43, Melbourne Road, Earlsdon, Coventry
Telephone: Coventry 72772
E.C.D. Thursday. WR. C.T.P.AA.

WORCESTERSHIRE

The City Aquaria, Bird and Pet Supplies
(Proprietor: Mrs. M. Hemming)
34, Friar Street (opposite Union Street), Worcester
Telephone: Worcester 22005
E.C.D. Thursday. R. C.T.P.AA. R.&A.

YORKSHIRE

The Corner Shop (Prop. J. Wilde)
526, Abbeydale Road, Sheffield, 7
Telephone: Sheffield 54172
E.C.D. Thursday. R. C.T.P.AA. R.&A.

SCOTLAND

Aquarists' Rendezvous
164/168, Albert Drive, Pollokshields, Glasgow, S.1
Telephone: South 4258 WR. C.T.P.AA.

P. N. Greening
176, Blackness Road, Dundee, Co. Angus
Telephone: Dundee 66409
E.C.D. Wednesday. R. C.T.P.AA.

NORTHERN IRELAND

Ulster Aquatics
15, Montgomery Street, Belfast
Telephone: Belfast 27144
E.C.D. Wednesday. WR. C.T.

PREPAID ADVERTISEMENTS

5d. per word (12 words minimum) Box number 2/- extra

FOR SALE

CHELTENHAM. Largest selection of Tropical and Coldwater fish in Gloucestershire. Equipment, Plants, Furniture, Plastic, Fibreglass Pools, Houseplants. Patricia Preece (Prop. Mr. R. R. James), Florists & Aquarists, 10, Suffolk Parade, Cheltenham. Tel. Chelt 24949.

PERRY'S for Plants. 1st and 2nd Awards British Aquarists' Festival. Assorted selections Tropical or Cold 7s. 6d., 10s. 6d., 12s. 6d. : Val. Torta, Sagittaria Netaxei, 6s. per dozen. Cryptocoryne Cordata 1s. 6d. to 2s. 6d.; Willisii 2s. 6d.; Haerseliana 2s. 6d.; seven assorted 10s.; Water Wisteria, Giant Hygrophila 2s. 6d. Post 1s. All Advertised Accessories. C. R. Perry, Professional Aquarist, 615, West Street, Crewe.

AQUARIA FRAMES. For quality and accuracy buy direct from the manufacturer. 1 × 1 × ⅛ iron, steel angle: 36 × 15 × 15 ins., 27s; 36 × 12 × 12 ins. 25s; 30 × 15 × 15, 24s. 6d; 30 × 15 × 12 ins, 24s; 30 × 12 × 12 ins., 23s 6d.; 24 × 12 × 12 ins., 21s 6d.; also 18 × 10 ins., 15s; 18 × 12 ins., 16s. 6d. from ¾ × ¾ × ⅛ angle. All mitred and welds ground flush. Carriage paid. Any size made to order. C.W.O. Money refunded if not satisfactory. For complete list, stands, shades, etc., 3ae to J. E. Heeney, 52, Chester Street, Accrington. Phone Accrington 34535.

WHEN IN STOKE visit Bonny's for tropical fish, plants and accessories. Finest selection for the aquarist in the Potteries. 16, Harnhill Road, Stoke-on-Trent. Phone 46358.

CALLING ALL AQUARISTS. Call and see our large selection of Tropical and Coldwater fish, Plants to variety. We also stock all accessories at "The Aquarium," 192, Wellingborough Road, Northampton. Phone 34610.

RUSTPROOFED Aquarium Frames, including bow and corner type. Ornamental Stands, Glazing Cement and Equipment Manufacturers. Woodley's Barton, Ormskirk.

GLAZED aquaria in all sizes including 36 × 15 × 12, 75s. 6d.; 18 × 10 × 10, 19s. 6d.; 24 × 12 × 12, 42s. 6d., tanks despatched to any part of Britain, carriage extra. Plants, Accessories, Fish. Wright's, 10, Lorne Road, London, N.4. Phone Archway 3820.

HEMEL HEMPSTEAD, HERTS. Tropical fish: 40 tanks of over 100 varieties, all equipment, plants, etc. Please pay us a visit and see a first-class display. F. Heinzen, 7, Bank Court, Hemel Hempstead, Herts. Telephone Boxmoor 5874.

TROPICAL FISH, fully quarantined, over 100 species offered at lowest prices. All aquarists' requirements supplied. Personal shoppers only. Sterling Fisheries, 62, Mayes Road, Wood Green, N.22.

WHITEWORMS—Generous culture and instructions—5s. Eric Baker, 32, Cleveland Road, Brighton.

GUARANTEED thermostat, heater and thermometer, 20s. post paid. State heater wattage. Sterling Fisheries, 62, Mayes Road, N.22.

AQUARISTS. Mr. Joseph Sankey, late of Northfield and Worcester Stores, Birmingham, is now in attendance for the sale of all aquariums and requisites. Also glass-fibre pools, fountains, waterfalls, pool-side goldfish, and advice on all fish problems at: Pimms, Bull Ring Centre Market, Birmingham. MID 1969.

AQUARIUM STANDS, frames, shades. Stands to take 2 tanks, 1 × 1 × ⅛ ins. steel angle: 18½ × 12 × 30 ins. high, 32s.; 24½ × 12 × 36 ins. high, 36s.; 30½ × 12 × 36 ins. high, 40s.; 36½ × 12 × 36 ins. high, 46s. Rustproof frames: 24 × 12 × 12 ins., 22s.; 30 × 15 × 12 ins., 25s.; 30 × 15 × 12 ins., 28s. Large frames, 1¼ × 1¼ × ⅛ steel angle: 48 × 12 × 12 ins., 47s.; 48 × 15 × 12 ins., 50s.; 48 × 15 × 15 ins., 55s.; 60 × 15 × 12 ins., 60s.; 60 × 15 × 15 ins., 65s. Stands: 48½ × 12 × 36 ins. high, 70s.; 48½ × 15 × 36 ins. high, 75s.; 60½ × 12 × 36 ins. high, 80s. Aluminium shades: 48 × 12 ins., 40s.; 48 × 15 ins., 46s.; 60 × 12 ins., 50s.; 60 × 15 ins., 54s.; 24 × 12 ins., 21s.; 30 × 12 ins., 24s.; 36 × 12 ins., 30s. Any size frame, stand and shade made to order, carr. paid. Money back if not satisfied. Hackney Engineers, 30-32, Sewters Street, Leeds, 1. Tel. 25061.

PLYMOUTH TROPICALS for fish, plants and equipment. 127, North Road, Plymouth. Tel. 62865.

WHITE WORM BY WEIGHT, 1 oz.-4s.—4 oz.-15s. Established Cultures in boxes—20s., all post paid. V. J. A. Deane & Son, "Dereham," Alcester Road, Purrsey via Alvechurch, Worcestershire. Tel. Wythall 2582.

GREENS OF BLACKPOOL for tropical and coldwater fish, plants, tanks and accessories. Open daily till 6.30 p.m. (Wednesday, 1.30 p.m.), Sunday, 10 a.m. to 1 p.m. 209, Waterloo Road, South Shore. Telephone 45668

GUARANTEED QUALITY PLANTS by return. Anubias, hygrophila, bacopa dwarf amazon, dwarf sagittaria, sagittaria, vallisneria spiralis V. torta, hairgrass, ludwigia, hornwort, 8d. each, 7s. 6d. dozen. Indian fern (fine, bread), cabomba, beckerei: 1s. 6d. each. Dwarf lily, wisteria, giant hygrophila, hastifolius, cordata: aponogeton, 2s. each. Amazon sword, 4s. 6d. each. Post 9d. all orders. Over 120 varieties tropical and coldwater fish, personal shoppers only. Kingfisheries, 138, Croydon Road, Beckenham, Kent. BEC 3718. Closed Wednesday.

FAITHFUL'S FISHERIES (TROPICAL) LTD. for quality tropicals and aquatic plants. Suppliers to the trade only. Write, 'phone or call: 62, Leigh's Conduit Street, London, W.C.1. Holborn 3002 and Willesden 6318.

BENNETT'S LIVESTOCK SUPPLIES, 305, London Rd., Hazel Grove, Ches. Large selection Tropical fish and Reptiles.

BLANKET WEED REMOVER. This device is as unique, effective, and original as the shredders. Made of stainless steel, it will remove blanket weed from aquariums without damaging plants. Price 3s. 9d. plus 9d. postage. SHREDDERS for White Worm, Earthworm, Mosquito etc., etc. I can now offer the Super Shredders Combination at 20s. plus 1s. postage. This comprises the usual fine toothed plate, a coarse toothed plate and the top plate with handle; a perfect combination in stainless steel, or the Super Shredders (fine tooth only) still at 16s. plus 1s. postage. GIANT SAGITTARIA, as supplied to London Zoo; suitable for tropical or coldwater aquaria, also ponds. Young plants, 6s., 7s. 6d. or 9s. 6d. dozen. Large plants 1s. 3d. and 1s. 6d. each. Postage 1s. 3d. E. S. Walker, 143/145, Bure Lane, Christchurch. PS.—Postal trade only. Local purchasers can obtain supplies from Cook's Aquaria, Boscombe.

COLOURED SLIDE SHOWS of aquarium plants for hire to clubs or societies. Personal shows for London and Essex areas. Brentwood Aquatics, 274, Warley Hill, Brentwood, Essex.

IF ITS TROPICAL FISH you want cheap, call anytime, inc. Sundays. Large selection. Mrs. Cooper, Bean Hatchery, Bean, nr. Dartford, Kent.

BARCLAYA Mottleyii, rare and beautiful aquatic, translucent crimson weed foliage, strong plants 10s each retail. J. Ellis, Hasting (Tel. 2205) Grimsby. (P.S. RETAILERS, we specialise in Aquatic Plants of every description for the trade only, write for lists).

AMPULLARIA GIGAS Infuscria snails 6 small for 3s. post paid. John E. Marshall, "Chiverton", Dartford Road, South Darenth, Dartford, Kent.

SUPERB VEILTAIL GUPPIES. Awarded "Water Life" diploma. Best in open show. £2 per pair, carriage 3s. 6d. C. R. Perry's Professional Aquarist, 615, West Street, Crewe.

THERE was a young lady from Ryde,
Who complained that her fish always died,
Then she changed to McLean's
Now she breeds Harlequins
And shows off her trophies with pride.

CEYLON SUPPLIERS. Importers and Re-distributors to the Aquatic trade of all types of Ceylonese fishes. Large discounts for quantity buying. Enquiries to: J. R. de Silva, 17 Onslow Gardens, London, S.W.7.

OUTDOOR POOL-BRED. A few surplus hardy fish for disposal from exhibition stock, of Calico Veiltails, Fantails, Shubunkins, Red Scaled Parrotts, coming in colour: also Golden Tench, Golden Orfe, Golden Rudd, Black Moors, all from 2s. 6d. each, aquarium grown and pond plants, from 8d. Stamp for list. H. North, Aquarist, 2 Leonard Place, off Roundhay Road, Leeds 7.

TIME SWITCHES reconditioned, 14 day clock, once on once off every 24 hours, jewelled movement, fully guaranteed. Varnet 1 amp, 25s.; Horstmann 10 amp, 35s. P. and P. 2s. 6d. A. R. Batchelor, 4 Park Road, Bromley, Kent.

COVENTRY CALLING ALL AQUARISTS, for the finest display of tropical and coldwater fish, plants and all equipment. Visit "The Coventry Aquarist," 43 Melbourne Road, Coventry.

BRISTOL SHUBUNKINS, 1965. Well coloured, bred from my winning stock, 5s. each, 9s. 6d. carriage. Oxenham, 49 Park Lane, Westerbourne, Bristol.

BRISTOL. Now open—Bristol's Tropical Fish Shop. Fish is our business, not a side line. See the largest selection. All fully quarantined, many bred by us. Four minutes from Temple Meads station. Early closing day, Wednesday. 8 p.m. Friday. Mapson Aquatics, 84 Victoria Street, Bristol. Tel.: 26282.

REPTILES, AMPHIBIANS, ANIMALS, Birds, many species. S.A.E. price list. Houghton (Zoological Suppliers), 36 Park Crescent, Hornchurch, Essex, Romford 44311.

STAND WITH 1 36 in. and 2 18 in. Tanks, complete with Heaters, Thorm, Covers and Pump. Switch unit. Perfect condition, £10. Phone: Glasgow Merrylee 5570.

TANKS SET UP and Serviced. 48 hour guarantee. Clean, Healthy and wide range of Tropical fishes and plants. Trade Supplied. Lists on application. The Aquarium, 2 Gatcombe Road, London, N.19.

SPECIAL OFFERS. October, Neons 1s. 9d., Kribbi 1s. 6d., Blue Acaras 1s. 6d., Zebras 1s. 3d., Cabombas 3s. 6d. doz. Min. 10s. Carriage and Packing, 7s. 6d. No callers. The Aquarium, 2 Gatcombe Road, N.19.

AQUARIUM 48 × 15 × 12, hood and fluorescent lighting. Complete with electrical equipment, plants and fish. Offers. Tindall, 48 Leicester Avenue, Doncaster.

FANCY Goldfish fancy McLean's fish food.

KINGPETS IN BATH. Tropical and Coldwater Fish, Plants, Supplies. Stockists of Arbe, Pirmoo and PVC coated aquariums, glass and lens front. Garden pools, statuary, fountains. 23 Brock Street, Bath. Tel.: 4026.

SUPER PET STORES, 116 Victoria Street, Blackburn. Tel.: 55049. Tropical and Coldwater Fish and Plants. Plastic coated tanks, Bow tanks and wrought iron stands, second hand tanks and stands usually for sale. All accessories, etc.

FOR A GOOD BETTA BEST, feed McLean's fish food.

TAYLOR'S AQUARIUM, 76 Manchester Road, Burnley. Tel.: 26742. Quality aquarium plants our speciality. Complete selection equipment, accessories, tanks, stands, etc. Rare varieties tropicals available.

continued on page xx

PREPAID ADVERTISEMENTS—continued from page xix

FOR SALE

NICE SELECTION, good, clean healthy tropicals, no rubbish. You pay for the best (all accessories), electrical, etc. Prince's Pet Store, 142 Elder Road, Stoke-on-Trent.

HENDON CONVENTION, Saturday, 16th October. Return visit by Mr. van den Nieuwenhuizen.

LARGE DISCOUNTS available for orders of 50, 100 or 200 of any available variety of Tropical fish or Plants. The Aquarium, 2 Gascoigne Road, London, N.19. Callers please arrange.

MICRO WORMS BY RETURN. Starter Culture, only 1s. 6d.
GRINDAL WORMS BY RETURN. Super Starter Culture, 3s.
WHITE WORMS BY RETURN. Super Starter Culture, 3s. All above cultures, post paid, with instructions. D. Josh, 10 Lee Road, Bowers Gifford, Basildon, Essex.

ONE MISSISSIPPI ALLIGATOR, 30 inches, exceptionally well marked with bright crossbands. Good feeder, used to handling, £9. Chivers, Blagdon, nr. Bristol, Phone 344.

CULTIVATED AQUARIUM PLANTS: Blodea Densa, Vallis Torta, Sag Natans, Myrio Verti, Ludwigia Mulertt, Hygro Polysperm, Pigmy Chain, 6d. each or 4s. per dozen. Ambulia, Giant Sag, Giant Baccopa, Red and Green Cabomba, Micranthemum, 9d. each or 6s. per dozen. Aponn Natans, 1s. 9d. each. Aponn Undulatenus, 3s. 6d. each. Aponn Ulvaceus, 3s. 6d. each. Crypto Balansea, 2s. each. Echino Murrij, 15s. each. Echino Longivelus, 7s. 6d. each. Echino Species, 4s. 6d. each. Echino Radicans, 7s. 6d. each. Echino Intermedius, 3s. 6d. each. Malayan Swordplants, 2s. each. Water Lettuce, 1s. each. Nomophila Stricta, 1s. 6d. each. Cape Four Spatterdocks, 6s. 6d. each. All orders taken in strict rotation, please add 1s., post and packing on orders under 12s. 6d. Victoria Aquatics, Staithes, Saltburn, Yorks.

THE CUT PRICE aquarium king strikes again. Our aquariums are the lowest prices obtainable: 24 × 12 × 12, 39s. 6d. or including fully guaranteed heater thermostat thermometer, 59s. 6d., carriage 12s. 6d. extra. 36 × 15 × 12, as above, 99s. 8d., all aquarium accessories post free, special size aquariums made to order. All tropical fish at lowest prices, example, neon tetras, 2s. or 12 for 20s. Norwood Aquarium, 98a Norwood High Street, London, S.E.27. GIP 8008. (Corner Rothschild Street).

TROPICAL FISH in variety. By rail anywhere. S.A.E. for list Naylor, 44 Dorley Dean Road, Selly Oak, Birmingham.

BUSINESS FOR SALE

AQUARISTS BUSINESS, very well known, East Midlands. Newly built fish section, 60 tanks. Breeding house 20 tanks. Outdoor pond. T.O. for 1964-65, £6,000, increasing steadily. Excellent percentage. Growing area. Accommodation, part newly-built. Freehold. Fixtures and fittings, £9,000 plus S.A.V. (about £800). Audited Accounts. Box 5796, *The Aquarist*, The Butts, Brentford, Middx.

APPOINTMENTS VACANT

STAFF REQUIRED in London and Bucks for aquarist's business. School-leavers or older. Live in or out. Experience not necessary. Apply Box 4001, *The Aquarist*, The Butts, Brentford, Middx.

MANAGER REQUIRED for busy aquarium department modern pet shop, West Middlesex. Applicants must have sound knowledge of tropical and coldwater fish with some experience of retail selling. Apply Box 5717, *The Aquarist*, The Butts, Brentford, Middlesex.

REPAIRS

GUARANTEED HEATER REBUILDS, 5s. 6d. each. Send old heaters and state wattages required. New heaters, year's guarantee, 8s. 6d. All by return. J. Weir, 7, The Drive, Welwyn.

NOTICE

HENDON CONVENTION: Saturday, 16th October. Return visit by Mr. van den Nieuwenhuizen.

WANTED

WANTED. TOP PRICES paid for good quality plants and fish. Super Pet Stores, 116 Victoria Street, Blackburn. Tel.: 55049.

HAVE YOU READ

FISH FOODS AND FEEDING

by Feroze N. Ghadially

SUMMARY OF CONTENTS

General Principles · Feeding Problems Encountered by the Fish Breeder · Foods of Animal Origin · Vegetable Foods · Dried, Bottled and Frozen Foods · Miscellaneous

Obtainable from
THE AQUARIST
THE BUTTS, HALF ACRE,
BRENTFORD, MIDDLESEX

Price
4s. 11d.
post free

Shirley Aquatics Ltd.

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: SHIRLEY 13

Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

VISIT OUR NEW SHOWROOMS

Aquarium Fishes and Plants Displayed to Perfection.

MARINE TROPICALS

We are working in close co-operation with the Famous *Tropicarium Frankfurt* and are able to offer the same excellent range of Marine Tropicals carried by them, the rarer species being obtained to order.

We are also stockists of the New Tropicarium Ozone Reactor Tube which is invaluable in marine aquarium keeping. Send SAE for details.

NEW SEASON'S AQUARIUM PLANTS

Barclaya Longifolia **10s.** and **12s. 6d.** each (New Imports)
Cryptocoryne Blassii **10s.** and **15s.** (New Imports)
Cryptocoryne Siamensis **15s.** each (New Imports)
Spathyphyllum Species **7s. 6d.** each New and Attractive

BRISTOL SHUBUNKINS

A few 2-year-old pairs at **£5** per pair
This season's youngsters **7s. 6d.** and **10s.** each, 7 for **40s.** and **50s.**
(Callers Only)

TROPICAL AQUARIUM FISHES

A wonderful selection for callers

PLEASE NOTE—All enquiries requiring a reply MUST be accompanied by S.A.E. Our premises are situated on the main Stratford-Birmingham road, 8 miles from Birmingham, Midland "Red" Bus No. 150 from Bus Station, Birmingham, passes the door, alight at "The Crown," Monkspath.
HOURS OF BUSINESS—
Weekdays 10 a.m.—6 p.m. Sundays 10 a.m.—12.30 p.m. (Also Sunday Afternoons May-July Only)
CLOSED ALL DAY EVERY MONDAY
TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £10, insulated container and carriage 10/-. Cold water minimum order £5 plus 10/- case and carriage. Plants by post (minimum order 10/-) please add 1/6 post and packing.

Printed and Published by BUCKLEY PRESS LIMITED, London and Brentford