**TROPICAL FISH**

**FISH OF SPECIAL INTEREST (IN LIMITED SUPPLY: IN STOCK 2nd OCTOBER)**

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**LIVEBREAKERS**

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**CHARACINS**

| Neon Tetras               | Neon Tetras               | Neon Tetras               |
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| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**PIFLESH**

| Neon Tetras               | Neon Tetras               | Neon Tetras               |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
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**ROGLAYERS**

| Neon Tetras               | Neon Tetras               | Neon Tetras               |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**DWARF CICHLIDS**

| Dwarf Cichlids            | Dwarf Cichlids            | Dwarf Cichlids            |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**CATFISH & LOACHES**

| Catfish & Loaches         | Catfish & Loaches         | Catfish & Loaches         |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**DANIO**

| Danio Goldfish            | Danio Goldfish            | Danio Goldfish            |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**SARDINES & SWORDTAILS**

| Sardines & Swordtails     | Sardines & Swordtails     | Sardines & Swordtails     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**GOLDFISH**

| Goldfish Parroti           | Goldfish Parroti          | Goldfish Parroti          |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

**CICHLIDS**

| Cichlids Parroti           | Cichlids Parroti          | Cichlids Parroti          |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |
| Black                      | Black                     | Black                     |
| 3-5 in.                   | 3-5 in.                   | 3-5 in.                   |

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Comments and Quotes

Life of fish sex cells • Predators are of value
• Biting the hand that feeds • Drugs from fish • 'Nifty' breeding sites

How Long to make a Fish?

WHEN eggs and sperms of fishes are deposited in water during the spawning these germ cells have only a limited time to make contact and achieve fertilisation. This is because the eggs in water soon undergo changes (hardening) making them incapable of being fertilised and because the sperms remain actively swimming for only a brief period in which they can reach an egg. Recent work on trout has given some actual figures for the time limits of survival of eggs and sperms.

Trout eggs, like other fish eggs, swell in water after being extruded from the female fish, their maximum size being reached in 20 to 25 minutes. They have been found to be capable of fertilisation throughout this time, although the ease with which fertilisation can occur decreases progressively throughout the period, so that a greater proportion of eggs fails to develop when fertilisation is attempted towards the end of the swelling period.

Sperms have a much shorter period in which they remain viable, their maximum activity occurring in the first 15 seconds and this declines from then, until after 2 minutes in water their movements have ceased. These results were reported by Dr K. Buss and Dr K. G. Cori in THE PROGRESSIVE FISH CULTURIST (U.S.A.), and their investigations showed that if the eggs and sperms are artificially shed and kept out of water they can still affect fertilisation after much longer periods than those quoted above.

For goldfish breeders who use hand-spawning techniques these findings indicate that delays in bringing eggs and sperms together, even slight delays, will seriously affect the number of fertile eggs obtained once the shed eggs are placed in water.

Problems of Fish Culturists

ASSUMING that you were trying to breed and rear as many fish as possible to as large a size as possible under artificial conditions would it be a good thing or a bad thing to have animals that attack fish in the same area? The answer is not as simple as might be assumed, for at the international meeting of fishery biologists held at Reading in September evidence was put forward to show that fish predators can be desirable auxiliaries in keeping stocks healthy. This is because these natural predators bring about the removal of weak and deformed fish from the breeding stock, such fish being the ones most easily falling as prey.

The object of the September meeting was to survey the biological basis of the production of freshwater fishes in ponds, and among other matters discussed was the influence that the feeding behaviour of some fishes has on their production. Even with plentiful feeding it proves impossible to raise the numbers of fishes that show territorial behaviour.
to the theoretically possible figure. These fish continue to compete with one another although food supplies are big enough for all simply because it is their habit to keep a region of the pond or stream as their own territory and will allow no other fish of the same species to feed there. This is, of course, a problem that aquarists meet in keeping some aquarium fishes, the cichlids in particular, in numbers in tanks.

Some Pet Fish!

The scared hands of Dr Anne Alexander of Durban, South Africa, come within inches of the snapping jaws of a five-foot shark every day.

While feeding the female shark with chunks of meat or fish held in a pair of forceps, she tests its reaction to different types of food.

The 31-year-old research scientist, who formerly worked at Cambridge University, is trying to discover whether the taste of food determines whether a shark will attack certain prey, including human beings, in preference to others.

This shark has bitten her three times. Once, to get more information about shark bites, she waited until photographs could be taken of her wounds before having them stitched.

Her guinea pig at Durban's Osteoarthritis Research Institute is a two-year-old ragged-tooth shark, named Bess.

Dr Alexander manoeuvres a small net over the shark's nose to bring it to the surface at feeding time. Then she holds the nose with her left hand while offering a piece of fish or meat in the forceps with her right.

Despite her past experience of getting bitten, she seems unperturbed as the rows of teeth viciously snap shut.

Bess is being tested to study reaction to the sight, smell and taste of various foods.—PORTSMOUTH EVENING NEWS

Drugs from Fish

The poison secreted by fish and other marine animals may one day provide man with a new range of drugs.

According to an Australian scientist, Dr Robert Endean, experiments have shown that chemicals produced by some shell fish may be a means of making paralysed muscles contract, and that the poisons made by sea cucumbers can cause tumours in mice to dwindle.

Writing in the SCIENCE JOURNAL, Dr Endean claims that the doorway to a vast undersea storehouse of new therapeutic drugs 'is now ajar'. He says that many of today's drugs, such as morphine, atropine and curare, were developed from chemicals made naturally by plants.

Among fish which Dr Endean and his team are screening are certain species of mullet and goat fish which produce chemicals giving rise to nightmares and hallucinations when consumed by man.

The red-brown sponge has been found to produce a useful antibiotic and some types of shell fish destroy disease-producing bacteria.

'Niffy'

Breeding Sites

An almost totally aquatic amphibian (contradiction in terms though that seems to be) kept in aquaria by many aquarists is the South African clawed toad (Xenopus). It is also well known for its use in medical laboratories in human pregnancy tests. An observation by a South African biologist seems to show that this toad is able to detect the presence of ponds in which the water is a bit 'high' and actually seeks these out for breeding.

Dr S. S. du Plessis, who reports this in NATURE, has noticed that when the fish ponds at the Provincial Fisheries Institute in Lydenburg are filled with water and 'matured' with fresh manure to encourage development of live foods for fish breeding, within 2 or 3 days large numbers of Xenopus make their way to these ponds by travelling overland at night. They then commence spawning in the ponds, and by the time the 'maturity' has led to formation of a rich plankton growth the ponds are teeming with Xenopus tadpoles ready to feed greedily on it. It is likely that the toads 'smell out' the water which will be so favourable for their tadpoles, when they surface for breathing in nearby ponds.

Film Show Suggestion

SOCIETIES planning film shows for meetings in the winter months might like to know about the Central Electricity Generating Board's film called 'The Lonely Places'. Its theme is the consideration given to the effects on local wild life of siting power stations in out of the way places, usually by major rivers or on the coast.

The efforts made to safeguard fish life at Trawsfynydd and Rhedol in Wales are featured. At Rhedol, a fish lift and fish ladder have opened up twenty miles of new spawning grounds. Vigorous research is carried out by the Generating Board into all forms of marine life. The film shows the experiment at Roosebeck power station, Barrow-in-Furness, which discharges cooling water into the land-locked Cavendish Dock. The slightly warm water causes an unusual growth of weed which threatened to choke the screens and reduce the water intake. Grass carp which feed on this weed have been imported from Hong Kong and the result of the experiment is awaited with interest. The film also shows the research being carried out at Bradwell nuclear power station on the Essex Estuary. Water which has passed through the condensers is still warm when discharged and biologists are studying the way molluscs and fish grow in these conditions.

'The Lonely Places' is in colour, runs for 23 minutes and details for free borrowing copies in 16 or 35 mm can be obtained from the Film Library, Public Relations Branch, Central Electricity Generating Board, Sudbury House, 13 Newgate Street, London E.C.1.
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LETTERS

Extermination of Hydra

In reply to the request for aquarists' experiences in exterminating hydra by use of batteries and wire (recently referred to by readers' queries, 'Aquarium Polyps'), I have used this method myself with great success in dealing with both hydra and snails. In one tank in particular which I treated in this way there were 1 week-old giant gouramis (Colisa fasciata), and the fish seemed to feel no ill-effect and were raised quite normally.

The one fault that I could find was that this method killed Fallenia. I could see no reason for this as all other plants seemed quite unaffected (Bauzips, wisteria, Hygrophia, Cryptocoryne).

A 12 volt battery was used, with a wire connected to each terminal and a penny attached to each free end of the two wires. The pennies were then dropped to the gravel at opposite ends of the tank, and left for a period of 4 hours. Results are not immediately visible but the following day hydra will have disappeared and snails can be siphoned from the bottom. It will be noticed that bubbles rise from one penny, and that the other becomes lightly coated green, but from my own experience this has no effect on the fishes, be they large or small.

E. E. Field, Middlesbrough

F. B. A. S. Defended

I am with regret that I read in the August issue of PETFISH MONTHLY another letter attacking the Federation of British Aquatic Societies. This time by Mr. G. C. B. Thompson of the Three Counties group, and again this letter shows an utter ignorance of F. B. A. S. 'F. B. A. S.' is talked about as if it is some supernatural deity, a single being. It is, of course, a federation of clubs that have banded together to pool their resources so that by doing so they may enjoy their hobby the more. The F. B. A. S. has long been recognised that an organisation that is run by part-time officials could not hope to successfully cater for the whole country. I think it was with relief on the part of most F. B. A. S. officials that other federations came into being. Today it is welcome. Indeed, if a request is received to affiliate from a club already covered by one of the other federations we suggest that they affiliate to this for the obvious reasons. Several clubs in South Wales are affiliated to the F. B. A. S. and by their own efforts have gone from strength to strength. The F. B. A. S. has recently been dropping hints that the time is here when they could run their own area. This would enable them to develop, and, it is hoped, strengthen our ties with them. The Irish Federation is affiliated as a unit to the F. B. A. S. It remains sovereign to itself, runs its own affairs but has this special attachment to the F. B. A. S. Now, if the Three Counties group, some of whose members are affiliated and some are not (a point here, I think), is dissatisfied with the F. B. A. S. and the way that the spare-time workers are running it, then the answer is simple in the extreme: (a) leave, (b) attend the A.G.M. that is held every December and elect those people that they think would run it better. From this remark it can be taken that the Three Counties clubs are conscious by their absence at the four F. B. A. S. meetings a year, and therefore contribute nothing to the organisation apart from their subscription which averages £1, and that on their own admission has to be written for. Most of the Three Counties clubs run open shows and apply to the F. B. A. S. for championship class trophies. These are won outright and cost about 50s each, according to the design. Therefore the F. B. A. S. has a financial loss of approximately 10s every year from the Three Counties from this item alone, apart from the literature they receive. Not bad, is it, from a useless F. B. A. S.?

For years the F. B. A. S. has issued lists of judges and lecturers. I have one to hand now dated 1949, which to my knowledge has been superseded five times. The latest revised list was printed in June this year, and amendments are published quarterly. Mr. Thompson is aware of this fact as his name appears in the current list. Whilst on the subject of judges and lecturers, consider this. It is not the duty of these people to visit your club. Most do it for the fun of it, barely covering expenses. So if you cannot obtain speakers, perhaps your club is not a pleasant one to visit.

The production of fish standards is a subject upon which I could write a book. Suffice to say that the F. B. A. S. has always produced fish standards and will continue to do so. Everyone in the hobby is a judge, or thinks he is, and wide agreement must be reached before a new standard is printed. This proves to be a slow job but better this than riding roughshod over a group of aquarists and causing resentment.

Having answered most of the points made by Mr. Thompson, may I make this plea to the Three Counties. Do not set up another federation in the south, but take over the F. B. A. S. Supply clubs with all the judges and lecturers they need. Keep up an endless stream of fish standards and sell them in booklet form for less than the price of ten cigarettes. Type and duplicate all current information and distribute it. Hold four meetings a year and some of us may attend, but only to criticise the work you are doing. We will not bother to inform you of any change of addresses or indeed give any help whatever, as we will be too busy writing to PETFISH MONTHLY complaining of your uselessness.

And now, as I am not seeking engagements through your pages, I find it unnecessary to sign myself as a judge and lecturer or to state that I hold any official position in the F. B. A. S., as none of these acts would add one iota to the facts or opinions stated.

W. E. H. BARKER

Catching your own Fish

YOUR column-writer 'Arpee' has invited letters from readers of PETFISH MONTHLY about his Personal Comment. I am a pet-shop owner with about 30 tanks of tropicals and therefore feel able to say something about Arpee's comment (PETFISH MONTHLY, October) on dealers being 'reluctant to give you the free choice which...
in my view you are entitled to'.

My exultant haggles at the vision of my customers being
handed nets and being invited to make their own catches,
particularly on our busiest trading days. I wonder what
would happen to our net for one tank and holding jar
for one tank system then? I wonder what my tanks
would look like after a day of such activities and what I
would do about the smashed cover glasses, broken plants
and fish that had been dropped or driven to jump out
on to the floor? Would I still be asked to replace the
fish that died, after their removal from the shop, because
of injuries received during netting? Mr Arpee—you
have your customers that 'catching fish is an art' (PET-FISH
MONTHLY, September), and although I would prefer
to describe it as a skilled technique, most of my customers
acknowledge by their comments that we are much better
than they are at the job!

Allowing the customer to choose the individual fish
he wants is another matter and I do this as far as possible.
It is amusing, however, to see how often the customer
becomes less sure about the fish he has chosen once
your net is in the tank, or once the fish is in the bag.
because—hey presto—the colours and department of
all the fish change. Some shops meet this matter by
giving fish prices as a range instead of a single price.
Then the chosen fish (usually one of the larger ones)
is assessed as costing sixpence or so more, which
compensates to some degree for the extra time involved
in picking it out.

Fish cannot be treated like goods on the shelves of a
supermarket (and even there customers are not allowed
to handle or weigh up non-packaged items!). It would
be a sad day for me to see any living creatures treated
as if they were such goods.

DEALER
(name and address supplied)

Can Fish Think?

I DOUBT whether Mrs Rothwell's short-tempered
friend (PET-FISH MONTHLY, October) can be a very
successful aquarist! Also, I have yet to see an 'astonished'
fish!

Although many laboratory experiments have shown
that the actions of fishes can be controlled by a kind of
reward and punishment procedure (reward being food
and the 'punishment' usually being a mild electric shock rather than a
'smart tap'), this is no evidence of a
thought process and perhaps is an
indication of quite the opposite.
Cockroaches have been trained in the
same way. Where thinking is involved the organism
(certainly in the instance of man) is more likely to
break away from or resist such simple training procedures.

Fighting between fish is likely to be the result of
infective processes such as the natural guarding of a
small part of the tank as the fish's own territory. I am
of the opinion that the continual application of 'punish-
ment' to try to stop such actions rather than the fish-
keeper's meeting the natural requirements of the fish
by giving it a larger aquarium comes under the heading of
cruelty.

Manchester 12

Prize Letter

New to the Hobby

AM a completely new entrant into the hobby of
fishkeeping and have only just set up my first tank
of tropical fish. Female opposition within the household
having been overcome, I entered my local aquaria with
the purposeful intention of purchasing what was
described to me as a 'starter set'; this comprising an
small tank 18 in. by 10 in. by 10 in. Inside the shop
I found a most helpful aquarist who very quickly dispelled
my doubts and before I knew where I was I had purchased
the necessary equipment and a tank 30 in. by 15 in.
by 12 in.

Having taken the plunge I was delighted to find your
magazine entirely devoted to my new hobby. I remember
many years ago, on holiday, buying a photographic
magazine to while away a train journey and although I
was very attracted by the pictures the accompanying
articles may as well have been written in a foreign
language for all that I could understand. I was deter-
mined, however, to learn something about photography
and I quickly discovered that I was able to learn a great
deal more from regular magazine reading than from
text books. I am hoping therefore that a regular order
for PET-FISH MONTHLY will do the same and I look forward
to reading articles especially devoted to the beginner.

Like many photographers, those aquarists with whom
I have come into contact in these early stages appear
to be only too willing to impart their knowledge to the
beginner, and I am happy in the knowledge that the
hobby of fishkeeping can be expanded as fancy and
finance dictate—I hope!

Houghton-le-Spring, Co. Durham

G. ROBINSON

Which Hormones?

ON behalf of the Fancy Guppy Association I would
like to reply to Mr B. Barber's letter appearing in
the September issue of PET-FISH MONTHLY. He requests
that the F.G.A. publish a list of hormones whose use
is allowed; he is confusing the term 'discouraged'
with 'disallowed'.

Through the media of our monthly journal and through
lectures at our Section meetings, our membership has
been instructed in the advantages and disadvantages of
introducing these chemicals into their tanks. The
'term of which little is known' is quite clear to them. This
rule was made for our members participating in F.G.A.
Shows and is merely a reminder that some of these
hormones can prove dangerous to those exposed to
contact with them.

We believe in the adage: 'A little learning is a
dangerous thing' and couldn't possibly publish, as
Mr Barber puts it, 'a list of hormones whose use is
allowed' because we haven't debarked any—merely
discouraged.

JIM KELLY
Manchester Chairman, Fancy Guppy Association

Co-ordination Between Federations

IN the July issue of PET-FISH MONTHLY Mr A. G.
Jessop, chairman of the Federation of British Aquatic
Societies stated 'the Association of Yorkshire Aquatic
Societies'...
A course for the would-be breeder of tropicaals

Part 7

Breeding the easier Bubble-nesters

By D. B. McINERNEY
(McINERNY'S Aquarium)

THIS month, continuing the discussion of breeding of fish in rainwater, we consider some members of family Amphilodidae.

A charming little fish, attractive, peaceful, and different in more ways than one, is Trichogrisia quadricolor. The nickname I gave this fish—sparkling gourami—has been generally adopted throughout the world, which bears out my first impression, for when seen in brilliant sunlight it can sparkle as though covered with jewels.

It differs from other amphilodids in that it builds a bubble nest, not at the surface of the water, but under a horizontal plant leaf some 4 or 5 inches above the sand, and it makes a croaking noise like its cousin Trichogrisia quadricolor. Though the fish is at maximum 3 inches long, the grating sound produced by the male when courting can be heard through the water and the glass sides of the aquarium from a distance of 20 feet.

Sexing of adults at first seems difficult, for both are the same size, have the same shaped fins and are equally colourful, but an unfauling identification is that whilst the female has a straight row of reddish brown dots from eye to tail, the male has, in addition to this, a second arching row of dots above this straight line.

A breeding tank 24 in. by 8 in. by 8 in. will, if divided in half, easily accommodate two breeding pairs, one in each side. Place an inch layer of well-washed sand in the bottom of the tank and fill to a depth of 6 inches with rainwater at 80°F (26°C). In this plant several small sagittaria, leaving a space in the centre towards the front of the tank for one plant of Cryptocoryne wendtii or a Hygrophila stricta. The sagittaria are merely to afford refuge places for the female. The horizontal leaves of the Cryptocoryne or Hygrophila will be used for holding down the small bubble nest.

The males are not very aggressive, but the female must have somewhere to rest while he builds his nest. During this time he will display in front of her and emit the rapid vibrating croaking noise. The nest is not very large, about ½ in. long by ½ in. wide, tucked under a flat or arching leaf growing horizontally in the water. When sufficiently excited the pair embrace, eggs are expelled, picked up in the breeders' mouths and stowed amongst the bubbles in the nest beneath the leaf.

Once spawning is over the female serves no more purpose and should be removed, taking care not to disturb the nest. The male now tends the eggs, renewing any bubbles in the nest which burst or escape. The eggs hatch in 72 hours and dozens of tiny fry can be seen, suspended tail down beneath the leaf. Should these disappear from view during the next day do not be too worried. It is unlikely that the male has eaten them. Search around and you will see that he has transferred the brood to a position under another leaf.

The fry are free-swimming on the sixth day after spawning, and now the male can be removed; but use a fairly large mesh net, as it is almost impossible to catch him without also netting the widely spaced free-swimming fry as well. Use of a net with a large mesh allows the babies to pass through, when the male is
gently and slowly lifted out. First food is Infusoria; continue this for 3 weeks. After a week add a little brine shrimp to this diet, and in a few weeks give a little micro worms. From 1 in. length the babies will take fine dried food.

Colisa chuna (boney gourami), though not so small as T. pumilus, but smaller than the dwarf gourami, is attractive and peaceful. The males when adult have an overall orange-gold tone, with a blue-black chest. For breeding these use a 24 in. by 8 in. by 8 in. or smaller breeding tank, filled with rainwater at 80°F (26°C). Plant it more densely and provide some floating plant, such as water lettuce or floating fern, for the male will utilise these in building his bubble nest at the surface.

When courting his mate the male will be adorned in his best colours and display in front of her, up-ending himself till he looks as though he is sitting on his tail fin. Spawning is similar to T. pumilus. Adopt the same procedure, removing first female, then male, as previously described, and follow on as before.

For the blue gourami (Trichogaster trichopterus) use a 30 in. by 12 in. by 12 in. tank, filled with rainwater at 80°F (26°C) and plant thickly, making sure the female has plenty of refuges to get away from the usually aggressive male. Surface plant is not essential, as the eggs float, whether in a tight or loose nest. The pair embrace in typical amphiloid style, but after spawning the female must be removed before she is damaged or killed. The male should be removed once the fry are free-swimming.

The brood may number from four hundred to four thousand. The aquaria with limited space should not attempt to raise all the fry. Keep only those which grow and develop well. Overcrowding will stunt the growth and the aggressiveness will develop when the young are 1 inch long, and it is unlikely that a huge quantity can be sold to other aquarists.

Use exactly the same procedure for the opaline gourami. Since the broods of both these species are likely to be very numerous, much larger quantities of Infusoria will be required if a great number are to be raised.

Fishes of the genus Macroodus are often considered to be very aggressive. Personally, I have not found this so. The species operculatus (paradise fish) grows to 4 or 5 inches when adult. Naturally, it should not be kept in the same tank with young neon, mosquito fish etc., but if kept with medium-sized fishes such as tiger, nigger, and fishes of this size it rarely does any harm.

A breeding tank 24 in. by 8 in. by 8 in., filled with rainwater at 80°F (26°C) and thickly planted, will suffice for breeding one pair. Watch the male for aggressiveness towards his mate. He is unlikely to damage her if she is well filled with roe and therefore agreeable to spawning; but if she has no eggs and no inclination to breed she is likely to flee from him and hide in the plant thickets; frustrated after building his nest, he may savagely attack it. If this occurs it is much more the fault of the aquarist than the temperament of the male. If all goes well and spawning occurs, treat them in exactly the same way as explained for the blue gourami.

In Macroodus operculatus (spear-tailed paradise fish) we have a medium-sized paradise, which is not aggressive. Unlike the former species, which has two filaments extending from the top and bottom of the caudal fin, this species has extended rays in the centre of the fin; hence the spearhead shape. The body is not striped with red and bluish-green vertical bars, but is a rusty chocolate overall. The outstanding feature is that all the fins are outlined with an electric blue. It rarely grows to more than 3 inches, and of this 1 inch includes the tail. It may be kept safely with fishes of the size of neons, flames, harlequins, zebras etc. Though the sexes are similar, the female’s body is thicker, and although she has the extended point on the tail, this is not so long as that of the male.

They will breed quite happily in a 24 in. by 8 in. by 8 in. tank. Overcrowding will stunt the growth and moderately well planted. Males rarely damage females, and then only if they are not in a condition to spawn. Mating includes the usual amphiloid embrace after the male has built his nest. The eggs are stowed in this nest, after which the female may be removed. Spawning is over once she loses interest in the male, and persistently swims away looking for food or a place in which to rest. Once the fry are free-swimming the male may as well be removed. The fry are small and require Infusoria for the first 2 weeks, and then brine shrimp and micro worms can be fed to them.

F.B.A.S. Standards under Discussion

At a recent delegates’ meeting of the FEDERATION OF BRITISH AQUATIC SOCIETIES in London the allocation of points for the judging of marine aquaria in the F.B.A.S. Guide was discussed. Mr. Essen (delegate for Riverside A.S.) said that members of his Society did not entirely agree with one aspect of the guide. Mr. Essen suggested that instead of the 10 points allocated for planting in an ordinary furnished aquarium being re-allocated to compel and rock-work in a furnished marine tank, the points would be better applied for the clarity of the water. At the judges’ and lecturers’ conference on 24th September the whole question of the guides for furnished aquaria came under discussion by those present. The general opinion of the audience was voiced by Mr. J. Stillwell, who proposed that the Federation’s guides for all furnished aquaria should be subjected to a complete revision. This proposal was fully discussed and agreed upon and a new guide for the judging of furnished aquaria (all types) was formulated.

F.B.A.S. standards for goldfish varieties were also discussed, as this matter had been raised at a previous delegates’ assembly, when it was agreed to leave this to the
Breeding Lace Gouramis

I have a pair of lace gouramis in my community tank and they are now about 3 in. long and nicely coloured. I should like to try to breed them and would be glad of any hints on how to do this successfully.

Move the fish to a separate tank (at least 15 in. by 10 in. by 10 in.) containing matured water. Feed well, and this, together with the raising of the temperature (by degrees) to 86° F (27° C) will bring them into breeding condition. The breeding tank can be planted thickly at one end with a good oxygenator such as elodes or hygrophila. This will help to keep the tank fresh but it is seldom necessary for the female’s protection since the males rarely attack during the courtship. After the blowing of the bubble nest and the spawning the female can be removed. This must be done very gently so as not to disturb the nest and one way to accomplish this is to wait until the female is at one end of the tank away from the nest and then trap her there by placing a sheet of glass between her and the male. She can then be removed quickly. Aeration assists in maintaining the tank’s freshness but it should be used very gently in order not to disturb the nest. Fry hatch within 24-48 hours and the male keeps up a constant watch, blowing back any eggs that fall out of the nest. The fry are free-swimming after 3 days and the male can then be removed. The fry do well on hard-boiled egg yolk filtered through a piece of muslin or on Liquify for egglayers and progress to dry fried food, newly hatched brine shrimps and small Daphnia.

Coldwater Catfish

I have recently bought a tiny coldwater catfish to go in my goldfish tank. The dealer assured me it would not harm the goldfish—my friends assure me it will. So far it appears to be perfectly harmless and spends all its time hiding under the elodes. Is it a danger to the other fishes?

Both your dealer and your friends are right! Small coldwater catfish can usually be kept for some months in friendly relationship with goldfish in a medium-sized well-planted tank provided that they are well fed with live foods such as small garden worms and Tubifex worms. They are nocturnal in habit, feeding at night and hiding quietly during the day. Unfortunately they have prodigious appetites and grow at an alarming rate. They very swiftly outgrow the other tank inhabitants and soon cannot be trusted with the other fishes, specially if these are smaller. They can never be trusted, no matter how small they are, with the fancy, slow moving varieties of goldfish to whose fins and eyes they do great damage. They are best kept in separate tanks and even in ponds it is preferable to use bottom-feeding tench as scavengers.

Body Parasites

My goldfish keep rubbing themselves against the bottom of the tank. I understand that this can be a sign of white spot but I can find no trace of this on them.

If the fishes are continually rubbing themselves against the tank base or rocks it would be an indication that they are feeling irritation from skin parasites of some kind, but not necessarily those of white spot. Gill worms or flukes are very common parasites. They spread all over the fish’s body and badly infected fish may show spots of blood on the fins and geyesh on the body. The easiest way to treat this is to hold each fish in a net in a solution of one teaspoonful of Dettol to a quart of water for 15 seconds; the fish should then be placed in a container of clean water. Treatment can be repeated once again, 24 hours later. Remember that both the Dettol water and the clean water must be of the same temperature as that in which the fishes have been living. Furthermore, gill worms are free-swimming so that the tank in which the infected fishes lived must be stripped, and disinfected, likewise any nets that have been used.
If your best male Guppies are suffering from split fins, then here is one solution . . .

“That’s Torn it!”

ASK the average Englishman when the Angesvin Glory figured in this island’s history and he will just shrug his shoulders and admit he hasn’t a clue; yet inform him it started just one hundred years after the Battle of Hastings and he will immediately give it a date. Much the same thing happens when the subject of genetics is mentioned in fishy circles—most fishkeepers have a vague knowledge of the subject but veer away when one starts to get technical. ‘X’ marks the spot where their interest flags!

Therefore I hope readers will forgive me if I take the coward’s way out and steer a middle course; after all, the only time a whale gets harpooned is when he comes up to spout, and all theories since the beginning of history have quickly found their critics.

Ask today’s fancy guppy breeder what he considers his biggest problem and it is a chopped rib to a broken chopstick that he will answer: “Split fins!” The pattern is so familiar. Your fish are at their prime, the show you have set your heart on winning is very close, when, overnight, their tails split wide open and your dreams of a red card fall apart.

Now the strange aspect of this complaint is that despite the fact the female guppy has fins equally as big as her male partner they rarely tear; fin splitting seems to be restricted to large-finned males.

In the early days of guppy breeding the emphasis...
was on the short-tail varieties and the menace of torn caudals rarely manifested itself in our tanks, but with the onset of the broadtail in the post-war period this complaint spread faster than a forest fire and nearly every show bench contains at least one example.

As is common with most "bugaboos" in the hobby, everything and anything has become suspect: sharp rocks and knife-edged plants like Vallisneria and Amazon swords were blamed; the guppy was accused of backing on to the sharp edges of these plants during his courtship dance, but this reason was soon proved wrong when guppies split their fins in bare environments.

Then the scientists took over and claimed that lack of minerals in both the water and diet were to blame; shortages of calcium and phosphates were suspect, but even this theory was quickly disproved.

For a while the battle raged. From across the Atlantic the suggestion that a shortage of the vitamin B<sub>12</sub> was responsible occupied the pages of the aquatic press but, like a comet flashing across the sky, it quickly faded out.

Finally, having exhausted all other possible reasons, breeders turned to genetics and laid the blame fair and square on the doorknee of too close inbreeding; here at last seemed a reason that began to make sense. After all, baldness in the human male is handed down from generation to generation and, like split fins, is in the main associated with the male sex.

Assuming that heredity was the culprit, let us see what would happen if the gene responsible was attached to the X chromosome. For the benefit of the beginner, fish, like mammals, are designated as XX in the female and XY in the male.

In the chart showing the results of several different crosses (A-H) these are the symbols used:

X Y: Normal male, not subject to fin splitting.
X X: Normal female, not subject to fin splitting.
X S: Gene associated with Y in the male and X in the female responsible for tearing of the caudal fin.

The inheritance pattern of splitting will depend on whether the father or the mother's germ cells contain the defective X chromosome (it could, of course, be carried on the Y, but more about that later; for simplification I have considered the X only) causing the caudal fin to tear.

With the split-finned father (left-hand side of the chart), all the sons escape the complaint because only the normal Y chromosome of the father (A and B) are involved in the conception of male guppies. All the daughters, however, inevitably receive a defective X chromosome (C and D) and thus become carriers of the affliction. Such carrier females (right-hand side of the chart) run a 50%; chance (E and F) that any one of them will bear sons that will have split fins eventually and any daughter will carry the defect (G and H); should this complaint, for the want of a better word, be carried on the Y chromosome, readers can very easily work out the results for themselves by using the same chart.

So much for that theory. Now to look a little closer at the genetics as applied to the deltatail guppy, the shape so prone to splitting. Albert J. Klee (see references) in the U.S.A. proved that there is no such thing as a gene for breeding true deltatails. This type is produced when the male fish carries the gene Ds responsible for the double-keeled caudal shape in combination with a number of female genes, most important of which is the Cp.

To avoid confusion it should be stated that the letters Cp simply stand for 'caudal pigment', a gene attached to the X chromosome which produces those beautifully marked blue to black pigments, so beloved of modern guppy breeders, in the fins of the female.

In his experiments Al Klee crossed the perfect delta male (XcP YD) with a XcXc female. The latter produces females with unpigmented fins (the original of long ago); sometimes the base of the caudal fin in the caudal peduncle region shows a slight trace of yellow, speckled with fine black dots. The diagram shows the result of the cross.

Now since the Cp gene is displaced by the Ch in the male it was expected that all the males would be of the double sword variety. That was the theory. What Al Klee found in fact was that the males were deltatails; the Cp gene had 'crossed over'!

This set me thinking because the tearing of the fin reminds one of the double sword shape. Was splitting caused when certain genes for 'swordness' attached themselves to the delta genes?

At this stage I might add that breeding fancy guppies
is rather like eating nuts, once started it is very difficult to stop, so, keen to pursue this theory we took a male guppy displaying very bad sword-like protuberances (XCh XCo) and crossed it this time with a pigmented

Outline of the delta tail guppy, a variety particularly liable to show splitting of the tail fin

female, XCo XCh. (All of the many colour patterns of the guppy have been given names, one is the coccineus, abbreviated to Co, derived from the Latin word meaning scarlet, as in cochinell.)

Ova from the female

Sperm from the male

XCh XCo XCh XCo YDs YDs XCo YDs XCo

XCh XCo Delta male; YDs XCo, split-finned male.

Here then seemed the answer; this cross gave us both good deltas (YDs XCo) and fish carrying the double sword and coccineus (Co) genes that later split their fins when 7 months old.

The conclusion to draw from this is never to breed with any fish that tear their caudal fins; it also explains why at times breeders have complained that not all the brood tend to split, but just a few, the remainder growing into apparently good broadtails. Splitting occurs when the Co is accompanied by the Ds gene and explains why the females never suffer.

From these facts the reader must not discount environmental factors. Though heredity seems the prime cause of fin splitting we must not overlook the fact that fish kept in dirty conditions and fed on a poor, unbalanced diet won’t be helped; though secondary, these factors still have an effect. Once the fin tears then the resultant rupture is wide open to the effects of organisms present in the tank, particularly those of Saprolegnea, fungus type.

Should you experience splitting and want to keep the fish for showing purposes only, place the affected fish in old water, the greener the better; this we have found encourages the healing processes. Any proprietary anti-fungus cure can be applied directly to the tear.

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a.


T he recent fascinating correspondence in Petfish Monthly on white spot has been most stimulating, and I heartily agree with the opinions expressed in the August issue that research into this scourge is a desirable thing. I must aver, all the same, that many who support this opinion might find themselves less sensitive on the subject if they had taken some of the simple precautions against the disease which have been ably and amply expressed elsewhere. At a guess I would say that over half of the cases of white spot occur where fishkeepers ignore the quarantine rule whenever fish have been subjected to chilling, or where plants or similar objects are introduced from a source not positively known to be ‘clean’. The puzzle seems to be to know whether a source is clean or not in the absence of visible signs of the disease on fish.

The most puzzling case of the disease I have encountered was an outbreak, two years ago, in a pool in my garden in which I was rearing a hundred or so shubunkin fry, all of 1 inch or more in length. No fish had ever been in the water before I introduced the fry shortly after they hatched. No fish survived. The only suggestion I can offer, short of the organism having been bird-carried (yet we never see any water birds here), is that there were dangerous extremes of temperature in the pond water. The pond was a makeshift one, constructed with PVC sheeting, and there were a number of larch but very shallow (1 inch deep) inlets, in which the young fish would bask in the heat of the sun. I wonder whether sudden descents into much colder water below might have brought about that condition in those fish whereat they prove most vulnerable?

I have a very nasty feeling that this White Spot story is about as uncomplicated as that of the common cold, though all in all the aquarist is probably at an advantage, since if he does what he is told he can at least keep his charges clear of white spot. If any reader has cured a cold consistently to any formula, I am sure that the scientists will welcome a postcard.

At one time it was considered not quite the thing to put more than an inch of sand or gravel into a tank when setting it up, and certainly anyone seen to have 3 inch hillocks of the stuff was warned that decay and pollution would soon set in in a big way unless immediate steps were taken to reduce the contours to a thin sameness. Since such caution dies hard it is as well to remind the beginner that the contours are not critical, provided that the other conditions are ‘right’, i.e. that the fish are not overcrowded and that overfeeding does not occur.
A few authorities are still unhappy about putting any subsoil beneath the sand or gravel in your tank, but there is no possible doubt about the efficacy of half an inch of peat or peat-based aquarium compost if strong and healthy plant growth is desired. Clay pellets, dried first, and then pushed into the sand alongside specimen plants, also seem to pay off, though if you have any Malay snail you will find that they bring them up to the surface if you don’t break the balls into fragments by poking a planting stick around the general area, having first allowed the water to soften them.

I am just slightly suspicious about plant growth chemicals, and so long as I can maintain satisfactory growth by using conventional methods, I shall keep off them, at least if there are fish in the same tank. I shall certainly experiment with them in a spare tank one day, and if in the doing I persuade a single new leaf from my costly Anubias, I shall probably order a gallon of it and no doubt make a fortune.

I cannot remember reading a book on aquarium-keeping which does not, somewhere, condemn the goldfish bowl as the most unsuitable of all homes for a goldfish or some other luckless underwater creature. This counsel has been uttered incessantly since the first quarter of the century, when I first started keeping fish, but the miserable things seem to be as deeply entrenched now as ever they were when ignorance could be more readily excused than in the enlightened days. May I put it to the trade that this article is something they can liquidate if they make up their minds to practise what they so often preach. We, perhaps, in return, will buy those splendid little plastic tanks instead, which, even if they cost twice as much, can be cut in half and turned into two containers without very great ingenuity.

One of the abominable counter-plays in the goldfish bowl controversy is the assertion by the pro-bowslers that the inmates are often so healthy. It is absolutely true that bowl-dwellers frequently look a picture of well-being and that they live for years, whilst the fish in a properly set up aquarium expire swiftly in a welter of green confusion and horror. The explanation seems to be that the water in the bowl is changed regularly, which means that pollution never has a chance, and that the inmates have a long, dull and antiseptic life. The fish in a properly regulated tank certainly are at risk if their owner lets things go, but if, at the very worst, they do succumb rather sooner than planned, at least they have likely had a merry life before the final catastrophe.

If the pro-bowl does get converted to the tank concept, I think he should go over gradually; first, buy the tank, and then just try fish and water in it; then try some gravel on the bottom, and after a few weeks of this, add some plants. Finally, after a month or so, attempt a scientifically constituted affair, having first read up the subject. A sudden conversion, without the background knowledge and understanding of the relevant factors, is potentially as evil as the goldfish bowl itself. Which, when you come to think of it, is possibly why so many dealers stock them.

Expanded polystyrene sheeting is so cheap these days that it is well worth buying a roll of it for insulating your tanks. If your aquaria are on stands it is particularly worth putting a layer under the tank, and the background can often be made with the same material. It can be painted with plastic emulsion paint—and I think a more satisfactory effect is achieved this way, since the white-marbled backing it otherwise gives looks pretty unnatural. Panels may also be cut to fit the end and front glasses of your tanks, to conserve heat during the colder weather, and to act as a form of insurance against power cuts.

For this latter purpose it will be found that the thicker form of polystyrene tile will prove more satisfactory than the sheeting. When sticking it to other substances, always use the recommended water adhesive, as a number of otherwise very effective adhesives used for other purposes cause it to disintegrate. I found this out by hard experience, and felt an utter fool!

Low-voltage Electricity for Control of Pests

In the answer to a reader’s query about control of hydra in an aquarium (PetFish Monthly, September) an invitation was given to readers to comment on their experiences with the use of low-voltage electricity to kill these animals. Several reports have been received (one letter is printed on the Letters page this month) and other aquarists have mentioned in conversations not only that they have had success with the method but also that it can have the additional application of being used to kill unwanted water snails.

In a recent issue of the U.S.A. magazine AQUARIUM ILLUSTRATED one of its associate editors, Don Cook, has also described his findings on the use of the method in tanks that contained small tropical fishes. The equipment he used was a 6 volt battery, connected by plastic-covered wires to two copper plates, each 1 inch square. The copper 'electrodes' were placed halfway down the depth of a 20 gallons aquarium containing hydra and young angel fish, one electrode being positioned at one end and the other one at the farther end. This arrangement killed all the hydra and did not harm the fish when left in position for 48 hours. Later a period of 3 hours was found to be all that is required, and with this period in smaller tanks (10 gallons) success was also obtained.

Continued on page
FOR THE COMMUNITY AQUARIUM

The Penguin Fish

The very name of the penguin fish is enough to make one want to see it, and once looked at, particularly if seen in a group, its claim to a place in the community tank is established.

First to strike the eye is the bold black band extending from the gill-cover edge right along the body and down into the bottom lobe of the tail fin. This band is edged with narrow golden lines. The general silver of the body, overcast with a bronze-yellow sheen, is darker above the black band than below it. The fins, apart from the lower lobe of the caudal and the first few rays of the anal, are clear and colourless.

A peculiarity of this Brazilian fish when it is not actually swimming forward is the tail-down, head-up position that it assumes. The periodic flicking movement by which the sinking tail end is suddenly restored to the near-horizontal level during such rest periods is another quite attractive characteristic of the penguin fish. It does not grow to more than about 3 inches in overall length so that the penguin does not embarrass its owner by over-reaching suitable community tank size.

As this is a shoaling species their characteristics are seen best and the greatest effect in the community tank is given by a group of at least three or four. The specimens you buy from the dealer will almost certainly not be sexable, for it is only with maturity that the females show up by a deepening of the belly region; they tend to be rather longer than the males of the same batch. When sexes do become apparent in this way it will be possible for you to remove obvious pairs from the community tank for breeding in a tank 18 in. or 24 in. by 12 in. by 12 in., but the penguin is not a ready spawner.

The general community tank temperature of 75°F (24°C) or that region will suit the penguins, which are not fussy fish in any way. They very soon settle in when brought home to a planted tank and are well in evidence in the middle levels of the water, showing great excitement at feeding time. Dried foods of medium size are taken as the particles descend through the water. Water fleas are eaten with avidity and tubificid worms (preferably chopped) and white worms are accepted.

Although several similar but different fishes have been offered under the name penguin, these are all of the genus Thayeria and are most commonly sold as Thayeria obtusa.

Control of Pests

Continued from page 245

in the presence of fighting fish youngsters without effect on the fish.

However, guppies, swordtails and mollies were found to react badly to the procedure if it lasted more than an hour. Control of hydra was still possible even with this shorter time of treatment but it had to be repeated at intervals every time fresh hydra were seen.

In tests with clown loaches, adult angels, Corydoras amicus, kissing gouramis and blue gouramis these were all found to be unaffected by the full 3 hours' treatment.

Water snails were affected by the 3 hours' treatment but were not killed in this time. Longer periods of treatment (up to 12 hours) that killed all the snails also killed some fishes, and since the water showed a greenish tinge of colour after this period it would seem that copper salts from the electrodes are formed in the water in poisonous quantities after prolonged electrolysis. Mr Cook asks what the results might be if the electrodes were of stainless steel rather than copper, and suggests that there is scope for further experiments with the use of low-voltage electricity in aquaria.
A New Look at

White Spot

By G. BUTCHER, B.V.Sc., M.R.C.V.S.

White spot is caused by a protozoan parasite belonging to the order Holotrichia. Its scientific name is Ichthyophthirius multifiliis. The disease is ubiquitous, being found in rivers and ponds of all continents as well as aquaria. Reports show that it occasionally infects marine aquaria. The cost of the disease in America is said to exceed 7,000,000 dollars each year.

Recent correspondence in PETFISH MONTHLY has shown that there is great confusion concerning the epidemiology of white spot, due to the apparently strange behaviour shown in its appearances in aquaria. This article is written in an attempt to demonstrate that there is a rational explanation for these occurrences.

White spot in its natural form lives innocuously in the epidermis (skin) of fish, causing little or no tissue reactions and therefore no visible white spots.

Known Life of the Parasite

The reproductive cycle starts when the organism drops away from the fish host, settles to the bottom of the tank, lake or river, and forms a clear cyst membrane round itself. Inside the cyst repeated cell division occurs until from 50 to 1000 young ciliates are formed. These leave the cyst and become free-swimming at the earliest in 7 hours when conditions are most favourable, although it may take up to 3 days under adverse conditions. The ciliates are spherical balls 0.5-1 millimetre in diameter and just visible to the naked eye. They are completely covered with cilia, short hairs which by waving in a rhythmical fashion enable the cell to progress in a rolling, tumbling fashion. There is a small cystosome or mouth opening, but the ciliate cannot feed when free and must therefore make contact with the skin of a susceptible fish within 48 hours or perish.

When the ciliate touches a fish it uses the cystosome and a rotating motion to burrow between the cells of the epidermis. Here it gains nourishment from the skin tissues and fluids and causes the body defence mechanism of the fish to react and form the white papules so typical of the disease. Infection may be so extensive as to kill the fish; the most important organs are the gills, where any number of parasites cause interference not only with respiration but also disturbance of the osmo-regulating cells found in the gills. Tissue reaction in the gills rarely causes white spots, rather a mass of granulation tissue (proud flesh) which can lead to the gill filaments becoming joined together (adhesions).

In the clinical disease the parasite grows to maturity in 1 to 3 weeks and can then be released to restart the cycle.

There are no reports of a sexual stage of reproduction and it is not thought that there is any formation of resting, resistant or spore-type forms away from the fish.

This is all reasonably documented fact. Differences of opinion about the next statements on immunity will undoubtedly arise. American authors are more favourably inclined to the Premunity-Commensal Theory than Europeans. I am basing this explanation on premunity, however, as it seems to give a rational explanation of clinical outbreaks of white spot, as well as having many proved parallels in protozoan diseases of other animals.

Premunity and White Spot

White spot is a commensal organism. This means that it lives normally in the skin of many fish without outward signs. There are many strains of the parasite, and some authors have thought that these were sub-species. It is now believed that these are in fact only strains of varying virulence. The presence of white spot as a commensal produces immunity in the fish. This is scientifically called premunity, and it is wholly dependent on the live presence of the organism in the skin.

Premunity is not a complete immunity and can fairly easily be overcome by a massive challenge of infection. This is helped by rapid changes in the environment of the fish. Most important are a fall in temperature or a change of tank. These changes are called 'stress factors'. The relationship of the fish host to the parasite is a finely balanced affair in Nature. No parasite can be called successful if it destroys all its hosts. In the aquarium the balance is always precarious. Fish weakened by stress factors lose this balance, and by triggering the release of the parasite from the skin cause the eventual liberation of large numbers of ciliates. In turn, this can overcome the premunity of other occupants of the tank.

Many tanks are therefore balanced when kept as
of the free-swimming parasite is also great. In comparison, it must be very simple for the parasite to contact a fish in the confines of a comparatively overcrowded aquarium.

It is essential that importers and dealers quarantine fish and plants for quite long periods. By providing a good stable environment they allow the natural balance to re-establish. Private aquarists must accept the fact that they will inevitably have trouble at some time or other after purchasing fish even from the most reliable dealer. A quarantine tank is therefore the best defence against this and also many other diseases.

**Treatment of the Disease**

Basically, treatment is simple. The temperature should be raised to 85°F (27°C). This hastens maturation of the cysts and also helps the fish to stabilise their immunity in relation to the parasite. This should always be the first treatment. Only if it is unsuccessful should drugs be tried. No safe drug exists that will kill the parasite encysted in the skin of fish. Many drugs are available to kill the free-swimming ciliates. They include quinine salts, chloramine, methylene blue, malachite green, common salt baths and formalin baths. Proprietary remedies are usually mixtures of these drugs and have the advantage of ease of availability and simplicity in dosage by following the dosage schedule on the label. Antibiotics can be of use in badly affected fish, which should be isolated. They are used only in combination with the anti-protocol drugs. They help to reduce secondary bacterial infection of tissues damaged by the parasites.

It is said that chloramine is effective because of the production of nascent oxygen which kills the ciliate. It would therefore be interesting to hear if anyone had used ozone to do the same. If effective this would be preferable to the use of drugs, which are all to some extent dangerous to fish and plants. Similarly, an even more attractive principle follows from the fact that the ciliates are killed by the irradiation of circulating tank water with ultraviolet light. Speed of water flow and intensity of irradiation would, of course, be critical, but at least in theory this should be effective in killing the ciliates.

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**Pond Hunting**

*A Simple Guide to Freshwater Invertebrates* by David C. Bowler, B.Sc. 26 pages, line drawings. A British Ichthyological Society publication. 2s 6d (from D. Marlborough, 58 Stonyfield Lane, Edgeware, Middlesex, postage 6d).

**THERE** must be quite a proportion of the population who spent time this summer enjoying the peace of the countryside from the banks of some river or pond idly wondering what some curious shape in the water could be. Those of us who are concerned mostly with only one of the inhabitants, the fishes, of these waters have little knowledge of the rest of the teeming life present there. So this little booklet, although clearly stating that it is for beginners only, should find a very wide readership.

The first part deals with the simple identification of the animals found, under main headings 'Soft-bodied types' and 'Animals with a hard covering to their body', with illustrations of each type. Next comes a section on the factors that may affect the position of invertebrates in the river or pond. Finally come pages of line drawings of the pond animals classified.

The drawings are many and excellent and the booklet more than fulfils its aim to enable the average angler or non-specialist to identify quickly the freshwater animals that he may come across, for example, in his excursions to obtain live food for his fishes. Having identified them, however, it is quite certain that the reader would be interested in a few succinct remarks about their life cycle and habits. A companion booklet is an urgent requirement here.

*PetFish Monthly, November 1966*
Your Fish Can’t Shop for Themselves

. . . . so what do you look for in a fish food?

HOW do you decide which food you buy for your fish? A quick check on the dealers’ shelves will show you that at the present time there are being marketed more than a dozen different brands of dried fish foods, most having several separate specialist mixes under the brand name. The days when one walked into a shop and asked merely for ‘a packet of fish food please’ are obviously over, but which food to buy is now the problem. Do you choose by price, by the appearance of the pack, by the claims in the advertisements, by your dealer’s recommendation, or do you make some trials to assess for yourself the relative merits of the various foods?

A single food is unlikely to meet fully all the needs of a collection of different kinds of fishes in any case, but most people seem to have one food for ‘general’ everyday use. For choosing such a food I suppose a useful approach would be: what’s in it, what size are its particles, how much do I get for my money and do the majority of my fish like it?

Yes, I put the choice of the fish last and for two reasons. One is that a good many fishes that have been taking one kind of food are likely to act as if you’ve suddenly put powdered coke in their tank when you try a new food on them, so that one has always to allow time for their old feeding habit pattern to be broken. Secondly, there are substances that will cause fishes to act like crazy things when they get a smell or taste of them, and it seems likely that even if these non-nutritious fish-attracting compounds were mixed with sawdust one would still get the impression from the first responses of the fish that you were giving them something delicious. This is not, of course, a suggestion that any manufacturers would deliberately add substances without food value but only to point out that the feeding responses of fish need to be observed with care to see whether they are consuming or only sampling and spitting out!

What’s in It?

The amount of information given on a food packet about the brand’s constituents varies from make to make. Some present a detailed itemised list of ingredients, others only a summarised percentage analysis of protein, fat, carbohydrate, ‘fibre’ and mineral content. Some makes give both, some give no information at all or only general statements about their product’s ‘balanced’ nature.

In six foods looked at, for which analyses were stated, percentages for protein ranged from 36 to 46%, for fats from 2 to 5%. With the ingredients most commonly used in fish foods around 40%, appears to be the maximum proportion of protein obtainable. Many makes appear coy about stating carbohydrate content, probably because in the bad old biscuit-meal fish-food days the foods were carbohydrate and nothing else and warnings were sounded by writers about the danger of feeding with such water-fouling and fattening foods. Carbohydrates in the correct amounts are the energy-providers, so there is every reason for them to be present. Although some packs quote a water content it seems unlikely that this could be a source of ‘make-weight’ since any significant moisture would rapidly encourage mould formation.

‘Vitamins’ are often mentioned as being present, but not usually named, and some makers claim to include ‘hormones’ (again without naming them), but these
additives, even if present, would not favourably sway
my personal choice of a food for my fish.

Size and Amount

Foods having fine particles are of little use if the fish
they are intended for have huge mouths and appetites.
If the food’s particles are large they should not be so
dense that they sink in the water too rapidly or they may
be left uneaten on the bottom. Flake foods have a lot
to be said for them in these considerations, for they seem
to be ‘suckable’ by the smallest fishes and yet are
accepted by larger ones too.

Now that weights of contents are being stated on fish
food containers, it is possible for the buyer (I won’t
say the consumer in this instance!) to see how much his
money gets. Six brands selected at random have been
compared and their prices for containers of food with
weights in the range 1 ounce to 1 ounce computed on a
common weight basis: prices per ounce ranged from 1s
to nearly 4d, but although I would not have selected
the cheapest of the six on this basis I would certainly
have excluded the dearest on the grounds of its being
overpriced.

It is also well worth working out the cost per ounce
of your selected food in terms of quantity bought if a
range of sizes of pack is offered, for provided the amount
used justifies the purchase of a large pack this can save
quite a bit on the food bills.

I find that in the writing on their packs makers give
me quite a lot of food for thought about their product,
just not a lot of food for my fish, but it’s nice to be able
to select with reason and with facts to guide rather than
to buy because the colour of the tin appeals.

Formation of an Aquarium Society: 2

Constitutional Aspects and the
Rule Book

Once the founding stages of the society have been instigated, the
constitution of the society will have
to be thought about, with special
consideration of the production of a rule book outlining the constitution
for the benefit of the members. This
is probably best dealt with either by
duplicating a small pamphlet, or
having a rules card or membership
and rules card printed.

Rule books are usually, though
not always, divided into two sections — the first dealing with the general
rules of the society, the second dealing
with rules appertaining to shows and
the showing of fish. As the final
decision on whether any particular
rule is necessary or not lies solely
with the society concerned, I can
only give a guide to those I think
may be advantageous or desirable.
The best way of doing this I think
is to list the rules found in an
average society catering for aquarists.
This list can, however, only be used
as a basis, and for this reason I have
appended notes where these may be
of help.

Rules

1. The annual general meeting of
the ‘NEW’ aquarist society
shall be held in the month of
(name) each year, at which
meeting:
(a) The committee shall be elected.
The committee shall consist of the
following members (see Part 1,
PetFish Monthly, October): chair-
man, vice-chairman, treasurer,
secretary, show secretary, public
relations officer, assistant secretary,
assistance show secretary and one
other member. (b) The accounts
shall be presented. The treasurer
shall produce a statement of the
accounts of the society for the
previous year, which shall be audited
by two elected auditors (non-
committee). (Note: Accounts may
be audited by chartered accountants
if the society is large enough to
warrant the expense.) (c) The
reports of the committee members
for the previous year shall be read.
The minutes of the last annual
general meeting shall be read, and
signed as correct by the chairman.
2. All fully paid-up members
shall enjoy full and equal voting
rights.
3. The terms of office for
committee members shall be as
follows: Chairman: 2 years for the
first term followed by further
periods of 3 years. Vice-chairman: 1
year for the first term followed by
further periods of 2 years. Secretary:
2 years. Assistant secretary: 1 year,
followed by further periods of 2
years. Treasurer and show secretary:
2 years each. Public relations officer,
assistant show secretary and one
other member: 1 year each. (Note:
Spacing the terms of office in this
manner ensures that all the officers
cannot be replaced in one election,
as this could leave the society
without knowledgeable officers.)
4. The rules can only be
altered or amended by a majority
vote of the fully-paid-up members
present.
5. All applications for member-
ship shall be endorsed by any
one existing member and shall
be accompanied by the annual
membership fee, which is payable
one year in advance and due on
(date) each year. (Note: Monthly
Continued on opposite page
A Hair Grass with a Difference

By C. D. ROE

Very popular with many aquarists is the well-known 'hair grass' (Elodea canadensis), which is so valuable for coldwater or tropical aquarium decoration. But there is another plant of this genus having hair-like stems which is less well known although equally decorative and perhaps more graceful in the aquarium. This is Eleocharis virgata, and when its growth runs riot its masses of stems provide an excellent refuge for fry fry.

The thin stems grow to about 10 inches in height and end in terminal buds; these produce small plantlets, which in turn produce terminal buds bearing yet smaller plantlets, the growth giving the impression of perpetual viviparous reproduction. In shallow water under shaded conditions in a greenhouse a solid mass of the plants will form in the water with a developing mass of younger plants projecting above the surface. Good, but not rich, loam is an excellent planting medium for E. virgata, which can be grown out of water in wet conditions and transferred in clumps to aquaria.

This Eleocharis comes from the north American continent, where it is indigenous to north and south Carolina, Georgia and Florida. It is not the only plant in this genus sharing this 'viviparous' type of growth but it is one that has proved its worth for aquarium purposes.

Suggested Rules for an Aquarium Society

Continued from page 250

1. All entries shall be bunched at owners' risk and must have been the property of the exhibitor for at least 28 days beforehand. (Note: The 28 day-ownership rule is standard practice among societies for many reasons, and difficulties may occur at inter-club shows if this rule is not strictly adhered to.)

2. An entry fee of $5.00 per fish shall be charged at club table shows. (Note: The funds from this surcharge will help to meet costs of award cards, plaques etc.)

3. The judges' decision shall be final. All fishes will be judged in accordance with Federation standards. (Note: Depending on the judges and the area the society is in, this may be any of several Federations, addresses of which will be given in the next article.)

4. Classes will be amalgamated or divided if the number of entries warrant this.

These rules are, of course, incomplete, but it is hoped that they may provide a basis for discussion upon which new societies could base their own rule book.

(For meetings, shows, inter-club meetings and affiliation to the federations will be discussed in a further instalment)
BREEDER'S NOTEBOOK

Breeding the Pigmy Rasbora

(Rasbora maculata)

By J. LEE

I first purchased, and indeed saw for the first time, these beautiful little gems, which were in good condition and deep colour, at a big pet shop in London while on holiday there. After I had stood in front of the tank studying them for a good hour, watching their behaviour, I was convinced which sight! I was going to buy, although I was having difficulty in seeing them as they had not reached maturity (for these fish full maturity is about 1½ in. and mine were only about half that).

The eight I bought I divided between two tanks: four in one tank that I thought were males (distinguished by the spots on the body and colour) and the other four in the other tank as females. The water in both tanks was a mixture of half filtered rainwater and half aged tap water. To both tanks was added a small amount of rock sea salt and a thin layer of boiled dark peat at the bottom. As the tanks were 20 in. by 10 in. by 10 in. I decided to darken the top a little with a nice bunch of hornwort and bladderswirt.

For the next four or five winter months I got to work conditioning them on a staple diet of fine sifted Daphnia, Grindal worms, chopped Tubifex and, as the ghost larvae (glass worms) were quite big I also chopped a little of this as a stand-in now and again with some very small thin earthworms I had noticed in my white worm cultures. These were also chopped and ground so that the fish could take them without fear of being choked. As the months went by, the rasboras were growing quite well on this diet.

As we had some warm spring weather early that April, I transferred the four males into the tank with the females to see whether they could be sexed. For the next few weeks there was quite a mixed chase between them and as I watched very carefully I noticed one pair were side by side quite a lot, so being confident these were the pair out of the eight, I took them out.

After a good look round I decided on a very shallow tank which I had, with a ¾ in. angle iron, size 22 in. by 6 in. by 8 in. Not having any black paint at the time I wrapped some black plastic sheeting round the ends and sides and darkened the bottom with some well-washed fine charcoal. As I needed soft, slightly acid water for these fish, I added 3 parts of filtered rainwater and 1 part of aged tapwater, bringing the depth up to about ¾ in. (about ¼ in. from the top of the angle iron).

Then I added to the tank a handful of large flake pieces of boiled peat to turn the water slightly acid. After a couple of weeks or so, I decided to test the pH values and temperature. The pH was 5.3-5.7 (a good quality water for rasboras) and the water was gin-clear. The temperature fluctuated between 77°F and 82°F (25-28°C).

Spawning Coloration

I placed the breeding pair in at dusk. For spawning medium I used a mixed ball of stringy green algae and the very fine fern (Pistiastrum) which grows on rocks, already disinfected in a solution of diluted Dettol and rinsed very carefully. I then placed the tank right opposite the fishhouse door with the addition of a teaspoon of sea salt and half a teaspoon of Blackwater Tonic at this stage. When I retired for the night, the temperature was nearly 80°F (27°C) and the fish had settled down behind the thickets out of sight. Next morning was Sunday and I was up bright and early. I left the fishhouse door slightly ajar, letting a fine beam of sun in which just caught the glass a little. After breakfast I noticed that the pair of fish were beginning to spawn. When I peered into the tank the male had turned into a gorgeous crimson gem. I noticed that near the base of the tail the red seemed to glow like a crimson light—one of the most beautiful sights I've ever seen for such a small fish.

As the fish were still chiseling vigorously I left them to it. About midday I looked in the tank, and as things seemed quiet I removed the breeders. Although I could not see any eggs, I knew they had spawned—the female was quite slim. So without any hesitation I covered the tank on the top and down the front with thick brown paper, cutting out all the light, then added 7 to 9 drops of acriflavine.

The young hatch in about 24 to 30 hours. They then hang from the plants till they are free-swimming after 3 to 5 days. Although the fry are very tiny, they grow quite rapidly provided they are fed on rotifers and nauplii, then later larger nauplii and small Cyclops and Daphnia.

For the record, these little fish exhibit one of the most exciting spawning behaviours to be seen.
MEMBERS of the recently re-formed NORTH OF SCOTLAND A.S. are most fortunate in the venue for their meetings. These are held on the first Tuesday of every month in the Lecture Hall of a new Zoo and new members will be made most welcome. At the first meeting of the 1966–67 winter session, members were very pleased to welcome back the honorary president, Mr George Leslie, only recently recovered from a severe illness. At this meeting, after a general discussion was held to decide the future policy of the club, members adjourned to the aquaria section of the Zoo to carry out any necessary work on the tanks that they had donated to the Zoo and stocked themselves. The limited variety of fishes at present available would shortly be expanded thanks to the North of Scotland Zoological Society’s generous offer to provide funds for the purchase of much rarer varieties.

WHEN THE ASSOCIATION OF YORKSHIRE AQUARIST SOCIETIES held its quarterly meeting at the end of August, the chairman, Mr D. Carr (Bradford), welcomed delegates from the Bradford, Dewsbury, Halton, Hils, Mexenden, Rowntree (York), Sheffield, Skipton, Swillington, Wakefield and York societies. A special greeting was extended to the delegates from the York & D. A.S. as this society has rejoined the Association and the secretary informed the meeting that there were now only six societies within the Yorkshire boundaries that remained outside the fellowship of the A.Y.A.S. Secretaries of these societies had received letters inviting them to join the Association and he hoped for favourable replies.

It was agreed that the A.Y.A.S. 1967 Open Show should be sponsored by the Hull A.S. and held in Hull on 11th November, subject to confirmation. The first Sunday in May. The proposal that the Association formulate a set of rules that all member societies should accept, operate and adhere to at individual shows caused lively discussion but it was not accepted and it was agreed that show rules must remain the responsibility of each individual society. It was also unanimously agreed that the show rules of any society as published in its schedule should be clear and concise and strictly applied and adhered to since absolute observance of such rules by both organisers and exhibitors would eradicate difficult ‘incidents’ that otherwise cropped up.

The chairman thanked all the societies for their suggestions concerning A.Y.A.S. trophies; that from the Bradford A.S. that the standard trophy be an oblong polished wooden plaque (6 in. by 44 in.) with a suitably inscribed chrome centrepiece was accepted, Mr Winterburn’s (Bradford) suggestion, that at society shows the class awards should be announced or written up in some way as and when the results became available from the judges as such prompt publication of class winners would be greatly appreciated by all exhibitors, was supported. The next quarterly meeting of the A.Y.A.S. will be held on Saturday, 11th November at 3.0 p.m. in the Church Institute, Albion Place, Leeds.

TROPICAL AQUARIUM BREEDERS are congratulating themselves upon Mr Jim Kelly’s acceptance of the presidency of their society. They have a new chairman to welcome, too, in Mr Brian Panley, who has replaced Mr Clifford Walker, to whom all members express their great appreciation for his wholehearted services in the past.

At the annual general meeting of the FREELANCE A.S. Mr A. E. Russell was re-elected chairman; Mr R. A. Thomas replaced Mr B. Prior as treasurer and Mr Thomas in himself replaced as secretary by Mr J. E. Howat, 36 Vicars Hill, Lewisham, S.E. 13.

HAMPSTEAD & DISTRICT AQUARIST’S SOCIETY (LONDON BOROUGH OF CAMDEN) to cover the amalgamation of Hampstead into the London borough of Camden. At its first annual general meeting on the 20th September, Mr K. J. A. Pye (33 Steelees Road, London, N.W.3) was elected chairman-secretary; Mr R. Gardner, treasurer; assistant secretary, Mr T. Hall; minutes secretary, Miss P. Blackwood; show organiser, Mr G. Jennings.

MERSEYSIDE A.S. report that the idea of handing out at the Liverpool Show special edition News Letters explaining the work and object of aquarist societies and suggesting that the reader should attend a club meeting has proved very successful. Seven new members were welcomed to meetings during September. Although they may have missed the highlight of the club’s year—the very successful Liverpool Show in July—there are plenty of varied club activities to take part in: lectures (including one by the chairman, Mr Fred Mullia, on ‘The Small Fish House’), table shows, an auction and the showing of a 16 mm. sound film in EasternColour of the River Usk and the life in and around its waters. Merseyside members also are frequently named in the award lists of surrounding shows. At the Garston & Openshaw open show, Mr Ken Parke (a first and the best fish in show in the large barb class, firsts in the large cichlids and in the loaches classes, a second in the loaches (pairs) and a second in the medium characins. Mr R. Moorcroft took a first (swordtails) and a third (danios, pairs). Mr John Robinson took a first (top minnows, pairs), a third (small characins) and a third (rasboras). Meetings are held on alternate Mondays at Montrose Athletic and Social Club, 5 Richmond Terrace, Liverpool 6, when new members will be most cordially welcomed. The secretary is Mr Robert Moorcroft, 24 Frankby Road, Liverpool 4.

MR A. W. Spencer of Witley, Nr Atherstone, writes with pride of his friends Mr and Mrs E. Pearson. They were due to judge the TAMWORTH A.S. club show on 17th September but were involved in a motorcycle accident a couple of days beforehand. Both were detained in hospital but Mrs Pearson travelled over 20 miles as soon as she was able to leave the hospital next day to judge the show so that club members would not be disappointed.
Entries Up at Newport’s Show

The fourth Annual Open Show and Exhibition of tropical, coldwater and marine fish and furnished aquaria of the NEWPORT A.S. was held on 17th September at Newport. The show was a great success, having a record number of entries and well over 50 more than last year. Members of aquatic societies from all over the west of England and South Wales attended, some from as far as Swindon and London. Judges were Mr Ferrant, Mr Johns, Mr Songhurst and Mr Wigg of the South Wales Tropical Fish Study Group. Prizes were presented by Mr Roy Hughes, M.P., for Newport, and notable among the many prize-winners was Mr F. Brown of Bristol, who obtained the highest aggregate points in the show. Mr Fitzgerald and Mr Glym James were close runners-up. Results were:

- Simonne fighting fish: 1. Mr F. Brown; 2. Mr A. Williams; 3. Mr J. Williams, A.A.V.S. Member; 4. Mr T. Fitzgerald, Miss Constance, 3rd place; 5. Mr C. Potts; 6. Mr Ralph Harris, Befon; 7. Mr F. Brown (A.A.V.S.); 8. Mr J. Williams; 9. Mr T. Fitzgerald, Miss Constance; 10. Mr T. Fitzgerald, Miss Constance.

The F.B.A.S. Open Show trophy for the best marine exhibit in the show went to Miss P. Blackwood of the Marine Study Aquatic Society. The best tropical fish in the show was a chequer barb owned by Mr F. Brown of Bristol. The best coldwater fish in the show was a green tench owned by Mr B. Light of Barry A.S. The Colindale plant trophy, presented by the F.B.A.S., was won by Mr F. G. James of Newport. An address of thanks was given to Mr Michael Parry, show secretary of Newport, for his running of the show.

LEAMINGTON & D. A.S. report that at the first of the new season’s meetings there were 57 fish entered in the table show, with 79 entries alone in the coldwater section. As well as being a record entry, it was interesting to find that the A.A.V.S. class was won by a green trigger owned by Mr D. Lucas, and that the coldwater class included a benny entered by Mr R. W. Sharp. This is the first time that marine fish have appeared on the bench of Leamington.

AQUARIST S ON THE MOVE: Now we hear that YORK & D. A.S. are to visit The Hague next Spring, Mr G. B. Hunsley, secretary of the society, reporting on his own recent visit to Holland in the club’s monthly News Letter, states that he was told there were 25,000 fishkeepers registered in Dutch societies, almost all of whom have a listing ticket since clubs restrict membership numbers. However, such numbers are likely to be in the region of that, for instance, of the society in The Hague (the oldest society in Holland and founded in 1919)–239, of which 79 members regularly attend the monthly meetings!
Good Teamwork at the Nottingham Open

By an ingenious plan, around 2,000 gallons were emptied from some 500 tanks in approximately 45 minutes. A large dustbin was connected to a 20-inch pump with the outlet going directly into the drain outside. It was then a case of all hands to the pump, as members competed with the pump to keep the water in the bin above the required level for the pumping to be maintained. Names of first-award winners in each class are:

**Acanthodes.** Male fighters: Mr. A. Mason (92 pts). Female fighters: Mr. P. Reynolds (92 pts). Largest gourami: Mr. A. J. Sparkman (92 pts). Dwarf gourami: Mr. J. E. Darlow (92 pts). Lure carriers: Mr. A. G. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Barbus.** Dwarf barb: Mr. G. Darlow (92 pts). Assorted: Mr. B. A. Price (92 pts).

**Carassius.** Flame fish: Mr. A. Mason (92 pts). Black: Mr. H. W. Hughes (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Cichlids.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Dendro.** Assorted: Mr. J. E. Darlow (92 pts).

**Dodon, minigonis, rambora.** Zebras: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Eleotris.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Gephyrologus.** Assorted: Mr. H. W. Hughes (92 pts).

**Haplochromis.** Assorted: Mr. H. W. Hughes (92 pts).

**Liberators.** Green swordtails: Mr. D. Roman (92 pts). Red swordtails: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Morays.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Prochilodus.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Protochilus.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Rhabdos.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Trichogaster.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Trichocoris.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Tetra.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Tilapia.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Trichogaster.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Urophorus.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Vivipara.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Xiphophorus.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Xiphiofungia.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Xiphophorus.** Assorted: Mr. J. E. Darlow (92 pts). Assorted: Mr. H. W. Hughes (92 pts).

**Gorton's Show**

**THE GORTON & OPENSHAW AQUARIUM SOCIETY'S second annual show was a huge success with 396 entries bunched from 24 competing societies.** Judging was carried out by Mr. C. Walker (F.N.A.S.) and Mr. A. Line (F.N.A.S.), and the awards and prizes were presented by the Gorton & Openshaw A.S. president, Mr. John Yeats. In show award went to Mr Ken Parke of Mersweside A.S. for a lemon fin barb and the best breeder in show award went to Mr Keith Wilbraham of Oram A.S. for a team of emperor tetras. Other awards were:

**Guppies:** 1. Mr. J. Murray (Bell Verde); 2. Mr. J. J. Shepp (Belle Verde); 3. Mr. B. W. C. (Belle Verde); 4. Mr. E. R. W. (Belle Verde); 5. Mr. L. E. Robinson (Belle Verde).

**Goldfish:** 1. Mr. T. H. J. (Belle Verde); 2. Mr. G. Rich (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Pond Fish:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Medaka (Swordtail):** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Fishes for Aquarium:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Platy (Betta and Kindred):** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Horned Barbs:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Sticklebacks:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Killifish:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Catfish:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Cichlids:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Fishes in the Open:** 1. Mr. G. Rich (Belle Verde); 2. Mr. J. B. (Belle Verde); 3. Mr. S. Smith (Belle Verde); 4. Mr. G. Hodgkinson (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Bristol A.S. Annual Show**

**BRISTOL A.S. held its annual open show of tropical, coldwater and marine fishes on 23rd and 24th September. The judges in the coldwater section were Mr. V. Capaldi, Mr. W. Hicks, Mr. L. G. Emory and Mr. Paul and in the tropical section were Mr. Smith, Mr. L. G. Emory and Mr. M. T. Dodge. Entries came from all over the west county and the coldwater section of the show lived up to the expectations of this society, which is one of the foremost "coldwater" societies in the country.

Mr. F. Brown of Bristol took awards for best tropical in show, best eelguy in show, and best fish in show with a tiger catfish that received 83 pts. Mr. Brown also obtained best livebearer in show and highest total points in show. The best fancy coldwater fish and best shubunkin awards were obtained by Mr. W. Hicks.

**Goldfish:** 1. Mr. H. T. L. (Bristol); 2. Mr. L. J. (Bristol); 3. Mr. W. H. (Bristol); 4. Mr. G. Rich (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Pond Fish:** 1. Mr. H. T. L. (Bristol); 2. Mr. L. J. (Bristol); 3. Mr. W. H. (Bristol); 4. Mr. G. Rich (Belle Verde); 5. Mr. E. H. J. (Belle Verde).

**Marine Fishes:** 1. Mr. L. J. (Bristol); 2. Mr. W. H. (Bristol); 3. Mr. L. P. (Bristol); 4. Mr. F. G. (Belle Verde); 5. Mr. E. H. J. (Belle Verde).
Gorton's Show

THE GORTON & OPENSHAW AQUARIUM SOCIETY's second annual show was a huge success with 369 entries bunched from 24 competing societies. Judging was carried out by Mr C. Walker (F.N.A.S.) and Mr A. Lindley (F.N.A.S.) and the awards and prizes were presented by the Gorton & Openshaw A.S. president, Mr John Yeats. Best fish in show award went to Mr Ken Parkees of Merseyside A.S. for a lemon fin barb and the best breeders in show award went to Mr Keith Williams of Oram A.S. for a team of emperor tetras. Other awards were:

Guppies: 1st, Mr J. Murray (Belle Vue); 2nd, Mr J. Hand (Stretford); 3rd, Mr R. Walshe (Haywood); Millies: 1st, Mr M. Wilde (Stretford); 2nd, Mr I. Hughes (Belle Vue); 3rd, Mr J. Hand (Stretford); Giltfins: 1st, Mr L. McCourt (Gorton & Openshaw); 2nd, Mr G. Rich (Stockport); 3rd, Mr E. Storey (Irlam); Swordtails: 1st, Mr T. Halley (Stretford); 2nd, Mr G. Storey (Gorton); 3rd, Mr R. Walshe (Haywood); Siamese: 1st, Mr E. Storey (Irlam); 2nd, Mr G. Rich (Stockport); 3rd, Mr R. Walshe (Haywood); Moorish Idols: 1st, Mr J. Hand (Stretford); 2nd, Mr R. Walshe (Haywood); 3rd, Mr E. Storey (Irlam); Greenwells: 1st, Mr M. Wilde (Stretford); 2nd, Mr E. Storey (Irlam); 3rd, Mr R. Walshe (Haywood); Barbus: 1st, Mr J. Hand (Stretford); 2nd, Mr E. Storey (Irlam); 3rd, Mr R. Walshe (Haywood); Haemulids (Stilt Fish): 1st, Mr J. Hand (Stretford); 2nd, Mr E. Storey (Irlam); 3rd, Mr R. Walshe (Haywood); Erythrinids: 1st, Mr J. Hand (Stretford); 2nd, Mr E. Storey (Irlam); 3rd, Mr R. Walshe (Haywood);

AFTER a lapse of two years HIGH WyCOMBE A.S. once again held their open show in conjunction with the Wycombe Show. There were 149 entries and the judges, Mrs E. W. Smith and Mr Tony Wilkinson, held the view that the quality of the entries was very high. Mr Zurmuehle (High Wycombe) took best fish in show with his Ogphryodon.

Club coldwater furnishing aquarium: 1st, Ms F. Wood (High Wycombe); 2nd, Mr F. Burman (High Wycombe); 3rd, Mr G. Storey (Irlam); Coldwater furnishing aquarium: 1st, Mr F. Burman (High Wycombe); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr G. Storey (Irlam); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mr F. Burman (High Wycombe); 3rd, Mrs P. Claridge (Shildon); Coldwater furnishing aquarium: 1st, Mrs P. Claridge (Shildon); 2nd, Mr F. Burman (High Wycombe); 3rd, Mr G. Storey (Irlam); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr F. Burman (High Wycombe); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr F. Burman (High Wycombe); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr F. Burman (High Wycombe); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr F. Burman (High Wycombe); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr F. Burman (High Wycombe); Coldwater furnishing aquarium: 1st, Mr G. Storey (Irlam); 2nd, Mrs P. Claridge (Shildon); 3rd, Mr F. Burman (High Wycombe).

Bristol A.S. Annual Open Show

Bristol A.S. held its annual open show of tropical, coldwater and marine fishes on 23rd and 24th September. The judges in the coldwater section were Mr V. Capaldi, Mr W. Hicks, Mr T. L. Dodge, Mr L. G. Emery and Mr Paul and in the tropical section were Mr Smith, Mr L. G. Emery and Mr Paul Wheeler. Entries came from all over the west county and the coldwater section of the show lived up to the expectations of this society, which is one of the foremost 'coldwater' societies in the country.

Mr F. Brown of Bristol took awards for best tropical in show and best egglayer in show, and best fish in show with a tank catfish that received 83 pts. Mr Brown also obtained best livebearer in show and highest total points in show. The best fancy coldwater fish and best shubunkin awards were obtained by Mr W. Hicks.

Goldfish: 1st, and 3rd, Mr B. T. Jacob; 2nd, Mr W. Reeves; 4th, Mr R. L. Howitt; Breeding: 1st, Mr T. L. Dodge; 2nd, Mr M. L. Ansell; 3rd, Mr J. L. Brown; 4th, Mr J. L. Brown; Coldwater: 1st, Mr W. Reeves; 2nd, Mr R. L. Howitt; 3rd, Mr J. L. Brown; 4th, Mr J. L. Brown; Marine: 1st, Mr B. T. Jacob; 2nd, Mr W. Reeves; 3rd, Mr R. L. Howitt; 4th, Mr J. L. Brown; Shubunkins: 1st, Mr J. T. Hairgrove; 2nd, Mr J. T. Hairgrove; 3rd, Mr J. T. Hairgrove; 4th, Mr J. T. Hairgrove; Other: 1st, Mr B. T. Jacob; 2nd, Mr W. Reeves; 3rd, Mr R. L. Howitt; 4th, Mr J. L. Brown.
IT IS with great regret that we learn of the death of Mr T. Adamson, honorary secretary of the Rowntree Aquarist Society and honorary secretary of the Association of Yorkshire Aquarists. The letter written by Mr Adamson and printed on p. 238 was forwarded to us for publication by his son, who felt that this is what Mr Adamson would have wished.

Stewart, 3; Mr B. Hawkins; 4; Mrs V. Bower, junior furnished aquarium enthusiast; 5; Master P. Bar (R.A.S. Junior Trophy); 6; Mr C. Chapman; 7; Miss M. Staveley; 8; Master C. Staveley; 9; Mr G. W. Bostock; 10; Mr A. B. Staveley; 11; Mrs M. Staveley; 12; Miss D. Doran; 13; Mr W. R. Staveley; 14; Miss E. Greenhall; 15; Mrs E. Glass; 16; Mr R. T. Portland; 17; Mr J. A. Bolton; 18; Mr D. J. Woodward; 19; Mr G. A. D. Cross; 20; Mr W. R. Staveley; 21; Mr T. W. Staveley; 22; Mr R. J. Doran; 23; Mr B. Cooper.

Dates for your Diary

12th November. HENDON & D. ORPINGTON AQUARIST SOCIETY, 1966 Convention, Whitefields Secondary School, Clermont Road, London, N.2. The guest speaker will be Mr D. Backhaus, curator of the Exotarium, Hamburg Zoo. Further details from the secretary, Mr G. W. Bostock, 94 Whitworth Avenue, Edgware, Middlesex.

14th-19th November. NATIONAL HOBBIERS FAIR. The R.H.S. Old Hall, Vincent Square, London, S.W.I. Come and see PFM at our stand there.

26th November. FUR, FEATHER & AQUARIA SHOW. Aquaria Section organized in association with the Essex, North and East London Aquarists' Association. At the King's Hall, Lower Clapton Road, London, E.5. From 1 to 5 p.m. Show secretary Mr A. Collins, 12 Armouth Road, Chigwell, Essex.

3rd December. FEDERATION OF BRITISH AQUATIC SOCIETIES general meeting at the East India Club, 15 Conduit Street, London, W.1.

27th May 1967. ASSOCIATION OF YORKSHIRE AQUARIST SOCIETIES Open Show, Hall, (Subject to confirmation: details awaited.

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Aponogoton corens, 1s each; giant Sag., giant Vallis, water strawberry, water nasturtium, water Sedum, 1s 6d each; hair grass, Nymphar selloi, Acetes pulvinus, Malaysian swords, 2s each; banana plants, Eichhornia tuberosa, Alternanthera serrulata, Elodea japonica, giant Hygros, willow leaf Hygros, Boreo ferns, water wisteria, dwarf Crypta’s, Crypta, ciliata, 2s 6d each; Lobelia multiflora, fountain plant, Crypto. balansae, 3s 6d each; Aponogoton distichium, Ophiogon variegatus, 6s 6d each; Amazon swords, 4s 6d each; radicans, acorus, intermediate, Barlaya motleyi, 7s 6d each. Please add 1s postage on orders under 15s. VICTORIA AQUATICS, STAITHEs, SALTBURN, YORKS.
Societies . . . are affiliated to the F.B.A.S. and so receive all material.

In May of this year I was elected secretary of the A.Y.A.S. No correspondence from the Federation has reached me since that date. I have scrutinised back-correspondence files; in February, 1939 the then secretary approached the F.B.A.S. about show standards etc.; subsequently intermittent reports on Federation matters were received until 1964, when contact between ourselves and the Federation appears to have ceased.

Mr G. Jennings (May issue) expresses my personal desire in advocating greater co-ordinated organisation and recognition among the various bodies. The A.Y.A.S. will be too pleased to co-operate in the exchange of news and information between Federations, Associations and Societies throughout Great Britain and elsewhere.

This letter is not written in any spirit of criticism or of contradiction of the F.B.A.S. or its officers. It is a sincere effort to establish lasting, mutually advantageous contact between the A.Y.A.S. the F.B.A.S. and all other interested organisations.

T. ADAMSON
Secretary,
Association of Yorkshire Aquarist Societies

WITH reference to the sanguinary Mr J. Stillwell I consider that it is regrettable that he wrote his letter (petfish monthly, October) before the F.B.A.S. meeting on 3rd September. It is only fair to acquaint readers with the following facts:

1. The Three Counties Group were strongly represented at this meeting, rubbing shoulders with many old friends.

2. Their complaints of receiving the 'Mushroom Treatment', i.e. fed on bull and kept in the dark, were found to be not without some foundation.

3. They publicly stated that they were prepared to help the Federation, especially by the work of their study group, on the old problem of points for size, provided that they were kept in the picture.

4. One of their delegates offered his services on their committee; I wonder if he has received a copy of the minutes of that meeting, let alone an acknowledgment of his offer?

5. The list of judges and speakers to which our poor haemorrhaging heart sarcastically alluded was received quite coincidentally only a couple of weeks before the F.B.A.S. meeting.

6. Reference to the alleged clashing of the Three Counties show fixtures is irrelevant. The host club, a new club at that, was not officially affiliated to the F.B.A.S. . . . no fault of theirs, however, they had applied months previously but had not received an answer. More mushrooms?

2. The Three Counties Group have nothing but
genuine admiration for the delegates from the deep South and regret their own inability to attend meetings in London on a regular basis. Perhaps the F.B.A.S. would consider holding some of the meetings in Reading, a choice far nearer for Portsmouth and Southampton, only half a dozen miles more for Brighton and, quite obviously, ideal for the Three Counties Group.

So please, dear heart, don’t give the impression that our Group is not most grateful to that dedicated band of judges who so often have ventured into the Highwayman’s Country. They are a grand lot. For heaven’s sake let us cement good relations by improving communications.

R. A. DOWE
Vice-Chairman,
Brauchnell A.S.

FORTHCOMING SOCIETY HANDBOOK

ENCOURAGED by the tremendous success which the first edition of the HANDBOOK of the Federation of Scottish Aquarist Societies enjoyed, the council have decided to proceed with more ambitious plans for the next edition to be published in January.

While much of the content will remain directly connected with the F.S.A.S., it is intended to expand the section devoted to the activities of associated bodies, such as the British Killifish Association, and the Fancy Guppy Association, to include details of the Associations which were overlooked in the last issue. It is also proposed to introduce a section on programme aids giving information on films and slides which are available for hire to societies. The Pet Shop Directory will be enlarged to include dealers in England, Wales and Ireland.

Such an undertaking cannot be accomplished without the co-operation of individual aquarists, active societies and pet trades throughout the United Kingdom. To this end a questionnaire was recently sent to societies seeking their co-operation in compiling the necessary information. If your society did not receive a questionnaire, please accept my apologies, as the reason would no doubt be beyond my control. If you would care to help, I should be extremely grateful if you will send me details of the following.

1. The name and address of any pet dealers in your area.

2. The name and details of any zoo or public aquaria in your area.

3. The name and source of any film connected with the hobby which you may have seen.

4. The source of any slides available for hire.

5. Details of any Body associated with fishkeeping.

Entries in the Pet Shop Directory will be made entirely free of charge. Pet traders have merely to send me details of their business name and address to have these included. Traders who wish to take advertising space may have particulars on request.

Last year’s HANDBOOK was printed to a very high professional standard, and was circulated to some 600 aquarists in Scotland. Copies were also distributed in
England and America and were well received in these countries.

In an effort to increase the circulation of our handbook and because we feel that the revised edition will be of interest to aquarists outside Scotland, order forms have been sent to Societies. These Societies who did not receive an order form and who wish to place an order may do so simply by writing to me. The cost will be 2s 6d plus 6d postage, but remittances should not be included with the order as an invoice will be sent with the order. Society orders for eight copies or more will be sent post free. It is regretted that further orders cannot be placed after publication. All information should be sent to me by 15th November and all orders should reach me not later than 15th December.

In conclusion I express the hope that aquarists throughout the United Kingdom will rally to support this bold venture by sending helpful information and by ordering a copy.

Robert M. Cooper
Secretary
Federation of Scottish Aquarist Societies

W. Harold Cotton
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Hypo Silent diaphragms...1/8
Macrosonic Minor diaphragms...1/8
Zuebelke Super diaphragms...2.1/8

RUBBER SUCKERS
Knob type...1/6
Double sold...4/6

FILTERS
Hypro Jot...1/6
Hypro de Lux...1.5/6
Giro Wall Bubble for...1/6

FILTRATION ACCESSORIES
Diatomaceous earth...1/15
Glass wool...1/15
Diatomaceous earth...1/15
Diatomaceous earth...1/15

CLEANING EQUIPMENT
Windmill Air Rake 30"...10/-
Windmill Rake 30"...15/-
KleenAir Standard...14.68
KleenAir 57...4.68
KleenAir 65...3.68
KleenAir 85...2.68

CLEANING ACCESSORIES
Rubber tubing for ascending-air flow...6
Aluminium sleeve scrapers...2/3
Seaweed...12/6

NETS
Opening aquarium nets, green monofilament...12/6
3/10" x 1/2"...7/6
5/8" x 1/2"...1.1/6
7/8" x 3/4"...4.1/6
1" x 3/4"...7/6

AQUATIC LITERATURE
Tropical Fishes...2/6
The Goldfish...2/6
The Aquarium...2/6
Live Foods for...2/6
Aquarium Fishes...2/6
Goldfish for the...2/6

FISH FOODS
Wardleys...4/6
Grappone...1/8
Salmone...1/8
Liver meal...1/8
Fish meal...1/8
Methyl...2/6
Other types

Dried flakes...1/6
Dried white fish...1/6

BREEDING TRAPS
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Hypro Fish Breeder...50/6

REMEDIES
Haldem...1/6
Diatomaceous earth...1.1/6
Clarke (clearers)...2/6

MICROBIALS
Arboreal aquarium pump...2.1/6
Aquarian product...1.1/6
Acetate water...1.1/6
Crystal leaser...2.1/6

TANK BACKINGS
Armours (16" x 16")...14.4
Rectangular (16" x 24")...15.5
Shipwreck (16" x 24")...16.4

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Worms Alive automatic feeder...9.1/6

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Flora-Pride...4.6
Planting Sticks...1.9

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String strength...2.1/6

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**Telephone:** Victoria 5179

### ANGLE IRON TANKS

<table>
<thead>
<tr>
<th>Size (cm)</th>
<th>Price (£)</th>
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<tbody>
<tr>
<td>18 x 10</td>
<td>2.55</td>
</tr>
<tr>
<td>18 x 12</td>
<td>2.85</td>
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<td>3.85</td>
</tr>
<tr>
<td>22 x 18</td>
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### STAINLESS STEEL AQUARIUMS

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<td>22 x 16</td>
<td>3.85</td>
</tr>
<tr>
<td>22 x 18</td>
<td>4.15</td>
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### 3-D BACKGROUNDS

<table>
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<tr>
<th>Type</th>
<th>Price (£)</th>
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<tbody>
<tr>
<td>Rocks</td>
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</tr>
<tr>
<td>For 12-18 tanks</td>
<td>3.50</td>
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<tr>
<td>For 15-24 tanks</td>
<td>4.00</td>
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### PISTON PUMPS

<table>
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<tr>
<th>Make</th>
<th>Price (£)</th>
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<tbody>
<tr>
<td>Jeeves Ltd.</td>
<td>3.75</td>
</tr>
<tr>
<td>Jebao D-10</td>
<td>3.15</td>
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<tr>
<td>Jebao D-15</td>
<td>3.55</td>
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### FILTERS

<table>
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<tr>
<th>Type</th>
<th>Price (£)</th>
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<tbody>
<tr>
<td>Windmill Pre-filter Biological Filters</td>
<td>6.00</td>
</tr>
<tr>
<td>Windmill Internal Cartridges</td>
<td>5.50</td>
</tr>
<tr>
<td>Hydor Juv. Bottom</td>
<td>4.50</td>
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<tr>
<td>Giro External Bubble</td>
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### WATER SLICKS

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<th>Type</th>
<th>Price (£)</th>
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<tr>
<td>Oyster with fountain</td>
<td>9.00</td>
</tr>
<tr>
<td>For 10-15 tanks</td>
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### COMBINED HEATER & THERMOSTAT

<table>
<thead>
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<th>Make</th>
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<tbody>
<tr>
<td>Es Del-O-Matic</td>
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<tr>
<td>Es Del-O-Matic</td>
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### THERMOSTATS

<table>
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<tr>
<td>User</td>
<td>1.50</td>
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<tr>
<td>User Economy</td>
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<td>User Outside</td>
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<tr>
<td>User Outside Control</td>
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<td>User Corner Top</td>
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<td>User Corner Top</td>
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<tr>
<td>User Electric</td>
<td>3.50</td>
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### OUTSIDE FITTING THERMOSTATS

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Constar L.T.D.</td>
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<tr>
<td>Constar L.T.D.</td>
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### THERMOMETERS

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<tr>
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<td>1.50</td>
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<tr>
<td>Es Del-O-Matic</td>
<td>2.00</td>
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### FANTASY GRAVEL

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<th>Type</th>
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<tr>
<td>Mottled Lavender</td>
<td>2.50</td>
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<tr>
<td>Mottled Green</td>
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</tr>
<tr>
<td>Red</td>
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</tr>
<tr>
<td>Mottled Blue</td>
<td>3.20</td>
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<tr>
<td>Blue</td>
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### ARBRE PLASTIC AQUARIUMS

<table>
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<tr>
<td>Fairy Diaphragms</td>
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<td>Fairy Air Chambers</td>
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<tr>
<td>Zigzag Diaphragms</td>
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<td>Diaphragms</td>
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### AIR PUMPS

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<tr>
<td>P.V.C. flexible tubing</td>
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<tr>
<td>Rubber air tubes</td>
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<td>Rubber air tubes</td>
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### RUBBER SUCKERS

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<td>Double sized</td>
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<td>Universal Heavy</td>
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### WHITEWORM CULTURE

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<tr>
<td>Small</td>
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<td>Large</td>
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### NITS

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<tr>
<td>Green nits</td>
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<td>Brown nits</td>
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### BREEDING TRAPS

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<td>Windmill combined breeding and rearing</td>
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### DUROGLOST

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<tr>
<td>Water hardness testing kit</td>
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### MISCELLANEOUS

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<tr>
<td>Hydras</td>
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<tr>
<td>Algae</td>
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### OTHER FISH FOODS

<table>
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<tr>
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<tbody>
<tr>
<td>Fish flakes</td>
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<tr>
<td>Shrimp meal</td>
<td>3.00</td>
</tr>
<tr>
<td>Turtle bits</td>
<td>5.00</td>
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</tbody>
</table>

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- Fishes in Colour (Gemme Verones) (N.Y.)...
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- Tetramin Staple Food...
- Tetramin Conditioning Food...
- Tetramin Staple Food in Tablets Form...
- Tetramin Staple Food in Tablets Form...
- Tetramin Staple Food in Tablets Form...
- Tetramin Staple Food in Tablets Form...
- Tetramin Staple Food in Tablets Form...
- Tetramin Staple Food in Tablets Form...
- Tetramin Staple Food in Tablets Form...

### FISH FOODS
- Brook Tropical Fish Food...
- Brook Tropical Fish Food...
- Brook Tropical Fish Food...
- Brook Tropical Fish Food...
- Brook Tropical Fish Food...
- Brook Tropical Fish Food...
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- Brook Tropical Fish Food...

### REMEDIES
- Warley's...
- Warley's...
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### TETRASCARE
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- ESTIMATED APPROX. POSTAL CHARGES for sending the above items...
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Shirley Aquatics Limited
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Sixty-four aquariums displaying freshwater tropicaIs are supported by our fish-houses containing over five hundred aquariums and ponds so that no stock is ever kept in crowded conditions. All stock held in quarantine for a reasonable period and in many cases grown on for a few months before being offered for sale.

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Our plant list is the largest in the world. We list over 200 different plants suited to indoor aquariums. Many of these plants are extremely rare and therefore not always available.

With such a comprehensive range as we carry, it must be appreciated that stocks fluctuate considerably, and we invite our customers travelling a great distance to telephone and enquire whether what they require is available. Stock advertised one month may not be in stock the following month.

We carry a small range of Coldwater aquarium fishes and have particularly good stocks of pond reared young and young adult Bristol Shubunkins.

We are stockists of reliable equipment and accessories and are always pleased to give advice.

Tropical Aquarium Plants

BARGAIN COLLECTIONS

30 PLANTS (our Selection) 10/-
50 PLANTS (our Selection) 30/-
30 PLANTS (decorative collection) 40/-

Special Until Xmas Only

WATER BANANA PLANTS
3/6 each, 4 for 10/-
CRYPTOCORYNE BECKETTI
3/6 each, 4 for 10/-
MELON SWORD PLANTS
10/- and 15/-
RUFFLED SWORD PLANTS
20/- each

NEW

“TROPIC-MARIN”

The artificial sea-salt sold with guarantee. Made from chemically pure ingredients it is almost indistinguishable from natural tropical sea-water. Even corals and delicate sea animals can thrive in sea-water made from this salt. See the living coral reef on display in our Showroom.

5 gallon size 10/-
20 gallon size 40/-

Postage as follows:

5 gallons 3/-
20 gallons 3/6
40 gallons 4/6
100 gallons 7/6

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HOURS OF BUSINESS: Weekdays 10 a.m.—5 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. Plants by post (minimum order 15s) please add 1s 6d post and packing.

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