

JULY 1984 80p

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



THE YUCATAN FLAGFISH
(colour feature)
50 Years of Aquarium Keeping
FIGHTING FISH OF JAVA



COVER STORY *Photo: A. van den Nieuwenhuizen*

Pseudotropheus zebra was among the first species of Mbuna cichlids imported from Lake Malawi during the mid-60's. Its brilliant coloration was, no doubt, largely responsible for the cliché (still in use today) that refers to Mbuna being as colourful as coral fishes. However overworked and abused this statement might be, it is, nevertheless, valid and has become even more so with the passage of time and the discovery of more and more colour varieties of the species. The existence of these, each with its own distinct features, makes *P. zebra* a polymorphic species. However, the story does not end there. Experimental work in laboratories, allied to observations in aquaria and in the wild, have led to a growing body of informed opinion that these "morphs" may, in fact, constitute a "complex" of closely related species. This opinion is based on the fact that some morphs, which appear to differ only in colour, behave as if they were distinct species, each breeding only with its own kind. This is one of the major determining criteria used to define a biospecies. *P. zebra*, therefore, still has a wealth of information to reveal—in the meantime, it continues to hold a deservedly prominent place among cichlid fanciers.

CONTENTS

16

Close-up on Brachyrhaphis

Derek Lambert describes an attractive genus of Livebearer and looks forward to its increasing availability

18

Your Questions Answered

Queries received from readers are answered by our experts

22

Fighting Fish of Java

This mouthbrooding Anabantoid (*Betta picta*) is the subject of an article by A. van den Nieuwenhuizen

24

50 Years of Aquarium Keeping

Some reminiscences of Chester Zoo Aquarium by June Williams

26

From a Naturalist's Notebook

The wider canvas of flora and fauna as seen by Eric Hardy

28

The Yucatan Flagfish

Dr Robert Goldstein writes about the origin of *Garmanella pulchra* from Mexico

30

Tomorrow's Aquarist

Part 2 of The New Tank Syndrome deals with selecting fish and determining correct stocking levels.

34

The Basis of Fish Health

Continuing this series with some notes on the common Gill Fluke

38

Company Profile

British Carp, Half-Koi and Koi are featured in our report on Newhay Fisheries Ltd

41

Spotlight-Rodway's Tetra

Jack Hems highlights *Nemigrammus rodwayi*

42

Crossword Puzzle

Test your wit and knowledge of the hobby

43

Coldwater Jottings

Frank Orme discourses on the coldwater aspects of the hobby

44

On The Test Bench

The first of an in depth series of product reviews by Ian Sellick

46

What is Your Opinion?

Opinions expressed by readers on all aspects of the hobby, with comments by the author

49

A-Z of the Aquarium

Our popular series continues with items on Electrodes, Endangered Species, Filefishes and Filtration

51

Commentary

Roy Pinks comments on various aspects of the aquatic world

52

Meet the Societies

Pride of place this month goes to Salisbury & District Aquarist Society and Dorchester Tropical Fish Society.

53

News from Societies

Past and future events throughout the United Kingdom

AQUARIST



Founded 1924
as "The Amateur Aquarist"

Editor: Laurence E. Perkins

Consultant Editor: John A. Dawes

Advertisement Manager:
J. E. Young

Vol. XLVIV No. 4, 1984

Subscriptions:
Renewable 31st December
annually. (Surface mail)
August-December £5-75.
Airmail quoted on request.

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

The Editor accepts no
responsibility for views expressed
by contributors

Printed by Buckley Press,
The Butts, Half Acre,
Brentford, Middlesex.
Telephone: 01-568 8441

Close-up on BRACHYRAPHIS

by Derek Lambert



Brachyraphis episcopi (male)

SEVERAL years ago there was a new introduction to the livebearer scene in this country which caused quite a stir. This was *Brachyraphis rhabdophora* (Regan 1908). At the first auction at which a pair of this species came up for sale they reached the astonishing price of £25. Since that time several other species of this genus have come into the hands of livebearer enthusiasts.

The genus *Brachyraphis* was named by Regan in 1913. The name comes from the male's gonopodium which looks like a short needle. Before this time these species had been placed in various genera, the commonest being *Gambusia* to which they are closely related.

The *Brachyraphis* genus is restricted to Panama and Costa Rica, except for *Brachyraphis hartwegi* (Rosen & Bailey 1963) which is found in the Rio Chiopos and its tributaries in Southern Mexico. Their native habitats tend to be small rivers, where they frequent the shallower waters near the banks, and still waters such as ponds, ditches and canals.

The most popular species at the moment is *Brachyraphis episcopi* (Steindachner 1878). It likes a clean well-planted tank, with some secluded areas to hide in. Once they have settled in they eat all foods ravenously and have been found to be hardy and well suited to aquarium life. This species grows to about 30mm and has

a very peaceful temperament. These attributes, combined with its pleasing coloration, make it an ideal community fish.

The dorsal fin is brick red and contains two dark crescents, one in the middle and one at the outer edge. The caudal fin is pale orange with fluorescent blue edging. The anal fins first few rays are cream coloured, and behind this is a black smudge which starts in the body and runs down to the lower edge of the fin. In the male this fin is modified into a gonopodium which is used to transfer sperm to the female's vent during the sex act. The pelvic fins have a flash of white on them. The background colour of the body is light brown, paling to cream

on the belly. On the back and upper sides the scales are edged in dark brown, which gives rise to a very attractive net pattern on this part of the body. Along the lateral line the scales are alternately black and gold. When the fish is in good condition the sides gleam a metallic blue, especially in the region of the vent.

The common name of this species is the Bishop. It was originally considered to be very difficult to breed, but since Southern Livebearers Aquatic Group members have been maintaining it, it has been bred with increasing success and ease. The brood size is small, with 20 being the most you can expect. These are produced at four-week intervals and are very small at birth. They need a little more care and attention than the more common livebearer species. A diet of newly-hatched brine shrimp and micro worm suits them well, but they are slow growing and susceptible to chills.

Brachyraphis rhabdophora is a much larger species, attaining some 65mm when full grown. As has already been said, it was the first of the genus to come into the country, and unfortunately, it is also the one with the most pugnacious temperament. Even so it enjoyed a few years' popularity with specialist livebearer keepers. Since the arrival of *Brachyraphis episcopi* its popularity has waned and it has become something of a rarity.

Brachyraphis terrabensis (Regan 1907) is very similar to *Brachyraphis rhabdophora* in both body form and coloration. Indeed the only way to tell them apart is by a yellow spot in the gonopodium of the *Brachyraphis terrabensis*, otherwise both species have a black gonopodium. This species comes from rivers of a higher altitude than other members of the genus, so presumably would prefer a lower temperature. It is worth mentioning that both these species have been kept and bred in unheated tanks. The individuals produced this way were more robust than those produced at higher temperatures but took much longer to mature.

Brachyraphis hartwegi, was named after Dr. Norman Hartweg who, with Pierce Brodtkorb, originally collected this species in 1937. This is the most attractive member of the genus to come into this country to date. Unfortunately it is also one of the most difficult to keep and breed. It attains a similar size to *Brachyraphis episcopi* and has a similar temperament, although it tends to be a little more nervous.

It must be assumed that all the different species will interbreed, so it is essential to keep the different *Brachyraphis* separate from each other to prevent hybridisation. At the time of writing none of this genus are generally available in the shops, nor is it likely that they ever will be. Therefore, it is only through organisations like the Southern Livebearers Aquatic Group that these and other rare livebearers can be obtained.

It is to be hoped that these attractive fish will one day become as common as some of the other livebearers in our

tanks. Until that day, it is up to the dedicated few, to protect these species from extinction. For, in their own country, although the fish themselves may be protected, their habitat is not. This is the problem of all conservation programmes—although it is relatively easy to stop the hunting of a particular species, it is impossible to stop progress and set aside vast tracts of land for conservation. The pollution of natural water courses grows worse day by day, taking the indigenous populations one step closer to extinction.

It is only through organisations like the Southern Livebearers Aquatic Group that these fish have any real hope for long term survival. Further information about S.L.A.G. and the work it is doing can be obtained from the Secretary, D. J. Lambert, 20 Queen Mary Avenue, Morden, Surrey SM4 4JR.

Brachyraphis rhabdophora (female)



Your questions answered...

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope which department you wish your query to go to. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper,
The Butts, Brentford, Middlesex TW8 8BN.

TROPICAL



Dr. C. Andrews

Tropical



control of snails . . .

Can you suggest a method for ridding my tank of snails?

Snails are by no means an essential part of a tropical or coldwater aquarium (or pond) and since some species may develop to pest proportions, their introduction into a tank is best avoided if at all possible. Rinse all plants in running water before adding them to a set-up tank or pond.

Control measures include:

(i) introducing fish such as clown loach and other *Betia* species, opaline gouramies, convict cichlids or puffer fish which will feed on some snails;

(ii) placing one or two fish food tablets beneath an upturned saucer on the tank floor and leaving it overnight. The snails will be attracted by the tablets and may be removed with the saucer the next morning. This method will probably have to be repeated every night for a week or so. Do not allow uneaten tablets to pollute the tank.

Chemical snail-eradicators do exist, although these must be used carefully—especially in a badly infested tank.

Even when present in large numbers, snails are unsightly rather than dangerous to fish. If all else fails it may be necessary to completely strip the tank down, rinse all the rocks, gravel and decorations in dilute bleach or formalin (followed by a good rinse in clean water) and dip all the plants in a cherry-red solution of potassium permanganate for a few minutes.

hornet tilapia . . .

Can you provide me with some information on the hornet tilapia, *Tilapia buttikoferi*?



Tilapia buttikoferi

Tilapia buttikoferi comes from central West Africa and prefers soft slightly acid water and a temperature around 26°C. It may reach a length of 20 cm and enjoys live foods, although you may be able to get it onto other, more convenient foods. This species seems to love snails.

As you might expect, this cichlid is a little aggressive and somewhat disruptive, and hence is not suited to a community tank.

If you are a cichlid fan, why not contact the British Cichlid Association, c/o Dave Monk, 33 Kirkmeadow, Bretton, Peterborough. Do enclose a S.A.E. when writing.

carbon in aquarium filtration . . .

In your opinion is activated carbon an important filter medium in freshwater tanks?

I believe that, in most situations in freshwater aquaria, the use of activated carbon is somewhat over-rated, and (in filters like corner filters or power

filters) adequate results can be achieved using a 'sandwich' of nylon wool—washed gravel—nylon wool.

Of course, activated carbon has remarkable absorptive properties, but unless preventative steps are taken, these properties diminish very quickly with time. Thus, I would suggest that the best use for carbon in freshwater aquaria is in removing unwanted disease treatments from the tank water (and hence strictly on an occasional, rather than routine, basis).

looking after sterlets . . .

Can you provide me with some information on the tank care of the sterlet?

The sterlet (*Acipenser ruthenus*) is a small sturgeon species which has quite a wide distribution in Eurasia. Although they may grow quite large (up to a metre in length, perhaps), small specimens are quite easy to care for. They seem to do best in a cool, well filtered tank with a sandy bottom. The sterlet should feed on a variety of 'wormy' live foods and frozen foods.

A fish for the indoor coldwater aquarium—really in a tank of its own.

C.A.

Coldwater



coldwater cats . . .

Can you tell me something about the Catfish, *Ameiurus nebulosus*? also I would like to get the European catfish, *Silurus glanis*.

COLDWATER

Arthur Boarder

PLANTS

Vivian De Thabrew

KOI

Hilda Allen

MARINE

Graham Cox

DISCUS

Eberhard Schulze

The first named is found in Eastern lakes of the U.S.A. It grows to 40 cm., and is a carnivorous bottom feeder, usually at nights. It has a large mouth and can swallow any fish half as large as itself, even one only five inches long can swallow a Stickleback.

The European catfish, *Silurus glanis* is too large for the garden pond and is not likely to be obtained from the usual pet shop. At the turn of the century, Lord Rothschild introduced some to the Tring, Herts., group of reservoirs, over which he had fishing and shooting rights. Few were caught there and it was thought that they did not survive, and two or three were found dead. However, they must have bred as young ones have been caught in the nearby canal which is fed from the reservoirs. A few years ago one was caught in Wilstone reservoir, one of the group, which weighed 33½ pounds. So if you want your garden pond cleared of other fishes, this is the one you can introduce.

newts . . .

I am very interested in ponds and aquaria and would like to keep British newts. Can you tell me about them and where I can get some?

There are three species of British newts, The Great Crested newt, *Triturus cristatus*, the Smooth newt, *Triturus vulgaris* and the Palmated newt, *Triturus helveticus*. The Smooth newt is the more common one and the Palmated the less often seen. The Crested newt is about five and a half inches long, the Smooth newt four inches long and the Palmated not much over three inches long. The last

named is peculiar in that in the breeding season the male develops a thread-like appendage to the tail. All live on live foods such as earth worms, etc., they can be netted from natural ponds in early spring, when they come to the surface to breathe, or by fishing for them with a worm tied on a piece of string. Newts go to the water to breed in March and leave the water when they have done so. They live on land and feed mostly at nights. They hibernate in the winter under stones or in crevices. The males only take on their brighter colours in the breeding season. You may be able to obtain some from dealers specialising in Amphibians, who advertise in *The Aquarist* magazine, but only likely in the spring.



Unlike the (larger) crested newts, smooth newts are not yet protected by law

water snails . . .

I have been told that I must have some water snails in my goldfish tank to keep the water pure. Is this correct please?

This idea is an old fashioned one which has no truth in practice. Water snails can eat plants and also fish food. If dried food is placed on the water surface, it will not be long before the snails will find it and start to eat it. That which they do not eat they foul up with their slime and so the fishes will not touch it. Any experienced aquarist will tell you that water snails should never be introduced to a tank or you will soon be regretting it and try to get rid of them as soon as possible. The idea that snails eat up all decaying vegetation and do not touch healthy plants is a fallacy. **A.B.**

Plants**an ecological problem . . .**

I would be grateful if you could advise me as to improving plant growth in my tropical freshwater aquarium. I have a tank 36 in. x 14 in. x 14 in. with exterior pump. I used to have a 25 watt Grolux tube but increased the lighting to 45 watts by adding a white tube. Until then plant growth was not good. Whilst single root plants survived, bunch plants lost their leaves from the bottom up until only those near the surface were left. Once the lighting had increased the Vallisneria were much more active and sent out runners

but tended to do so under the Grolux tube only. The Wisteria seem to have produced some new leaves but growth is still not at all vigorous. With Elodea there tends to be some rotting at the base of the stem. I should add that this does not occur to any other types, and that the Wisteria have dropped numerous roots. I intend to replace the 20 watt white tube with Grolux but do not wish to purchase one until I am more certain of the wattage. Would another 20 watt tube be sufficient if it were Grolux, or should I buy perhaps 25 watts, making the overall lighting 50 watts?

At present the lighting is on 10 hours per day. The gravel is not black or foul-smelling, and there is some aquarium peat under the top layer.

Two 20 watt fluorescent tubes on for 8-10 hours per day are usually sufficient for your size tank. However, as the three species of plant you mention (Vallisneria, Elodea and Wisteria) all require fairly bright light, 45 watt (in total) may be an advantage.



Vallisneria will grow in light and alkaline environments

The reason why your Elodea (Egeria) is not doing so well is also because it is an alkaline-loving plant, and hence will not thrive in the slightly acid conditions favoured by plants like Wisteria. Vallisneria will tolerate slightly alkaline

conditions. Therefore either you have to provide alkaline conditions in your tank by incorporating some calcium content into your planting medium (instead of peat) and concentrate on growing plants which favour these conditions, such as *Cryptocorynes Ciliata*, *lutea*, *nevillei*, *petchii*, *wendtii* and *willisii*, *Echinodorus martii* and *E. tenellus*, the *Myriophyllum* and *Potamogeton* species, *Sagittaria filiformis*, etc. (a fuller list is attached), or give up the idea of growing Elodea.

In either case, make sure your planting medium is 3½ in. to 4 in. deep, so that the plants can develop good root growth and become strong. V.T.

Koi



frogs and koi . . .

In early April I found several masses of frog spawn on a ledge in my Koi pond but have been advised to remove them as frogs can be dangerous to Koi. Is this just an old wives' tale as I can see no reason why frogs should be any danger to Koi?

As an elderly wife myself, I know that this story is usually treated with scepticism, but I can assure you that frogs can present a danger to Koi in Spring.

By the time this appears in print, I trust your problem will have been resolved by a grateful, local conservationist who will have transferred the spawn to a more natural habitat which unfortunately is fast disappearing by man's constant expansion into the countryside.

Frogs are not welcome in garden ponds unless ponds are specifically intended for that purpose and I know of several cases where expensive Koi have been in danger of asphyxiation through the amorous activities of frogs.

Short-sighted or not, when clamped tightly round the gills of fish, and only removed with great difficulty after the fish were noticed to be seriously distressed or even near to death, I think you will agree that frogs can be dangerous to Koi.

It is not a good idea to have shallow

parts in a pond intended for Koi, an ideal Koi pond will have a depth of between 4 to 5 feet, with sheer, straight sides and a distance of at least 10 inches between the water level and pond surround. Koi are uneasy and jumpy in shallow-water and need at least 2 feet of water in which to manoeuvre in safety with the chance of escape into deeper parts if danger threatens.

plants and koi . . .

Having made a garden Koi-pond I have now been told that I cannot have plants in the pond. Surely this is not true, and I would welcome your opinion.

You can have what you like, according to your pocket of course, and if you propose buying a small Koi, (but hopefully not less than 6-7 inches long) then these small fish will welcome the cover and protection afforded by plants in the pond.

Marginals, and indeed shelves are not a good idea as these attract Koi into shallow, warmer areas where they can be 'sitting ducks' for cats and herons which are ever watchful for a good meal. Water lilies provide some welcome shade from summer's sun besides being a beautiful addition to any pond, and most pond-keepers really like plants, myself included.

However, the sad facts of life are that if the Koi grow and thrive, then plants are unlikely to in the limited space provided in many garden ponds. Larger Koi are vigorous, active fish and nothing escapes their attentions in searching for food.

Koi are not vandals, although it would be easy to think they are destructive when actually all they are doing is what comes naturally for carp. There is no reason why you should not have a couple of water lilies and oxygenators in the beginning to see what happens, but if and when the Koi decimate them then you could give thought to providing some overhead shade with a shelter partly covering the pond as Koi-keepers do in Japan. Strong sunshine promotes the growth of algae in all its many forms as well as having a damaging effect on Koi kept in very clear water. When buying plants please go to an accredited

supplier, no one should be tempted to bring anything from the wild for the sake of a few pence. Plants from natural streams and ponds can be host to many parasites, particularly leeches whose offspring will be virtually impossible to eradicate without drying out the whole pond.

H.A.

Marine



cleaner shrimps . . .

This letter involves my marine aquarium. At present it contains 1 electric-blue damsel, 1 dusky damsel, 1 chocolate clown and 1 tomato clown and probably 2 neon gobies by the time you receive this letter. All these fishes range from 1 in.-1½ in., my real query is on inverts, as I am hoping to get 2 cleaner shrimps, please could I have some information on these?

Unfortunately you give no details as to the size of your aquarium and so I regrettably cannot advise you as to whether or not you have the space for two more creatures. I suggest that you calculate the gallonage of your tank (in Imperial gallons) by working out the cubic capacity in cubic feet and then multiplying the result by 6 to give the tank's capacity in Imp. gallons.

Now my time-honoured rule for stocking marine aquaria is as follows:

1. First 3 months after filter maturation: Do not exceed 1 in. of fish per each 4 Imp. gallons of seawater.

2. Thereafter: Do not exceed 1 in. of fish per each 2 Imp. gallons of seawater.

In this case, however, due to the extremely small amount of food eaten by *Hypolimnata* shrimps I'm confident you will have enough room.

collecting and the law . . .

Please can you clarify how the Wildlife and Countryside Act (1981) and the Wildlife Protection Act (1975) affect the collection of native species from rock pools by aqua-

rists who intend to keep these specimens in their home marine aquaria?

I have discussed this question with both the Department of the Environment in Bristol and the Nature Conservancy Council. From these discussions it is apparent that provided you are not collecting from an SSI area; i.e. a site of Special Scientific Interest, you are not breaking any laws by collecting fishes, invertebrates and algae from rock pools in the littoral (i.e. inter-tidal) zone. None of the animals or plants found in these areas is protected by law.



Intertidal fishes, such as *Gobius paganelus*, are not protected by law

As a marine aquarist, however, you will know that almost all the fishes which you collect in the littoral zone have a strong territory defending instinct and use all the rocks in the pools for protection from both predators and the battering effects of the waves. It is therefore vitally important for those creatures which you don't collect that every single rock which you disturb is carefully returned to its original site and position. G.C.

Discus



spironucleus . . .

I have recently purchased a number of Brown Discus, size approx. 1 in. All appeared well but after 2 weeks I noticed that one of the fish had a swollen stomach and had white droppings hanging down 1 to 1½ in, a condition I believe to be *Spironucleus*.

The fish in question has almost stopped feeding; I have raised the temperature to 80 degrees and

although the swelling has gone down slightly the fish is still producing the white droppings.

I would very much appreciate your observations on the above condition and any cure you may be able to suggest.

These fish must have been infected when you bought them; although *Spironucleus* is no longer the most feared Discus disease it once was, many hobbyists still have great difficulties in curing it.

Spironucleus or *Hexamita* is caused by flagellates and cannot be distinguished from one another in the aquarium. It causes inflammation and the fish often lose weight very rapidly. I am sure that the swelling in your Discus fish was not related to *Spironucleus* but was an additional ailment. Most Discus fish have these parasites as harmless symbiosis in their intestines and they will only really increase and get out of hand as a result of stress or environmental changes. In Germany *Spironucleus* is also often known as a 'neglect disease'.

To cure this ailment in Discus one will have to keep the aquarium bottom free of the white faeces by syphoning them out when ever necessary; raise the temperature to 96 degrees F for about 8 to 10 days. That a very reliable heater/thermostat and thermometer is needed goes without saying. Also, plenty of air must be pumped into the aquarium since at this temperature the oxygen content of the water is very low. Certain types of medicaments are often successful: Flagyl 400 at 1 tablet per 50 litres of water; ¼ water change, necessary amount of tablet, 3 days; ¼ water change, repeat after 4 days; Hexa Ex use like Flagyl 400. Power filters must only be run on clean new filter wool, which must be changed often otherwise fish could be re-infected.

It also often helps to add to the water a vitamin complex to keep the fish going since they hardly ever take any other foods. The best type of vitamin complex I know is aquasbio-food U: it contains 8 vitamins, 8 amino acids, 2 fats and 2 carbohydrates.

In very young fish this disease can often be fatal; older specimens usually cope with it.

E.S.

Fighting Fish of JAVA



by A. van den
Nieuwenhuizen

THIS mouth-brooder was described as early as 1846 as *Panchax pictus* by Cuvier and Valenciennes. When Bleeker established the genus *Betta* in 1850 the fish received the name *Betta trifasciata*. Only later did it receive its final designation of *Betta picta* (Cuvier and Valenciennes, 1846). A good deal of confusion continued to surround this species, however, within the hobby. The very similar species *Betta fusca* (Regan, 1909) was a particular source of confusion. The problem was resolved by Dr. F. P. Kouman. Subsequently, the two species were distinguished by means of the detached first ray of the dorsal fin of *Betta picta*, which is not found in *Betta fusca*. Their natural habitats, too, differ where they have been established to date. *Betta fusca* has been found in Singkep, Sumatra and Perak. *Betta picta*, on the other hand, is known in Sumatra and Java. The Dutch aquarist Sybrandi also caught them in the swamps of Ambarawa. In Java the species was also collected in the heights of the mountain range. At the beginning of 1953 the species appeared in Holland, only to quickly disappear again from aquaria, because it was not able to match the coloration of the fighting fish, *Betta splendens*, which was very popular at that time. With the appearance of the current edition of 'The Aquarium Today' I

reached a milestone. It was thirty years since I had begun to photograph fish behaviour. Even in those days I was on the look-out for *Betta picta*. But it was not until about three years ago that I obtained some of these fish, from Dr. D. Liem of Vivaria Indonesia in Jakarta. Unfortunately, they were all males. A short time later I was lucky enough to receive further specimens, this time from JGL, the international labyrinth fish society. These were followed by fish caught in the wild by Dieter Vogt and H. T. Snijders, who originally had considered them to be *Betta trifasciata* because of the clearly visible lateral bands, but then recognised them to be *Betta picta*.

Betta picta attains a size of about six centimetres, there being usually no difference between males and females. The sexes can be reliably distinguished only in adult specimens. When mature, the males have a broad, dark lilac-coloured band in the anal fin which is bordered by a thin, greenish-blue line at the edge of the fin. This band is particularly prominent in fish from Java. The same coloration is to be seen in the lower part of the caudal fin. The females differ, however, in that they lack these bands of colour and have a rounded-off caudal fin. *Betta picta* is of interest to the aquarist because of its behaviour rather than its coloration, however. Consequently, this fighting fish is best cared for in a species tank rather than a community tank, which would generally be too large. Furthermore, a lot of dense

Female on right and supported on pectoral fins, shoots eggs from her mouth towards male for him to collect

vegetation and other fish moving swiftly about the tank result in *Betta picta* leading a hide-away existence amongst the plants. In their natural environment, of course, they live almost exclusively in areas of dense vegetation, but the same conditions in the aquarium make observation difficult. As far as the composition of the water is concerned, the species is undemanding.

Since these fish also come from mountain streams, which are at an altitude of up to 1600 metres (Spoelstra, 1955), it is advisable to keep them in clear, well oxygenated, clean water. An average water temperature of 23°C is to be recommended, although a drop to 15°C can be tolerated without injury. Higher constant temperatures of around 30°C should be avoided, however, as they are liable to cause the water quality to deteriorate. At the temperature recommended above the fish will also come into breeding condition. In my experience a temperature difference of two to three degrees, following the rhythm of day and night, brings the fish into condition more quickly. *Betta picta* accepts all kinds of live food. Their preference is for mosquito larvae. They will also chase energetically after small water beetles. If the menu consists solely of water-fleas, however, the females will have difficulty in coming into spawning condition. My own fish have never

accepted dried food. If one wants to keep a group of *Betta picta*, an aquarium with a surface area of at least 70 cm by 40 cm should be used. When the females are ready to spawn, frequent squabbles break out amongst the males. Consequently, the aquarium should contain as many hiding places as possible. Dense groups of plants alternating with smaller, open areas, moor oak and other decorative items should provide the males with ample opportunity to establish their own territories.

Pairing takes place just above the tank bottom in the open areas between the plants. After a number of preparatory pairings the fish pair in earnest and give off their sexual products. In doing so, the male curves his body round his partner and the eggs are fertilised as soon as they are extruded. Then the male relaxes and so the eggs, most of which are lying on his anal fin, fall free and are immediately taken into the female's mouth. A most interesting piece of behaviour follows. The female blows out one or more eggs in front of the male's mouth, tempting him to collect them. If the male does not succeed in snapping up the eggs, the female picks them up again. This egg 'bombardment' is repeated until all the eggs are collected together in the male's mouth. It is usually then, and not before, that the pair spawn again. Altogether more than a hundred eggs may be produced, all of which are



Exchange of eggs continues, the female here on right, having blown two eggs in front of male's snout



Male with tightly egg packed mouth and room for no more



taken into the male's mouth and incubated there. After about ten days their development is complete and the fully-formed young are released from the male's mouth. Dense vegetation such as Java moss and Riccia at the surface of the water are essential for the survival of the fry, for the males occasionally pursue them. Freshly hatched Nauplius larvae or brine shrimps are immediately accepted as the fry's first food. If well looked after, the young of *Betta picta* grow on very quickly.

Female, above, trying to coerce male into further spawning but, with mouth bulging with eggs, he declined and retreated amongst the plants



50 Years of Aquarium Keeping

by June Williams

It was in October 1934 when I had my first encounter with tropical fish; as a young girl I was given the task of presenting Lady Daresbury with a basket of flowers in which was concealed a can containing tropical fish—not a neat plastic or a practical thermos container, but a fish tin wrapped round with newspapers and covered by a woollen cloth to conserve the heat. The occasion was the official opening of the first Aquarium at Chester Zoo. It comprised just six cold water tanks and was situated in the Wine Cellar underneath the Victorian mansion which in those days was the centre of the Zoo. It also housed the Zoo's Cafe, Offices, Food Stores and was my home, as my father, G. S. Mottershead, had founded the Zoo four years previously.

As the Zoo grew in size, the Aquarium was enlarged to contain tanks of tropical fish and it became one of my favourite haunts. Peter Falwasser, who was a very keen Aquarist, took care of it and he explained to me the finer points of Aquarium Keeping. At the outbreak of War, Peter joined the Army and later died from injuries received at Tobruk. The Aquarium was left to the tender mercies of some young girls who had more enthusiasm than knowledge!

One day, when I arrived home from School, my father met me with the news that some of the tropical fish had been put into a cold water tank by mistake and would I go and sort the fish out and, as at that time, I knew more about the Aquarium than anyone

else in the Zoo, would I keep an eye on it from now on. So began my career as Aquarist at Chester Zoo.

During 1940 most of the Zoo staff left to do essential war work. I should have preferred to look after the Aquarium full time rather than attending School and doing homework in the evenings, but my mother had other ideas. The Aquarium was closed for the duration of the War and the Cellar became an air-raid shelter.

At first we all used to rush down into the Cellar and sit surrounded by empty tanks until the all clear then, as the War progressed, and the air raids became less frequent we became more blasé and stayed in our beds and the Cellar became the dumping place for things that might come in useful one day.

When I was discharged from the Land Army in 1946, one of my first jobs was to go down into the Cellar and try to get the Aquarium in working order again. What a job that was; all the iron and concrete tanks leaked. The cheapest and simplest, but not the best, way to seal them was to put some of our local clay into the tanks, fill them with water and keep the clay in suspension until it had sealed the leaks. The tanks that did not respond to this treatment I turned into Vivariums. A member, Mr. Parker, who was an electrician by trade, came every weekend and, just for his keep, did all the electrical work. An old fridge compressor was utilised to work the aeration. A new entrance and exit were built and more of the Cellars were used to build pens for snakes and alligators, as the old Victorian Con-

The author in her youth collecting *daphnia* in the company of a deer fawn which used to butt the bucket as it was being filled with *daphnia*

servatory which used to house these reptiles had suffered badly during the War and had had to be pulled down.

The Cellar now held 14 tropical tanks, 11 cold water tanks and 7 vivariums. It was an attractive Aquarium, naturally dark with a winding walk through each different shaped Cellar, with tanks and vivariums of various shapes and sizes dotted around it. However, it took a great deal of looking after as most of the equipment was old and makeshift. The snake pen had no trap and, at feeding times, it was always a job stopping the large Boa Constrictor from swallowing the small Royal Python who would persist in grabbing the Boa's meal once he had commenced to eat it!

In the Spring of 1948 George Cansdale sent the Zoo a consignment of extremely poisonous snakes from West Africa. It was impossible to accommodate these in the Cellar, so a new Reptile House was built in record time for them and my collection of reptiles, which included a pair of alligators that had long ago out-grown their pen, went to live in the spacious new Reptile House.

The Aquarium was now left with seven empty reptile pens, nobody was really interested in it. The rest of the Zoo was forging ahead and a new Elephant House and Polar Bear Enclosure were being built. The new Reptile House was a great success, as it deserved to be, but it was disheartening for me to watch the visitors flock to see the reptiles and only the dedicated few visit the Aquarium.

I was getting married in 1949 to the Head Keeper at Chester Zoo and my future husband had designed a new fire-place for our future home, incorporating a fish tank. A plasterer friend of his was building it for us. It proved a great success and the following year, when we wished to build a wall round the lodge in the Zoo, which was now our home, our plasterer friend again helped us to build it. The Aquarium was now in a very bad state

Continued on page 27

WHY don't the fish in your tanks keep bumping into the unseen glass sides? Fish are almost unique among animals in possessing a sixth sense in peculiarly structured nervous organs along the side of the body called the lateral line. It may in part be coloured, like the blue rear of the line on the bitterling, now established in several British as well as continental waters. It is not always straight, having a distinctive curve towards the forward end of perch and dab or downward in the roach. Its row of scales are marked by little pores, on both sides of the fish.

What is the purpose of it and why was it evolved? It is shared only in aquatic stages of amphibians and the Agnatha. It is virtually one or more head-to-tail canals continuous or broken, a slimy tube piercing the scales with vertical tubes and comprises a number of neuromasts, groups of sensitive receptor cells with a sense hair, somewhat like taste buds. From these "sense hairs" stimuli are passed by a parallel branch of the cranial nerve to the brain. Neuromasts are sometimes freely exposed in the water, as in slow-swimmers like cave-fish.

A fish virtually hears through its lateral line, and detects the movements of water currents which stimulate migratory salmon to ascend rivers. It senses the approach of other fish, to recognise heat and cold and to avoid predators, or colliding with objects underwater like the glass side of a tank. It is an organ combining senses of hearing and touch. The Russian biologist Disler in 1960 produced a standard work on its importance in fish-behaviour. It must be most valuable to blind cave-fish which carry more neuromasts than usual and it plays some part with the paired fins to balance a fish.

It enables the fish to detect the size as well as the speed and direction of approaching predators, as well as food like Daphnia or nearby members of its own shoal of fish even when stationary. It senses local pressure differences and water-displacements at right angles to the body. When the neuromasts are



by Eric Hardy

in mucous-filled canals these act as a buffer to the turbulence of water flowing over the skin as the fish swims swiftly. But neuromasts with thousands of hair cells are not confined to the lateral line. Several fish like deep sea lantern-fish have them numerous in canals on the head and others like angler fish, on the tail and often larger than those in the lateral line canal along the body. They help deep sea fish keep contact, like cave-fish. But they aren't like the bat's sonar system, or radar, which send out signals and receive the echo, for the lateral line is purely receptive. Look how they mark red-lined Rasboras, flying barbs, blue and black line tetras, green swordtails and giant Danios!

Burbot

Britain's rarest freshwater fish is not the schelly, as claimed by a London daily paper's angling correspondent, but the burbot. However, the capture by an angler in February on maggot of one from the River Eden is interesting because it is a numerous lake fish, a coregonid or whitefish survival from arctic times, living deep down waters

like Ullswater at Skelly Nab and Pooley Bridge, from which the specimen must have descended the outfall. Nor is it the first time one has been taken in a river for the closely related gwyniad of Lake Bala has twice been caught so far down the Welsh Dee as Chester, and further up at Llandrillo.

Among various ways in which fish rest or "sleep", some tropical parrot-fish in coral-reefs envelop themselves in a large cocoon formed by a slimy mucous secretion from glands in their skin. A front entrance permits water to enter for respiration, and a rear space for its exit. Why do parrot-fishes do this? One suggestion was that the envelope prevents silting-up of the gills during sleeping time. I consider it to be a protection against predators hunting them by smell, or parasites. Some other parrot fish wedge themselves into a crevice until morning.

Many tropical fish protect themselves from predators by bright warning colours and a bitter flesh. Many fish make sounds in courtship to keep shoals together or to defend territory. Some fish like anchovies make a sound when they swim, increasing its frequency with speed. This attracts predatory fish. By remaining still they cease to produce the sound and avoid being eaten. Grunts are made by cod and haddock as a defensive escape sound after a fight. The bottom-living tadpole-fish utters



The "pits" of the lateral line system of this Oscar, *Astronotus ocellatus*, can be seen extending forwards from below the black "tail spot" and backwards from behind the white "head spot"

single grunts when alarmed, but it isn't known if this is to frighten off predators.

These, and sounds by other aquatic life like water-boatmen bugs, stoneflies and caddis-flies are mentioned in an interesting and rather scientific new book *Animal Language* by Michael Bright (BBC, £9.75) illustrated with many sonograms.

Anti-predator tactics

The number of fish found with

beak-marks from heron, merganser and other predators show that the predator's strike isn't always successful and we should like to know more about how the fish got away. Snapping pistol-shrimps stun their fish prey with very high intensity sounds so loud that when they are kept in an aquarium where the glass is scratched it may shatter as a result of their trigger-like claw's report. Ghost-crabs defend their burrows with territorial calls while the mantis-shrimp scares in-

truders from its burrow with a loud click. At Bangor University College a 4-years, £64,321 research was completed last year to determine rules which members of a school of fish obey when performing anti-predator tactics, elicited by various stimuli, from vision to lateral line senses. Stings, like the dark dorsal fin spines of the lesser weever fish, are a well-known defence of fishes and I've gathered a few bathers' allegations that dogfish attacked and bit them in the sea!

Fifty years of Aquarium keeping

Continued from page 24



Some of the tanks at Heron Island 30 years ago. The water for these tanks was pumped directly from the sea. It was allowed to run through the tanks unfiltered and to overflow on to the coral sand beneath where it quickly drained away

and I was having a good moan about its condition, when the idea of building a new Aquarium of expanded metal and concrete was conceived. Although the War had been over for five years, conventional building material was still hard to obtain.

During our holiday we saw as many public Aquariums as we could afford to visit. I wanted an Aquarium that would be easy to run, one that had a central drain for all the surplus water; the Cellar had flooded whenever a shower of rain fell and I was tired of mopping up water. I wanted tanks that could be serviced from the back and at working height.

My twenty-three years old husband, who had never before designed or planned a building, drew up the plans for the new Aquarium and they were

put before the Zoo Council. We were given permission to start building in our spare time; the Society would pay for the materials and the plasterer's wages at weekends—he had a fulltime job, as we had.

We should have liked to have had larger tanks and a good heating system, but were controlled by the amount of money available. Fred, my husband, worked out a heating system, using Pyrotanix heating cable, which ran along the front and bottom of every tropical tank and through the filters that were between the tanks, so that every tropical tank and filters were interconnected. Two sections were for tropical fish and the third section was for cold water fish. At this time marine fish were a luxury we could not afford.

A large tank ran around the edge and roof of the Aquarium and visitors could view the fish swimming above them through glass panels in the roof. The water was circulated round this tank and over a waterfall in front of the Aquarium, through a sand filter and pumped back on to the roof. We had bred a lot of Shubunkins to fill this tank and reared them in the moat around the brown bears. It was a great day when we transferred them into this tank but our joy soon turned to horror as Shubunkins began dropping from the sky! We had made the bad mistake of not covering the tank with netting and the seagulls were having a field day!

The Aquarium opened on 1st October 1952. I ran it for a year and

then my husband and I went to Australia. However, we could not keep away from fish and were lucky enough to spend three months of that time on Heron Island in the Great Barrier Reef, watching fish in their natural environment, with no worries about heating, filters, lights or food because, of course, we ended up looking after their small Aquarium.

In 1957 we arrived back in Chester and Mrs. Chidlow, who was in charge of the Aquarium, met us with open arms. She had been a Cashier in the Aquarium before we left and, about a year after our departure, she had taken over the running of the Aquarium but by then the tank on the roof, waterfall and pool in front of the Aquarium had been dispensed with, although the rest of the Aquarium was basically the same and spotlessly clean.

So once again I took over the running of the Aquarium and Mrs. Chidlow, who had done a marathon job while we were away, thankfully returned to being a Cashier.

My husband, who had a talent for planning and building, started work on a newly acquired site in Birkenhead for a Quarantine Station for Chester Zoo, but he always kept an eye on the workings of the Aquarium.

It was now possible to fly tropical species, including marine specimens, from their native habitat. A new era was commencing for the keeping of tropical fish; things we had thought impossible to achieve were becoming commonplace. I wonder what the next fifty years will bring.



The YUCATAN FLAGFISH

by R. Goldstein

THE Yucatan Peninsula is a low lying coastal plain that juts northward from Central America, bounding the southeastern Gulf of Mexico in the same way that the Florida Peninsula bounds the northeastern part of this inland sea. Both peninsulas are similar in width, length and elevation, and may have at one time been connected in that prehistoric age before the Gulf of Mexico broke out to form the Florida Current and the Gulf Stream. Just as subtropical fishes of the killifish family (Cyprinodontidae) have radiated into a number of species near the tip of Florida, so has species radiation occurred in Yucatan. The similarity of the species, their obvious common ancestry, and other pertinent facts indicate that, at one time in the past,

the killies of Yucatan and Florida were the same ancestral fishes, and have since gone their separate evolutionary ways.

Whether the land masses were continuous or merely close enough to one another for fishes to cross narrow channels (as they do among the islands of the Florida Keys and the islands off the coast of Yucatan) is not known and probably unimportant. What is important is that the Yucatan sheepshead minnow (*Cyprinodon variegatus artifrons*) is of a different subspecies (some think even a different species) than the Florida Keys sheepshead minnow (*Cyprinodon variegatus variegatus*). Even more striking is the similarity (and obvious common ancestry) of the Gulf killifish (*Fundulus grandis*) to the Yucatan version (*Fundulus grandisimma*). A highly specialized fish in Florida is the goldspotted

The original habitat from which I collected *Garmanella* and *Rivulus marmoratus*. The bottom is soft silt over limestone rubble far below, and the emergent vegetation falls over and decays in the water

killifish, *Floridichthys carpio*, located almost exclusively in very hot southern waters of the peninsula. There are three subspecies of this fish, the Florida one and two others in Yucatan. The American flagfish (*Jordanella floridae*) doesn't occur in Yucatan, but its probable equivalent is *Garmanella pulchra*, which I am taking the liberty of dubbing the Yucatan flagfish. It occurs in waters the ecological equivalent of *Jordanella*, and bears several other similarities which indicate to me a strong case for common ancestry.

I made two trips to Yucatan in the early seventies, the first to the northern mainland and the second to the island of Cozumel off the north-eastern coast. As usual, I did plenty of homework before I went, in order to understand the region and the people, and to learn what was known of the native fishes, and what opportunities might exist to bring something back for introduction to the hobby.

Continued on page 31

the first report of this species from Mexico), a number of *Cyprinodon variegatus arifrons*, several *Poecilia velifera* (Yucatan sailfin mollies), mosquitofish (*Gambusia yucatana*) and a load of *Garmanella pulchra*. Except for the *Garmanella* and *Ritulus*, I had collected all these species previously on the mainland, so it was clear where my enthusiasm lay.

Garmanella is a beautiful fish, softly golden green and quite small and apparently delicate. Its similarity to *Jordanella* is in the pattern rather than in coloration. The unpaired fins are heavily spotted with tiny orange dots, and there is a dark ocellus in mid-body, which in some males becomes a large, irregular blotch.

I had no trouble bringing those fish back into the United States, either with Customs officials or the Mexican authorities. The fish were then set up in aquaria of several different sizes, with differing numbers of individuals, in order to determine the most effective way to breed them. It didn't make any difference.

Garmanella will breed in large communities or pairs or trios, but they are rather aggressive in smaller groups. They spawned equally well in floating and sunken spawning mops of synthetic yarn, producing plenty of eggs. These hatched in a week to ten days on the average, and the fry were easily raised on newly hatched *Artemia* nauplii. My fish had been set up in fresh water to which I had added a small amount of sea salts to provide some hardness, but almost imperceptible salinity. I distributed many of these fishes to the American Killifish Association and to some European friends, most of whom maintained them in straight freshwater aquaria with good results. I believe that the *Garmanella* in Europe today are descendants of this particular collection from Cozumel, for the reports of the fish in Europe began appearing in the literature about a year and a half after my distribution of the fish.

And I thought you might like to know where they came from.



Jordanella floridae the American flag fish probably had a common ancestry with *Garmanella*. This American flag fish collected in south Florida by author



The shape, square dorsal on blotch of this *Garmanella ps* reminiscent of the Florida



Still undergoing restoration, the giant pyramids at Chichen Itza arose out of a low jungle that only extended to a height of about the third level. Now that they are in a cleared field, something is lost of their improbability



and central
pulchra are
sea flag fish

The first *Rivulus marmoratus* collected from Mexico, this fish is hermaphroditic, but in an unusual way; there are no males and females. Each fish produces fertilized eggs from an ovotestis. One fish, then, becomes a cloning population.



July, 1984

33

THE BASIS OF FISH HEALTH

by 'Mayfly'

The Common Gill Fluke *Gyrodactylus*

The common gill fluke is one of the many flatworms (Trematodes) which infect fish. They belong to the ectoparasitic group (the Monogenea) and attach themselves to the outer surfaces of fish, mainly the skin and the gills. There are other flatworms belonging to a second group, the Digenea, which are endoparasitic and invade the internal organs, e.g. eyes, muscles, blood, and digestive system of the fish host.

The adult is a flattened worm, approximately 0.8mm long, narrow at the anterior end which bears a number of lobes bearing glands which secrete a sticky substance for attachment of the fluke to the host tissues. At the front end there is also a mouth, but unlike some other related forms there are no eyes in the genus *Gyrodactylus*. At the back end of the fluke is a very characteristic and efficient hold-fast organ called a **haptor** which has two large central hooks (anchors) surrounded by a ring of small hooklets around the margin. The haptor may become more or less embedded in the superficial skin of the host.

Unlike the internal flukes e.g. blood flukes, *Gyrodactylus* and its relatives in the Monogenea, have a direct life cycle—that is there is only one host, the fish, involved in the life cycle. Some species are host specific—that is

they only survive on one or a small group of closely related species of fish. The most dangerous types of flukes as far as aquarium keepers are concerned are those species like *Gyrodactylus elegant* which are less selective and can attach to, and reproduce successfully

on, a wide range of host species even though they belong to different families of fishes. It is as well to remember, however, that centrarchids (sunfishes) and cyprinids (e.g. carps and minnows) are especially susceptible to attack by flukes.



Gyrodactylus elegant. Showing the young form inside the body of the parent



Dactylogyrus vastator. A similar fluke which is sometimes confused with the *Gyrodactylus* but is distinguished by the four eyespots

The Common Gill Fluke *Gyrodactylus*

Each adult fluke is hermaphrodite that is, each has a full complement of both male and female sex organs within the body—but it is normal for cross fertilisation between two individuals to take place. These flukes do not lay eggs, but give birth to live young. The young forms can be seen within the body of the adult. When these are born they immediately become attached to the host. This method of reproduction is the secret of the success of this fluke because, compared with egg-laying forms it can build up a large population very rapidly.

Gyrodactylus is found mainly on the skin, particularly on the skin of the fins, favouring the dorsal, caudal, and anal fins. In some fish the pelvic fins are also severely affected. The rate of water flow over the fins is one of the most important factors controlling distribution of *Gyrodactylus*, hence fish with different swimming motions have infections concentrated on different fins.

The flukes are too small to be seen with the naked eye. An early sign of the disease is often an increased activity and erratic swimming of the fish. They may flash or rub themselves against the sides or bottom of the aquarium tank or pond. The fish's colour may become pale and the respiration rate (the movements of the operculum over the gills) becomes more rapid. Affected surfaces may become covered with a bluish-grey slime—owing to the increased production of mucus. In more severe attacks, skin damage can be seen with haemorrhages and ulceration, often on the tips of the fins which can lead to severe fin-erosion. Eventually in the worst cases they may become reduced to mere stubs. Even at this stage, if the infection can be cleared up, considerable re-growth of the fins will occur. Secondary invasion by other organisms, especially fungi, is frequent after fluke attack and incorrect diagnosis of the original problem is frequently made. Even if the fungus can be cleared recovery may not follow as the flukes can continue to increase in number.

Transmission from fish to fish is probably through fish/fish contact. Flukes do not live for long after removal from the fish host—so there is no question of their swimming to a new host. There is little risk of introducing a fluke infection to a tank accidentally with plants or snails or

other items. The infection is always introduced with fish. It is easy to obtain fluke-free fish—by either ensuring that you purchase disinfected stock or by giving all newly purchased fish a cleansing bath of formalin prior to their introduction into your tank. Most cyprinids and catfish can be treated with 1/6,000 formalin for 30 minutes without harm. However some tropicals (e.g. some of the gouramis) will not tolerate more than a 1/10,000 concentration for 15 minutes or so.

Many treatments have been used for *Gyrodactylus* infections besides formalin. These include: sodium chloride (common salt) 30,000 ppm bath for 15 minutes; potassium permanganate 5 ppm for 24 hours; methylene blue 5 ppm indefinitely.

However formalin appears to give the most consistent results. The major disadvantage of formalin is that, over a period of months or years, it gradually changes to paraldehyde, yellow-white crystals of which appear in the sediment in the storage container. This is very toxic to fish and should be discarded.

In outdoor ponds *Gyrodactylus* infections usually become severe during early autumn, particularly after a warm summer. This is because the life cycle of *Gyrodactylus* speeds up as the temperature increases. For this reason gill flukes in semitropical tanks can become very numerous, very quickly.



Company Profile

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The original Michael's Filter advertisement from A & P (above)

Present-day version used in the Newhay ponds (below)



If you thumb through the pages of an *Aquarist & Pondkeeper* from the early 1950's, you will come across an advertisement for Michael's Treble-Acting Filter-Aerator, priced at the princely sum of 6/9d (approximately 33p). Some of our readers may not only remember these adverts but may even still be the proud owners of one or more of these little, revolutionary aquarium filters.

Measuring no more than three inches from base to tip, these ingenious fore-runners of our present-day and ever-expanding range of undergravel filters proved so successful that they made it possible for their creator, Vilis (Bill) Michaels, to embark on what has proved (and is still proving) to be a long, highly successful and "original" career.

On meeting Bill, one is immediately

struck by his genuine love for his fish. This deep affection is the essential ingredient (sometimes referred to as "child-like wonder") which, according to some biographers, separates the exceptional from the plain good.

This, of course, means that any fish produced by such a person is the result of a great deal of thought, care, feeling and experience and is, therefore, likely to be, at least, a cut above average.

In Bill's case, the fish of most direct relevance to aquarists and pondkeepers are his Half-Koi and Koi.

However, before going into this aspect of Bill's work in more detail, it is well worth taking a brief look at some of the key factors that have led to the present-day flourishing state of health of Newhay Fisheries Ltd.

Bill Michaels came to England from his birthplace, Latvia, in 1945 and worked for a time in a textile factory where, following several promotions within the Company, he became First Engineer.

On his way to the factory each morning, Bill used to pass a house which had an aquarium and this kept alive thoughts of his childhood spent largely in a friend's Carp Farm in Latvia.

Inevitably, one thing led to another and Bill found himself building aquarium frames from scrap iron for his own use, as well as for other people. A small aquarium shop then followed with all its joys and problems.

Despite the heavy demands that this made on Bill's time, he still found time to apply his thoughts and skills as an engineer to aquarium technology. It was while attempting to solve an unrelated technological problem that the Treble-Action Filter-Aerator was invented. Initially, the idea was to find a suitable way of anchoring a diffuser stone below the gravel to create a stream of bubbles that would appear to emerge without the apparent use of an air-stone.

The unexpected result of Bill's

invention was that the contraption actually cleared aquarium water of debris as well. The undergravel filter was, therefore, born.

Within a short time, the Treble-Action Filter-Aerator was on the market and Bill's fortunes took a significant turn for the better.

For a time, he invested his profits in a garage business, making use of his talents as a creative aquarist to install small aquaria as part of his forecourt display. However, when a piece of waste land became available along the stretch of the River Ouse which runs near Cliffe (close to Selby), Bill saw his opportunity to develop his lifelong interest in Carp into a commercial venture producing fish for the table.

He, therefore, sold his garage business and moved to Newhay (a stone-throw away from Cliffe but much closer to the Ouse). At first, most of the business was centred around "Table Carp" grown from fry imported on a regular basis from Germany. When the UK Government passed legislation in 1975 preventing further imports of domestic fish for fear of introducing new diseases into native waters, Bill had to adapt or go out of business.

In typical style, he adopted a system of induced spawning (under cover to ensure environmental control) that has led to Newhay becoming the largest producer of Carp eggs, fry, fingerlings and table fish in the country. The last major development on the "business" side of Newhay Fisheries was its amalgamation with Warburton's Ltd., a major Lancashire-based bakery group, in 1980. This was a mutually advantageous move in that the Carp are now fed bakery wastes as part of their diet



A truly magnificent half-Koi



Bill Michaels standing by one of the large Koi ponds on his front lawn

while the induced breeding programme, plus other research activities, are carried out at Warburton's from Newhay stock.

At Newhay itself, three types of Carp are kept. All, of course, belong to the same species, *Cyprinus carpio*, but each has its own, very distinctive characteristics.

First, there are the Table Carp. These have been developed from original German stock cultured around Nürnberg. The particular "hybrid" from which Newhay Carp have arisen, is the Dinkelsbühl, thought by Bill to possess the desirable qualities he was searching for in terms of hardiness and flesh production. These fish look very much like Mirror Carp but have a very high back—they are really quite magnificent fish in their own right. Many tons of this Table Carp are sold annually by Newhay Fisheries in this country and abroad. In fact, demand is so high that Bill already has certain new and exciting developments in the pipeline which will result in an even more efficient and faster rate of production. However, I cannot (obviously) give commercial secrets away by divulging this information. Bill will, undoubtedly, "tell all" when the time is right.

For those not familiar with Carp Cookery, Newhay Fisheries distribute a collection of 20 recipes compiled and translated by Irma Benkis. I was fortunate enough to be treated to Carp Soup during my visit and found it (to put it mildly) absolutely delicious.

The Table Carp part of Bill's business is, as he points out, no different to chicken, beef, sheep or (even) vegetable farming. It is designed to produce fish just for the table and not for the ornamental pond.

As far as ornamental fish are concerned, Newhay is involved in two major projects.

One of these arose from the desire to produce ornamental carp which would stand up even to our harshest winters. Therefore, such a fish should have the colour of a Koi and the hardiness of a Carp.

This is precisely what has been attempted as part of the induced breeding programme. By crossing a Newhay Carp with a Koi, large numbers of Half-Koi have been produced.

Although some were throw-backs to the original parents, most turned out to be interestingly "different". These fish are strong, vigorous and silver coloured. In some ways they look like deep-bodied Platinum Obgons or Gin Matsubas. They are quite beautiful and sturdy and are now approaching breeding size. The second generation is eagerly awaited since it is expected to result in combinations of colour and body shape approximating Bill's original target. If this is the case, then it will not be long before we can buy hardy, UK-bred Koi from Newhay.

The second ornamental carp project involves the growing on of fry bred at Warburton's from Japanese Koi stock imported some years ago. These fingerlings are brought to Newhay as soon as the weather permits and are grown in outdoor ponds where they are then allowed to overwinter. The result of this treatment is that second-year fish are very hardy and, therefore, suitable for most garden ponds (assuming, of course, that the water depth is sufficient).

I can personally vouch for the hardiness of these fish (which Bill is not claiming to equal Show Koi from Japan in either pedigree or price) on two counts:

1. During my first visit to Newhay on a bitterly cold day in March, we fished out some Koi which were overwintering in one of Bill's outside ponds and found them to be both highly colourful and extremely healthy.
2. Last summer I bought some young Koi, put them into my own pond and left them there throughout the winter. Every one survived in a

water depth of about 30 inches perfectly well. It was only after visiting Newhay that I traced back my Koi to their source via a series of investigations. Yes, you've guessed it, my dealer (Belton Fish Farm in Yorkshire) had originally obtained his stock from Bill Michaels. Therefore, without knowing it, I had actually "tested" out Bill's fish in my pond.



Young overwintered Koi

There is a great deal more that could be said about Bill Michaels and his work. However, space dictates otherwise. Nevertheless, I would like to mention two more points of interest.

The first is that the original Treble-Action Filter-Aerator has been adapted by Bill to filter his huge Carp/Koi ponds at Newhay. Although the principle remains the same, these pond filters are jumbo-sized. Each is supplied by its own oil-free, electrical compressor and airline and is available for use in fish farms, ornamental ponds and waste treatment lagoons.

During my visit, I asked Bill how he kept a check on the quality of his water. When he showed me his test kit, it turned out to be one that I had heard and read about (and knew by reputation) but had only seen in research laboratories. These kits (Merck) are only available from Newhay, which explains their general unavailability in shops. They are not cheap but these Portable Water Test Kits cover the full range of tests required for ponds and aquaria "under one roof", as it were.

If you would like to know more about Newhay Fisheries, its Carp, Half-Koi and Koi, its Treble-Action Filter-Aerators or the Merck Water Test Kits, please contact Bill Michaels at Newhay Lodge, Cliffe, Selby, Yorkshire YO8 7P1. Tel. No. (0757) 638383.

John A. Dawes



SPOTLIGHT

IT is not easy to find mention of this New World characin in the literature of our hobby. Nevertheless, its initial introduction into dealers' tanks took place in Germany (probably Hamburg) in 1931. It is reasonable to believe that it turned up in this country not more than a few months or, perhaps no more than a year, later.

Incidentally, when the fish was first placed on the market, that is over here, not a few people in and out of the trade mistakenly believed it to be a species of *Hasemanina* or *Phoxinopsis*. It is difficult to understand why the error arose; for *H. rodwayi* had been described for science by Durbin quite a few years before the outbreak of World War I, in 1909 to be precise.

Be all this as it may, the characin's correct scientific name was made clear to readers of *Water Life* (1936-1939) in the issue dated 19 July 1938. It had been identified for the indefatigable Miss Margery Elwin (the then acting editor of this reliably informative journal) by Dr. E. Trewavas of the British Museum (Natural History).

Rodway's Tetra is native to the freshwaters of Guyana and undefined areas of north-eastern Brazil. It grows to a length of 1½ in. and more and has, in general, the contours (rather compressed) and outline of most of our more long-bodied popular community tetras.

In a satisfactory environment, and under a bright light, the colour is dark olive-green or mossy brown on the back, shading down on the sides to a blue-tinged greenish silver, showing patches of mirror-like areas of gold. The underparts are silvery white. A narrow stripe, green to greenish gold anteriorly and darkening to bluey green posteriorly, extends from about the

RODWAY'S TETRA

(*Hemigramus rodwayi*)

by Jack Hems

middle of the body to the caudal base, where it expands onto the fin and assumes the form of a dusky arrow-shaped marking, splashed with gold above and below. From this pretty marking a black line continues as far as the fork. The major portions of the lobes are reddish merging into pale translucent blue. The tips of the lobes are ivory white. Frequently, however, this touch of white is blurred or indistinct. The dorsal and anal fins are tinged with pink or rosy red. The first rays are white.

The male and the female are much alike in appearance except when they are in breeding condition. At this time, the male enhances his colours and, under the stress of sexual excitement, dashes about with increased vigour. In or out of breeding condition, a well-developed female displays a fuller abdomen than that of the male.

The main requirements of this splendid looking little fish are a roomy aquarium, furnished with a dense background of plants along the rear and both ends, and a soft neutral to acidic (within reason) water. A temperature of around 72°F (22°C) to 75°F (24°C) suits the species well. A temporary fall to the upper sixties (°F) or a rise

to the low eighties (°F) will have no ill effect. All changes in temperature, however, should be very gradual. It cannot be over-emphasised that, abrupt changes of temperature are dangerous to fish.

It is not the habit of *H. rodwayi* to be still: it is always on the go and swims, as a rule, in the middle and upper levels of the water. It takes any live, dried or fresh food small enough to be swallowed: the fish is not possessed of a large mouth. *H. rodwayi* does not molest other fishes. Hence it makes an admirable addition (taking everything together) to a community tank provided its companions are as inoffensive and about the same size as itself. It is a shoaling fish by nature and a dozen or more swimming to and fro in a well furnished and well illuminated tank makes an impressive and highly pleasing sight.

We are not ignorant of its breeding habits, but detailed accounts of spawnings have not come my way, though I do possess a huge collection of aquarium literature. We do know, however, that the fish spawn in the typical characin fashion, depositing eggs on fine-foliaged plants during the momentary pauses which occur between frenzied drives. The male does the driving. Altogether, then, there appears to be nothing very special about breeding *H. rodwayi*, apart from selecting likely looking fish (both fish in good colour and the female showing fuller-than-usual sides) and introducing them (preferably late at night) into a clean tank stocked with tied bunches of mossy or needle-foliaged plants and, of course, the right type of water. It seems hardly necessary to say that, after the fish have been put into the tank set aside for



spawning, the temperature should be raised a few degrees above normal. Prior to moving the fish into the breeding tank, special attention should be paid to their

diet. Live food should be given as often as possible. If egg-laying takes place, the fry (after the free-swimming stage has been reached) should be fed generously on infusorians and, as they increase in size, large live foods and powdered flake.

Back in the middle 1930s, Charles Schiller, a London dealer and enthusiastic fishkeeper, spawned *H. rodwayi* on several occasions soon after its debut in England. Accord-

ing to Mr. Schiller, the fry were neither difficult to raise nor were they molested by their parents. All this, however, in a large tank thickly stocked with plants.

For all that, I think that all parent fish, excepting those which instinctively protect their eggs against molestation, and care for their fry, should be removed from the breeding tank immediately egg-laying is over. It is better to be safe than sorry.

CROSSWORD

by Isis



CLUES

Across

1. R in ticket seller for freshwater fish (5)
6. F in appropriate for most aquarium fish (8)
7. Develop (6)
9. R in neckwear for layer (4)
10. Such as *Tropheus*? (4, 4, 4)
12. I about "Camera" for Continent (5, 7)
16. R in affirmative for date (4)
17. Fish catches for skin divers (8)
18. Pond scavenger (3, 5)
19. Stage essential aquarium component (5)

Down

2. Killifish (8)
3. Feeds on Maer gives Lake Enderman (2, 6, 4)
4. Generic term for *Aequidens* (8)
5. Useful cichlid spawning site? (5)
6. Rainbow genus (12)
8. Mitefish (4)
11. Car sheet for square measures (8)
13. Respiratory gas (6)
14. Unusual (4)
15. Blood vessel (5)

Solution on page 48



Coldwater Jottings

by Frank W Orme

THE next two or three months will find some newcomers to coldwater fishkeeping worrying about the well-being of their pets; will they survive while the owner is away enjoying a holiday; who will look after them? Any such fears can be dismissed if adequate attention is given to the fish, prior to departing for the annual break from daily routine.

Koi, in large pools, should be quite safe although, perhaps, some form of protection against would-be predators could add to the general peace of mind. Smaller pools, such as goldfish are usually kept in, can be protected by having a small-mesh net stretched above the water surface. This will give some protection from cats and birds which might otherwise enjoy a fishing expedition to the pool. Apart from this it is only necessary to ensure that the water level is topped up if there has been any noticeable evaporation due to high temperatures.

Aquariums should be given a clean and part of the water changed a few days before departing from home; this will ensure that the best conditions are provided for the well-being of the fish. Any algae that is growing on the walls of the aquarium can be left to provide an area upon which the fish can browse if they wish. Provided the fish have been well fed beforehand, and are not overcrowded, they should then be perfectly safe to be left unattended for one or two weeks. Healthy, well-fed fish in clean quarters can go for a surprisingly long time without attention.

Often, inviting a well meaning friend or relative to look after the fish can do more harm than anticipated. We have all heard the tales of woe, of people who have enjoyed a holiday only to find that upon their return the aquarium is a stinking mess of

foul water and dead or dying fish—due to an indulgent caretaker over-feeding and thereby polluting the aquarium with uneaten food.

If any reader is worried about leaving the fish unattended, my advice is to ensure that the fish are in good condition, well fed and in clean, healthy quarters, you can then depart for your holiday in the knowledge that apart from some unforeseen problem you will return to find your pets all alive and active—indeed the aquarium and its inhabitants may even appear to be in a better condition. For the benefit of the plantlife it is a simple matter to fit a timeswitch to control the lights. This may also help to protect the home from any would-be human trespasser who, seeing a light reflected through a window, could decide against risking an entry.

As always Stapeley Water Gardens illustrate a host of 'goodies' in their 1984 catalogue. There is everything from weathervanes to pond liners, pumps, plants, fountains, lighting, ornaments, fish and so on. Profusely illustrated in colour and black and white, it contains plenty of 'how-to-do-it' information together with comprehensive descriptions of the numerous products which they offer. In fact, at a cost of 25p, most aquarists will find something of interest within its 55 A.4 size pages. Situated on the A.51 at Nantwich, in Cheshire, this Centre has parking for 2,000 cars

and makes an ideal visiting place for a day out with the family. There it is possible to see examples of various pool designs, general gardening and water gardening plants and equipment. There are also large fish-houses displaying over 200 tropical fish tanks and up to 20,000 coldwater fish. Here is a Water Garden which is well worth a visit but if that is not possible send for their catalogue—it is good value—write to Stapeley Water Gardens Stapeley, Nantwich, Cheshire CW5 7LH.

Just one mile from the M.42 at Monkspath, and eight miles south of Birmingham, lies Shirley Aquatics on the Stratford Road at Shirley. This well known centre has been greatly enlarged in recent times to provide very spacious, fully glazed glasshouses in which is displayed almost everything that even the most experienced fishkeeper might require. Aquariums alone or in cabinets, pumps in variety, pools and liners, books, foods, plants galore, marine and freshwater fishes—both tropical and cold-water—and all those thousand-and-one other items which you would expect to find. Passing through the carpeted reception area to the glazed display houses and on to the grounds beyond, visitors will find the large display

Continued on page 45

Netting stretched out over a small pond—an effective anti-predator measure



ON THE TEST BENCH

by Ian Sellick

Do you ever wonder why you could get aquatic plants to grow prolifically in that old rusty angle iron aquarium, but have had no success since switching to a modern all-glass one? The answer could be a lack of iron in the water, traces of which are necessary for successful plant growth. Now available in this country is the Sera test kit for iron content of tap and aquarium water—the "Sera Eisen-Test".

The test kit supplied consists of a clear plastic stoppered vial, graduated in 5 millilitre divisions to 20 ml, and a plastic dropper bottle containing enough reagent for (it is claimed) 130 tests. A printed colour scale graduated from 0 to 2 milligrams per litre (mg/l = parts per million—ppm) is supplied, the steps shown being 0, 0.25, 0.5, 1 and 2 ppm iron.

The test is easily carried out; 5 ml of the water to be tested is taken, and three drops of the reagent added. After shaking, the solution is stood for 3 minutes and the colour compared with the chart.

Simple in theory, how does the test stand up in practice? A sample of tapwater deliberately drawn from a supply known to be fed by iron pipes was tried, and no colour was observed (the pipes have probably long since furred up). Therefore, in order to see the accuracy of the test, a number of artificial waters were prepared containing 0.5, 1.0 and 2.0 ppm of iron. The total hardness of the water was 100 ppm, and the pH 6.5. With the benefit of several test vials available, all the determinations were made simultaneously to be able to compare the colours with one another as well as with the printed colour scale.



All three waters gave a clear violet reaction that varied in intensity according to concentration. However, while it was easy to tell one from another, I found it very difficult when the vials were taken one at a time to accurately match them to the colour scale. The colours in the vial are much clearer than you would expect from looking at the chart. On the chart, 0.5 ppm appears rather salmony in colour, whereas in reality a distinct violet was found. Probably with practice, an 'eye' for the depth of colour could be gained, but, although it would add considerably to the expense, a colour wheel with permanent standards would be much easier.

In water, particularly ones with organic acids leached from, for instance peat and bogwood, iron tends to form complexes with the tannins. Therefore to see if this affected the test, tannic acid was added to the waters as above. No difference was found at any normal concentration, showing that

there is no interference with the test from this source. This is as expected, as judging by the smell of the test reagent (which some people might find a little disconcerting), the standard reagent for iron, thioglycolic acid is used to break the organic iron complexes, reduce the test pH to the appropriate level (pH 3.8) and convert the iron to the reduced form (Fe^{2+}), before it can react with the colorant, which I suspect is 'FerroSpectral'.

With the slight misgivings about the colour chart, this I think is a useful test for the aquarium plant grower. As of the time of writing I have no information on whether Sera's iron additive 'Florena' is available, but it ought to be as one without the other is useless.

According to the instruction sheet, 1 ppm of iron is ideal for optimal plant condition, less than this and an iron supplement should be added; however, above this limit, and both fish and plants will suffer.

The test costs just over three pounds, or about 2½p per determination.

Copper is an important element to monitor, both in freshwater and, particularly, in sea water. Unfortunately, I was not too impressed with the Sera test at the sort of levels where copper becomes toxic; the test really isn't sensitive enough. As with the iron test, colours are developed in a plastic graduated vial and compared with a colour chart. The chart is graduated 0, 0.3, 0.5, 1.0 and 2.5 mg/l (= ppm) copper.

The test is again easy to perform; 10 ml of water are taken, and seven drops of each of two test reagents added, the vial is shaken and the colour compared straight away. Accuracy was determined by preparing 100 ppm total hardness water at 6.5 pH containing copper exactly equivalent to the colour chart graduations. While I could readily distinguish and compare with the chart the 2.5 ppm level (a bright yellow colour), without the benefit of simultaneous determinations, it was quite difficult to exactly match the lower concentrations, and virtually impossible to distinguish the 0.3 ppm and 0.5 ppm test solutions. This is where the test falls down, as about 0.3 ppm copper is the ideal concentration for combating *Oodinium*

and like protozoal afflictions; 0.5 ppm and higher represents the level at which the fish start to suffer. Marine invertebrates of course are generally intolerant of copper at any concentration. It should be said that even at 0.3 ppm the presence of copper could be determined readily by the slight yellowing of the test solution, but that is all.

Again a colour wheel may well help in distinguishing these lower levels, but I think a slightly modified test is really required. The Sera test I suspect relies on the reaction of copper, when buffered at pH 5.5 with hydrochloric acid—sodium acetate mixture, with cuprethol to give a yellow colour. This system is fine where an accurate method of detecting the yellowing is available, but generally for test kits, yellows, especially pale yellows, are the most difficult to see. It is not always practicable, when the test needs to be done, to find a suitable source of north light! Most aquarists tend to have to rely on fluorescent light, or other artificial sources, which in themselves give a yellow cast. I think a preferable colour would be blue such as copper gives with *his-cyclohexanone-oxalylidihydrazone* (sorry!!) in alkaline

medium. This reagent is also more amenable to determination in the 0.1—0.4 ppm range.

At just over £3, the test kit will allow 50—60 determinations; 5—6p a time being a small price to pay if you can distinguish shades of pale yellow!

Chlorine is added, in relatively small amounts, to tap water in order to kill micro-organisms and render it fit for human consumption. However, the level at which we may tolerate it can prove harmful to fish. Ideally, all new water should be treated well before use to drive off free chlorine and a proprietary dechlorinator is often beneficial (especially as these usually nowadays contain chelating agents to bind and effectively remove metals such as copper). However, it is useful to know that your water is heavily chlorinated, even if you can't smell it! Chlorine in tap water is usually present as one or other of the chloramines, and there are a number of tests that detect free chlorine and chloramines. The Sera chlorine test is really a presence or absence one, although it could be adapted to a quantitative one if required.

Twenty millilitres of water is taken and 6 drops of the reagent added. Any

yellow colour generated indicates the presence of chlorine. According to Sera, the yellow colour is generated by as little as 0.02 ppm. On test, most tap water samples I tried contained some free chlorine. Total chloride in these samples was about 10 ppm (silver nitrate-ammonium thiocyanate titration), the low amount of yellow produced by the Sera test on the same water indicating that the test is specific to chlorine. This was further tested by doping tap water with both sodium chloride and hydrochloric acid; no further colour was found.

While the test kit is useful as a guide to chlorine content of fresh tap water, it has another very useful purpose, and this is as a test for bleach. This might seem a bit obscure on first sight, but bleach is widely used by aquarists as a cleaner. If you soak corals or other aquarium ornaments in bleach to clean them, testing the water you wash them off which will tell you rapidly whether all the bleach has gone, thus removing one possible worry.

The Sera Chlorine test will last for about 60 determinations and is priced at about £2.

Coldwater Jottings

Continued from page 43

pools containing many different types of coldwater fishes. In particular there is a large ornamental pool in which can be seen many fine large good quality Koi. Under the able and friendly management of Tony Wiltshire and his assistants, this is another Centre which is well worth visiting.

In the May issue of this magazine I devoted this column to a plea for more coldwater fish societies to be formed, and suggested ways of forming such a group. However, for the benefit of those who do not feel capable of such a venture, or would prefer to join an established society, I give the following details of the existing groups. The people men-

tioned will give full details of their activities, subscription rates, meeting times and venues, together with any other relevant information, in return for a stamped and self-addressed envelope.

British Koi-Keepers Society. Membership Secretary, 35 Copplebridge Drive, Crumpsall, Manchester.

Yorkshire Koi Society. Mr. B. Liddle, 23 Keswick Drive, Ferry Fryston, Castleford, West Yorkshire.

Bristol Aquarist's Society. Mr. V. Capaldi, 7a Walsingham Road, St. Andrews, Bristol.

Goldfish Society of Great Britain. Mr. A. C. Barnes, 10 Lower Forlington Road, Forlington, Portsmouth, Hampshire.

Northern Goldfish & Pondkeepers Society. Mrs. P. Hodgkinson, 9 Stratford Close, Farnworth, Bolton, Lancashire.

Association of Midland Goldfish

Keepers. Miss E. J. Edmunds, 71 Booths Lane North, Boothville, Northampton NN3 2JH.

South Park Aquatic (Study) Society. Mrs. M. Dudley, 163 South Park Road, Wimbledon, London SW19 8RX.

Northumbrian Coldwater Fish & Pondkeepers Society. Mr. J. English, c/o. Henderson Filters, Throckley, Newcastle upon Tyne.

Many, but not all, of the above societies produce Newsletters or Magazines and I should like to finish this month by sincerely thanking those organisations which so very kindly send me copies, especially the B.K.K.S., and Y.K.S., who have consistently sent their monthly magazines for some years past. And remember, when writing to any of the above people for details of their society, do have the courtesy to enclose a stamped self-addressed envelope.

WHAT IS YOUR OPINION?



by B. Whiteside,
B.A., A.C.P.
'Photographs by the Author'

JUST BEFORE EASTER I visited London for a few days and was delighted by the mild, warm, sunny weather. It seemed a shame to spend large sums of money to see 'Guys and Dolls' at the National Theatre, John Ogden at the Barbican, Lloyd-Webber's latest spectacular 'Starlight Express' at the Apollo, Victoria, and the superb Shirley McClean and Jack Nicholson in the mediocre Oscar-winner 'Terms of Endearment.' As usual, I visited Ron Baldry and his wife Lily in the East End—and was treated like a lord. Some photographs of Ron and his fish appear below. It's now the second week in May and the sun is still roasting down. I've never seen cherry trees in finer flower.

"I have just read with interest the May issue of *What is Your Opinion?* Two items in particular caught my attention," writes Mr. Alan W. Davis.

"First was the question: 'Have you ever lost interest in fish?' I have also kept fish since the age of five, and now being thirty nine, and never having been without them, I can also claim a long-lasting and permanent interest. My interest was further stimulated about two years ago by a friend of mine who introduced me to the wide variety of livebearers available—not in the shops, but through the specialist society, S.L.A.G. I became more than a little interested, and now have some

twenty one species of livebearer. Further interest came into my hobby about four months ago with the addition of a fish house. A dream come true, you might say; it was something I had really needed for a long time. My lounge and the space beneath the staircase where I had previously kept my fish were well overcrowded, and there was nowhere else to put fish except maybe in the bath. The spaces now house four foot tanks down to eighteen inch tanks, thirty eight in all.

"Having the fishhouse has also enabled me to use the six foot tank in my lounge for its original purpose, a purely decorative tank. It had previously been separated into three to house various species of livebearer, but now has been stripped down and rebuilt as a community tank for them. It has enabled me to renew my interest in aquatic plants, something I had let slip for the sake of keeping my tanks functional rather than pretty. However, I have now been able to take a long look once again at the lists of plants available, and very impressive some of them are; but equally, most disappointing most of them are. There are so many beautiful plants available to the aquarist if only someone could supply them. Most of the plant farms seem to go no further than Gabomba

and water wisteria. Where does one go to get good quality plants that are a little unusual?

"On the subject of plants and under-gravel filters, I once conducted an experiment to find out exactly what difference it made having undergravel filters under plants. I split a four foot tank into three by sealing a two inch deep partition across the base, back to front, in two places. In the centre section I put an undergravel filter, and in the two end sections I put Arthur Bowers compost covered with a fine net, and then the normal gravel right over the whole tank. Every time I purchased plants I made sure I got 3, 6, or 9, etc, of each variety so that the same number could go into each section. Over the first couple of months the sections with the compost in were slightly ahead in growth over the centre section with the u/g filter in. But in the long term it made no appreciable difference at all. All three sections of the tank grew just as well as each other. So, so much for the idea of not being able to get good plant growth if you use u/g filters.

"On the subject of sucking loaches, I give up. I always liked to keep a small sucking loach in my fry tanks to keep the glass clean, but the darned things always seem to grow so quickly on me that I am forever trying to give them away, and being greeted with 'NO THANKS!' Nobody wants a large

Ron Baldry in a flashlit photo beside his outdoor pond—April 1984





Some of Ron Baldry's young shubunkins, born last summer

sucking loach; they are very destructive, dashing round throwing gravel everywhere and uncovering the filter plates.

"My most recent addition to the hobby is to try photographing my fish. I did a lot of photography many years ago, and am now trying to renew my skills, to keep a photographic record as well as a written one. I am currently waiting for the first batch of pictures to come back from the printers. I dread to think what they will look like.

"Well I reckon that's just about my lot for now. That just about tells my tale—apart from saying that I also build all my own tanks, and I also design my own livebearer breeding traps—using a system of water flow to separate the fry from mother; and also a small tank to trap a fish and keep it still while photographing it. I think I have told you all there is to know about my version of fishkeeping as a hobby.

"My introduction to fishkeeping was originally as a remedy for being exceedingly nervous as a child: the idea was to make me relax. It worked then and has always remained for me the most relaxing and enjoyable hobby imaginable." Mr. Davis lives at 5 Star Close, Bentley, Walsall, West Midlands, WS2 0LU.

Master J. A. Stonehouse does not give his Christian name but he is 14 years old and resides at 6 Golfside Close, Traps Lane, New Malden, Surrey. He writes: "While reading your article I was delighted to see you

call the threadfin butterflyfish a beautiful fish and ask for any comments on it. I am 14 and have been keeping fish for about 18 months. For four months I had in my possession a threadfin butterfly. I found this an easy fish to keep. I kept it in a 20 gallon tank—complete with sand and coral—with four other fish: a regal tang, a clown wrasse, a common clown and a pygmy angel. I am sure my success with this fish was due to very careful 'climatisation' over a period of three hours. When the fish finally entered the tank it shuddered and swam around all night. It is easy to tell when this fish is in stress: it raises its dorsal spines over its head, puts out its gills and turns a nasty grey colour. Its diagonal stripes become very blurred.

"I found this fish bold, but sensitive to noise. I learned to watch the t.v. with the sound turned low. The slightest noise made it shudder. It was a voracious eater, quickly devouring *Mysis*, etc. It's a good bottom feeder fanning up any fallen shrimps with its large pectoral fins. I found that a 10% water change a week kept the water to its liking. Never use water from the hot water tank in case you have copper piping.

"Its death came about because of an unfortunate accident. I was pleased with my success with this fish and decided to buy another butterfly—the wonderful copperband. The second day I had the copperband, my friend saw it. His reaction was: 'You've got a new fish!' He then stamped up to the tank and pointed it out to me. The fish's reaction was to dart blindly into a rock where it chipped off a couple of scales. Two days later it developed a nasty fungal infection on the side where it had damaged its scales. I started using Myxazine, but later switched to Sterazin. That was my mistake. Myxazine would have cured it, whereas Sterazin is meant for parasitic infections. A week later it died. I took it immediately to my local dealer, at Lynwood fish house. As before he couldn't diagnose from my descriptions. He now told me to switch to Myxazine—but it was too late. The next day my

threadfin developed an infection in its head. The day after it died. I am sure it would still be alive today if it had not been for its infection. The ironic part of it was that I had just weaned it onto flake foods.

"I include in my letter a couple of hints. If you want to breed clowns then use serbae, chocolate clowns, not the common clown, because the common clown fry are prone to protein-induced wipeouts.

"If you use Trulite tubes then add a Gro-Lux tube to make up the missing red. Your lighting will now be even closer to natural sunlight. Also, do not use cover glasses with Trulite because the glass will filter out any ultra violet light—which is beneficial to invertebrates and algae. I should be pleased if you could just mention the fact that I collect old aquarium magazines and if anyone wants to relieve himself of a few, please drop me a line. P.S. Clowns like to breed in at least 24 in. deep tanks. Your article is my favourite: please don't stop."

Master Stonehouse's letter was most interesting—but it's a pity he did not include his first name. It's much less formal if I am able to refer to younger readers by their Christian first names—as I do with all my pupils. It's useful if readers also mention their age in letters—not necessarily for publication—because I like to include letters from both adults and teenagers; and, naturally, some readers give more credence to comments from adults than they do to opinions from youngsters. I try to keep an open mind; for example, many years ago I tried various combinations of Trulite and Gro-Lux and tungsten bulbs—to mention but a few—and I finally settled for the cheapest tungsten bulbs; however, all my tanks are freshwater and not marine—and all have cover glasses and, with one exception, support forests of plants. I have yet to work out why a 24 in. tank housing eight angels seems unable to encourage plant growth—other than brownish algae. Indian fern, which swamps other tanks, covering the surface, disappears quite quickly in my angel tank. Perhaps the angels

cat it. Java fern, that grows quite well and at a reasonable rate in other tanks, remains stationary and gets coated in brown algae in my angel tank. Perhaps a little more light would help. Incidentally, I hope I have correctly spelt the names of the cures Master Stonehouse mentioned; I do not know the products.

Earlier this week I had to take my dog to the local vet; and while I was at the vet's surgery he asked me to recommend a book on fish diseases. I have only one such book—*Aquarium Fish Diseases*, by Dr. Rolf Geisler, published by T.F.N. in 1963. It's now 21 years old and, no doubt, has been followed by numbers of more up-to-date publications. Please send me details of any books about fish diseases that would be useful to a vet. The reality is that none of my fish would cost more than a few pounds to buy new; the most valuable are two adult clown loaches. The others, with the exception of my angels, are probably only worth pence, e.g. guppies, neons, cardinals, cherry barbs. I should imagine that most cures now cost more than, say, a young neon. Yes/no? My vet diagnosed a gum infection in my dog and supplied some antibiotic tablets. The visit cost £5. My dog is worth £5 to me because it is unique; but any of my adult neons or cardinals look the same as any of my other neons or cardinals. If one were ill and I were unable to diagnose the disease, it would be cheaper for me to buy a new fish than begin to search for cures. A visit to a vet would be too expensive—and I should imagine that the average vet is not an expert in fish diseases. Have you any comments to make or experiences to relate? I'm not certain, but I think that a vet must treat an ill animal, e.g. a fish, if it is presented to him. Does anyone reading this know if my comment is correct—as applied to Members of the Royal College of Veterinary Surgeons?

Mr. Roy Chaplin, B.Sc. (Hons.), O.B.E., who lives at Street Farm Cottage, Park Street, Charlton, Malmesbury, Wiltshire, was the man behind the Hurricane before and during the Second World War, and he was



Apistogramma ramirezi—young ram

Chief Designer at H. G. Hawker Engineering Co. Ltd. between 1958 and 1962 when the P1127, the prototype of the Harrier, was conceived. Mr. Chaplin has a delightful collection of fishy tales. He tells of a shoal of minnows: "... We had (them) in our large aquarium just before the First World War. We caught them in the River Thames on a hook and line made by my father. He made some tiny hooks by bending up the tip of a pin. In those days most pins were made of plated brass. Pins today all seem to be of steel and cannot be bent to a small radius. Of course, there was no barb to this hook—but I don't remember losing many fish. These pins were shortened, of course, and attached to a 'trace' made by plaiting hairs from my mother's head. As far as I can remember this was bound onto the pin with another hair using a home-made adhesive—probably shellac-based, as in those days there was no comprehensive range of adhesives as there is today." I hope to recount more of Mr. Chaplin's fishy tales in another issue.

Photograph 1 shows Ron Baldry in a flashlit photograph beside his garden pond. Note how the pond plants were cut down to promote fresh growth. Photograph 2 shows some of Ron's young shubunkins, born last summer, in a tank in his fish house. Photograph 3 is of a young ram. Please send me

details of your experiences with rams. I'd also like your opinions on (a) unusual livebearers; (b) breeding catfishes; (c) cultivating species of Amazon swords; (d) flake foods; and (e) holiday care of aquariums. I hope you'll write to me. Good-bye until next month.

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Solution from page 42

- | | |
|--------------------|-------------------|
| Across: | Down: |
| 1. Trout | 2. Rivulina |
| 6. Tropical | 3. No Scream Fish |
| 7. Eel-like | 4. Acara |
| 9. Tetra | 5. Slate |
| 10. Rift Lake Fish | 6. Tetrameterina |
| 12. South America | 8. Lion |
| 15. Year | 11. Hoctars |
| 17. Spoons | 13. Oxygen |
| 18. The Tenth | 14. Race |
| 19. Glass | 15. Aorta |



of the Aquarium

Eleotridae

THE Eleotridae constitute a Family of marine, brackish and freshwater fish, known as Sleepers or Sleeper Gobies, found in most tropical and sub-tropical areas.

Together with the Gobiidae (Gobies), Rhyacichthyidae (Loach Gobies), Kraemeriidae (Sandfishes or Sand Gobies), Gobioididae (Eel-like Gobies), Trypauchenidae (Burrowing Gobies) and Microdesmidae (Wormfishes), they form the Suborder Gobioidi (the Goby-like Fishes) which are represented by about 234 genera and 1010 or so species.

Superficially, the Eleotridae and Gobiidae are quite similar. However, there are a few distinguishing characteristics which make correct identification straightforward. Perhaps the most distinctive feature is the structure of the pelvic fins. In Sleeper Gobies,

these are separate, i.e. they do not form a sucking disc. In Gobies, these tend to be united.

Although this feature is quite variable, even those Gobies which possess largely separate pelvic fins still have a membrane joining the fin bases.

In Sleepers, the distance between the last ray of the second dorsal fin and the origin of the caudal fin is longer than the length of the base of the second dorsal fin. In Gobies, this caudal peduncular area is shorter.

Whereas no Sleepers have downturned mouths, many Gobies do.



Dormitator sp. caught in Mexico

Filefishes



generalised diagram of a filefish

THE Filefishes or Leatherjackets are most interesting fishes belonging to the Subfamily Monacanthinae. With their closely related Subfamily, the Balistinae (the Triggerfishes—see A-Z, June 1983), they constitute the Family Balistidae. The Balistidae, in turn, along with the Triacanthidae (Triple-spines), Triacanthodidae (Spinefishes) and Ostraciontidae (Box or Trunkfishes—see A-Z, April 1983) constitute the Suborder Balistoidei. These are distinguished from their most closely related Suborder, the Tetraodontoidei (including the Puffers—A-Z, November 1983), by the possession of jaws with distinct teeth, i.e. not fused.

The above classification is that of Nelson (1976)—Fishes of the World, and differs from that given in many aquarium books which give the Filefishes and Triggerfishes the status of Family (Monacanthidae and Balistidae respectively).

Filefishes can be easily distinguished from Triggerfishes by the following characteristics:

Filefishes

1. One or two dorsal spines.
2. Soft parts of dorsal, anal and pelvic fins have simple rays.
3. Scales, small and not in regular series.
4. Upper jaw usually has six teeth in the outer series and four in the inner one.
5. Body, prickly, "furry" or leathery to the touch.

There are about 40 genera of Sleeper Gobies with a total of around 150 species. These include, at least, three blind species, i.e. two species of *Typhleotris*, a cave dweller from Madagascar, and one species of *Milyeringa*, found in artesian wells in Western Australia (information kindly supplied by Dr. Peter Miller of the Zoology Department, Bristol University).

Recent years have seen a welcome increase in the number of Sleeper Gobies which have become available to hobbyists. Of these, the most common are species of *Carassioptis* (Australian Sleepers), *Dormitator* (from Central America), *Eleotris* (mostly from Africa), and *Hypseleotris* (from Indonesia).

One species, *D. maculatus*, can, reportedly, grow to 2 ft. (60 cm.) in length. This, added to the predatory habits of most Sleepers, hardly makes Eleotrids suitable community fish (*Hypseleotris* is an exception). Nevertheless, they are both beautiful and interesting and are well worth keeping in a species tank or with other robust, medium-sized fish.

The most common species of these fascinating but somewhat difficult fish available in the hobby are the Common Filefish (*Cantherhines sandwichiensis*), the Orange-spotted or Longnosed Filefish (*Oxymonacanthus longirostris*), the Fantailed Filefish (*Paravogor spilostoma*) and the Tasseled Filefish (*Monacanthus spinosissimus*).

Triggerfishes

- Three dorsal spines.
- Soft parts of dorsal, anal and pelvic fins have branched rays.
- Scales, platelike and in regular series.
- Upper jaw usually has eight teeth in the outer series and six in the inner one.
- Body not prickly, "furry" or leathery to the touch.

Endangered species



Skiffia francesae (Photo courtesy of AQUARIAN FISH FOODS)

ALTHOUGH we often hear about the precarious state in the wild of species like the Giant Panda, the Blue Whale, the Siberian Tiger and the Mountain Gorilla, little (if anything) is ever heard about the numerous species of fish facing a similar fate.

This is a great shame on many counts. For example, a good number of these species can be easily maintained and bred in aquaria. Therefore, carefully monitored breeding programmes could ensure the survival of, at least, some before it is too late. After all, once a species becomes extinct, it is gone forever.

One of the first problems encountered is actually knowing which species are in danger of extinction. A second problem is obtaining specimens of these species.

The first is easily overcome by obtaining a copy of the Red Data Book, Volume 4 (Fishes) from the International Union for the Conservation of Nature and Natural Resources, 1110 Morges, Switzerland.

The second is often difficult (and sometimes impossible) to overcome. Some specialist Societies do, however, have breeding programmes for endangered species and anyone wishing to know more should contact one or other of these organisations.

The list of species featured in the current (1977) edition of the Red Data Book makes sad reading. There are no less than 194 citations and the signs are that the next edition will carry even more.

Many of the species listed are out of the scope of aquarists. For example, who could possibly accommodate and breed the massive Amazonian Arapaima (*Arapaima gigas*)? Nevertheless, some

others can be (and are being) bred by aquarists. Among these are, somewhat surprisingly, the Ruby Barb (*Barbus nigrofasciatus*) which is endangered in the wild through deforestation, oil pollution and soil erosion. A similar fate is being experienced by the Cuming's Barb (*B. cumingi*). *Skiffia francesae* is actually believed to be extinct in the wild as a result of the introduction of Red Platies (*Xiphophorus maculatus*) but is being maintained in USA, West Germany and UK by specialist aquarists. Other species known within the hobby and facing a greater or lesser level of danger include the Cherry Barb (*B. titteya*), the Blind Cave Fish (*Atyponax mexicanus*), the Brasilia Lyrefin (*Cynolebias boltoni*) and the Combtail (*Balonitina signata*).



Barbus titteya (Photo courtesy of AQUARIAN FISH FOODS)

Filtration

MUCH has been said and written about the relative merits of the ever-expanding range of filters available to hobbyists today. It is not the purpose of this item to fuel the discussion further. Rather, it aims at providing a brief summary of the principles of filtration and types of filter, leaving the final decision up to the individual.

If conditions inside an aquarium can be maintained well within safety limits, causing no hardship to its plants and animals, then there is no real need for a filter at all. However, it is equally true to say that achieving this type of fine equilibrium is very difficult, hence the desirability of installing, at least, some form of filtration.

Basically, there are three types of filtration: mechanical, chemical and biological. Although they are mentioned separately here, they can (and often do) function simultaneously.

In mechanical filtration, water carrying suspended solid matter is passed

through a medium which traps the particles, thus physically removing them and allowing clear water to pass through. Suitable filter media used include, filter wool (not cotton wool), nylon floss, aquarium foam and diatomaceous powder.

Chemical filtration works on the principle of absorbing certain dissolved toxic wastes, e.g. ammonia, by means of a highly porous medium, such as activated charcoal or resins, e.g. zeolite.

Biological filtration relies on the action of bacteria which feed on the toxic waste products generated by the

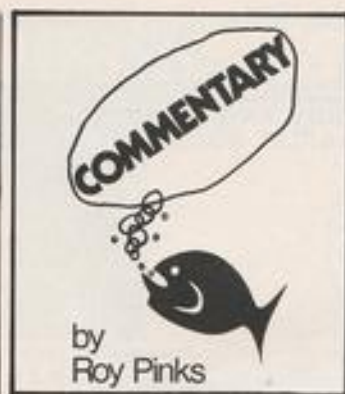


carp, including koi, produce large quantities of faeces, efficient filtration is therefore essential

tank inhabitants, converting them into harmless substances in the process. Rock chips (incorporated into a trickle-feed system), perforated foam and aquarium gravel are all suitable "biological" media.

Despite the huge range of sophistication and price that exists, most filters fall into one of the following categories:

1. *Box*: mainly used for mechanical and chemical filtration; may be internal or external; air or electrically driven.
2. *Sponge/Foam*: large mechanical, may be converted to biological; air or electrically driven.
3. *Undergravel*: mainly mechanical and biological; usually air driven.
4. *Reverse-flow*: mainly mechanical and biological; power driven.
5. *Power*: mechanical, chemical and/or biological; power driven; may be internal or external.
6. *Others include*: Powerheads, for, e.g. Reverse flow/undergravel; air-driven trickle-feed systems for mechanical, chemical and biological filtration.



WHEN a tropical fish fancier gets hooked on a particular species it is very difficult to dissuade him from what may, in fact, be a very unwise purchase. The commonest mistake is the inclusion of angels in mixed collections, but the following—by no means an exhaustive list—are almost certain to cause difficulties: Halfbeaks, Swordtails, Tiger Barbs, Red Tailed Tetras, *Moombasia sancta filomenae*, Congo Tetras, Penguins, Bettas and some of the larger gouramies. Shortcomings vary as between physical assault on other fish, especially fin nipping, and attacks on the tank environment, especially plants. You can add catfish and boxias to the list if you have concern for your tank floor, as many of these species dig around to such an extent that plants are uprooted and the substrate scattered all over the place. The last mentioned activity is particularly serious when loam and/or peat have been sandwiched between two layers of gravel to improve the prospects of growing plants. This is a technique which is becoming more and more popular, but it does suggest that due deference is paid to the ultimate occupants of the tank.

Information about the potential nasty habits of species should be sought from a variety of sources, and it is distinctly unsafe to rely on the unqualified opinion of individual writers, as few have actually kept all the fish they write about and often include information taken on trust from others whose experience happens to be incomplete. There's nothing dishonest about this, but it underlines the need,

where things are so inexact and variable, to expect the unexpected at all times. It should be recalled that many of the so-called peaceful fish can be very unlike their reputations in certain conditions. For example, just watch neons and pristellas scrap over apparently nothing, and I have recently noted that bleeding hearts can also be very touchy until they have settled to a new set of surroundings. It would only be fair to say that most of this tetchiness arises from temporary, probably stressful, conditions like pre-breeding or quarantine, and that when affairs have returned to normal the fish behave more in line with their good repute. Aggressiveness is a natural characteristic with whole families, such as the cichlids, and communal good behaviour is an exception, though not altogether a reliable one. So, with the cichlids and the like the buyer always beware if he has any sense. It is very much more unfortunate when the conscientious buyer who has read up his subject before purchase finds that one of half a dozen of a particular species turns out to be a positive horror.

Few aquarists would regard the Flame Fish as anything but a peaceful and decorative small tetra, but I can recall an individual some years ago



This female Snakeskin Gourami, *Trichogaster pectoralis*, shows extensive fin damage (mainly on the anal) caused by a male during spawning

which not only terrorized the others of its kind, but also any fish within striking distance, so that in the end it had to be removed. Had it been a Tiger Barb I would have understood readily! More recently I introduced four youngish Congo Tetras into a very well planted tank, and one finished up with badly nipped fins and all made such inroads into newly sprouting

plants that I had to deploy the quartet elsewhere. The case of the Congos was particularly puzzling since I can trace no record of their nasty taste for plants, though they have a poorish reputation for squabbling amongst themselves.

When a fish deviates from what is normally expected of it, it is termed a Rogue, and there are more about than is commonly supposed. It is a perfect nuisance to have to winkle out a rogue from a well ordered community tank, though some readers will have their pet methods as to how this may be done without completely wrecking the organization. Whilst a rogue may be totally unwelcome in a mixed collection it may be a godsend to an exhibitor, because such fish are usually physically and temperamentally far superior to their fellows and often take prizes on the show bench. From the exhibitor's point of view they are ideal for solo treatment in a small tank, where they may be conditioned and cosseted like the thoroughbreds they probably are.

If you do happen to acquire fish like these you will often find a member of the local club quite interested to buy them at no loss to yourself. At the same time I have found that most dealers are extremely co-operative in the matter, and will either exchange the fish for an equivalent or an alternative with a cash adjustment. But it is only fair to him to tell him exactly what the trouble is, as it will enable him to decide what to do with the fish when you have taken it back to the shop. The member of the odd 'dodgy' species will be returned to its fellows, but the true rogue may well be put in with other species able to stand up to it or segregated for sale to a known fancier of the species interested in exhibiting.

It is worth stressing that the worst result of rogue aggressiveness is fin nipping and bodily attack, particularly the former. Tail or fin rot can easily result from a protracted attack, leading to the death of the victim. This whole business certainly argues heavily in favour of suitable and lengthy quarantining during which period individual quirks should show themselves, and I will treat more thoroughly with this in some future notes.

Meet the Societies



DORCHESTER TROPICAL FISH SOCIETY



The D.T.F.S. logo



Discus

The D.T.F.S. was formed on 28 January 1977 from a nucleus of 16 aquarists. Before any coldwater enthusiasts from the area "switch off", let them be reassured that, despite the name, this Society caters for both tropical and coldwater hobbyists. The apparent contradiction will be fully rectified when the name of the Society is changed after this year's open show (the fourth) which is scheduled for 16 September. Anyone wishing fuller details of the open show should contact the Secretary, Barry Symes, without delay (see below for address).

Another major activity organised by the Society on an occasional basis is the staging of exhibitions designed to stimulate interest in the hobby and in the Society itself. These events have included furnished aquaria designed for specific types of fish, e.g. Cichlids, or for demonstrating various planting schemes, layouts, uses of bogwood, the principle of undergravel filtration, effects of different types of lighting, techniques of showing fish, etc.

By staging these exhibitions, D.T.F.S. puts into practice its main aim of "furthering the hobby of fishkeeping". Other aims include the cultivation of as many species as possible and the exchange of experiences and knowledge.

Links with other Societies in the area are encouraged through the Triangle Show which is held every autumn in conjunction with Yeovil & D.A.S. and Weymouth A.S.

Other activities (mainly at the monthly meetings) include Table Shows, slides, films, video shows, auctions and fish swaps. A Newsletter is published regularly keeping members informed of forthcoming events and plans are in hand for a quarterly magazine.

A rather interesting and out-of-the-ordinary scheme that has recently been launched provides partial financing of travelling costs (minibuses or petrol) for all members on trips to aquarist centres outside the county.

Meetings are held at 8.00 p.m. every fourth Wednesday at The Cornwall Hotel, Alexandra Road, Dorchester. For those living outside the area, special subscription rates can be arranged, so if you live within travelling distance, D.T.F.S. will be happy to see you at the Cornwall Hotel. A warm welcome is assured.

Subscription rates: Family, £4.00; Single, £3.00; Juniors and O.A.P's, £1.00; Associates, £1.00.

Apply to: Mr. Barry Symes, 3 Arnham Green, Dorchester, Dorset DT1 2PS.

SALISBURY AND DISTRICT AQUARIST SOCIETY



The S. & D.A.S. logo



Pterophyllum scalare

NEXT year (1985) will mark the Silver Jubilee of S. & D.A.S. We would like to be among the first to wish the Society the very best for the next 25 years and hope that the same determination that has kept it alive during hard times will continue to prevail.

In fact, at one stage, membership declined to such an extent (as with so many other clubs in the region) that S. & D.A.S. came perilously close to extinction. However, faith in the Society and an unflagging desire to survive saw it through this difficult period, emerging with renewed vigour and a steadily increasing membership which augurs well for the future.

S. & D.A.S. was formed in 1960 by a group of 17 fish-keepers from Salisbury and the large surrounding rural area.

The first open show was held in 1964 (it used to be called an open bottle show in those days) at the Memorial Hall in the Salisbury suburb of Harnham. Unlike more recent ones, this inaugural Show was strictly a tropical affair, with no concessions made to coldwater enthusiasts.

Despite the near-collapse mentioned earlier, there has been an open show every year, bar one. Again, this speaks volumes for the determination of the dedicated nucleus of members who form the cornerstone of the Society. This year's Show is scheduled for Sunday 9 September.

S. & D.A.S. has a formidable reputation as a "Showing Club", scooping up silverware from far and wide. There is no shortage of expertise in the committee either. These include three F.B.A.S. judges who showed their depth of knowledge by helping to win the prestigious Association of Southern Aquarist Societies Inter-Club Annual Quiz last October.

Club activities also include slide shows, talks, inter-club shows and quizzes and occasional trips to public aquaria or "shop tours" in London.

With the sprawling Salisbury Plain right on its doorstep, the Society has always had a strong representation of service personnel among its members, an association that it is very keen to maintain.

Meetings are held twice monthly at the Salisbury Liberal Club in Salt Lane. All are welcome.

Subscription rates: Standard Membership, £5.00 (including wives/husbands); Juniors (under 17), £3.00.

Apply to: Mr. Rowland Adams (Secretary), 26 Empire Road, Salisbury, Wiltshire. Tel: (Salisbury) 20928.

NEWS...

SOUTH EAST



Tongham A.S. held an Intra-Club competition with Reading A.S. and Brighton A.S. on 19th April. An interesting talk was also given by Adrian Blake on Herbs and the Judge for the evening was Roger Paine. Refreshments were provided by Tongham A.S. Results of the competition are as follows: Class 2—Characins: 1, C. Raggio (B); Neomethys Unicostatus; 2, J. Otley (T); *Gambusia* *Sylvesteri* *Splundus*; 3, I. Perret (R); *Pterobolus* *Brevis*. Class 3—Cichlids: 1, R. Cooke (T); *Pseudocrenilabrus* *Mozambicus*; 2, R. Chivers (R); *Melanochromis* *Auratus*; 3, R. Smith (B); *Cichlasoma* *Burtonianum*. Class 4— Gouramis: 1, C. Raggio (B); *Boltonia* *Signata*; 2, C. Tonna (P); *Raja* *Bredoi*; 3, A. Onley (T); *Trichogaster* *Trichopterus*. Class 6—Catfish: 1, K. Chivers (R); *Pseudomystus* *Ramirezii*; 2, I. Legge (T); *Mplasterium* *Littoralis*; 3, R. Smith (B); *Pomolobus* *Pictus*. Class 7—Corydoras: 1, R. Cooke (T); *Corydoras* *Nanus*; 2, D. Haskell (R); *Corydoras* *Nanus*; 3, C. Raggio (B); *Corydoras* *Lepidota*. Class 8—Rasbora: 1, C. Raggio (B); *Rasbora* *Megalops*; 2, C. Tonna (P); *Rasbora* *Punctipinnis*; 3, R. Cooke (T); *Rasbora* *Megalops*. Class 11—A.O.V. Begglyers: 1, R. Cooke (T); *Mastacembela* *Lepidogaster*; 2, P. Reeves (B); *Epiplatys* *Spilargenteus*; 3, C. Tonna (P); *Labeo* *Bicolor*. Class 14—A.O.V. Livebearers: 1, P. Andrews (R); *Daphnia* *Kamoharui*; 2, C. Raggio (B); *Daphnia* *Kamoharui*; 3, P. Smith (T); *Daphnia* *Kamoharui*. Class 19 and 20—Goldfish: 1, E. Smith (B); *Goldfish*; 2, D. Caser (T); *Goldfish*; 3, C. Sims (R); *Goldfish*. Club Competition: 1, Brighton 19; 2, Tongham 18; 3, Reading 17. Best Fish in Show: C. Raggio's *Boltonia* *Signata*. Overall: 1, I. Legge (T); *Lepidogaster* *Lepidota*; 2, R. Cooke (T); *Pseudomystus* *Ramirezii*; 3, R. Cooke (T); *Pterobolus* *Brevis*; 4, C. Spinks (R); *Corydoras* *Lepidota*.

SOME forty members attended the May meeting of the East Kent Aquatic Study Group to hear the Guest Speaker, Mr. Rod Roberts, relate the story of his recent fish collection expedition to "The Cameroons". With the aid of maps and colour slides, Rod was able to illustrate the natural habitat of many of the fish which the Society members keep in their own home aquariums. He also showed pictures of some of the rare fish, plants and animals which he encountered on his travels.

The monthly table show was judged by Mr. John Edwards and revealed: Killies: 1 and 3, M. Martin; 2, T. Webb. Mollies: 1 and 2, T. Webb; 3 and 4, D. Bridgeman. Flies: 1 and 2, T. Webb; 3 and 4, D. Bridgeman. Following a break for refreshments, there were lots of bargains to be snapped up in an auction of fish and aquatic plants.

Meetings are held on the second Tuesday of each month at the Memorial Hall, Beltinge, Herne Bay.

RESULTS OF East Kent A.S.G. first open show held on 22nd April 1984. Ag: 1, B. Spore (EKASG); 2, S. Smith (Mid Sussex); 3, T. Webb (EKASG); B: 1 and 2, P. Whiddell (Tonbridge); 3, I. Harvey (EDAS); 4, R. Bridgeman (C); 1 and 2, C. Bird (Stood); 3, P. Whiddell (Tonbridge); 4, J. Edwards (EKASG); G: 1, Mrs. F. Edwards (EKASG); 2, J. Marsh (Deal A.S.); 3, Mrs. F. Edwards (EKASG); 4, J. Mash (Deal A.S.); Cb: 1, F. Scarr (EKASG); 2, Mrs. F. Edwards

From Aquarists' Societies

(EKASG); 3 and 4, P. Whiddell (Tonbridge); D: 1, M. Keene (Polkstone); 2, J. Edwards (EKASG); 3, M. Martin (EKASG); 4, M. Smith (Romeford and Becontree); Da: 1, C. and D. Bridgeman (EKASG); 2, D. Woby (EKASG); Dc: 1 and 2, J. Ronney (Bexleyheath); 3, R. Scouting (Ashford); 4, J. Amos (Bexleyheath); Df: 1 and 4, M. Draper (Tonbridge); 2, J. Kearsey (Deal A.S.); 3, T. Webb (EKASG); E: 1, R. Somers (SELAS); 2 and 3, R. Scouting (Ashford A.S.); 4, J. Edwards (EKASG); Ee: 1, D. Nice (SLADAS); 2, T. Laughlan (Haringey); 3, D. Kirk-aldie (Deal A.S.); 4, W. Chapman (SLADAS); F: 1 and 3, S. Mason (Deal A.S.); 2 and 4, C. Cherrington (SLADAS); G: 1, R. Somers (SELAS); 2, J. Edwards (EKASG); 3, T. Webb (EKASG); 4, F. Scarr (EKASG); H: 1, M. Draper (Tonbridge); 2, S. O'Donoghue (SELAS); 3, J. Edwards (EKASG); 4, C. and D. Bridgeman (EKASG); I: 1, J. Amos (Bexleyheath); 2, J. Ronney (Bexleyheath); 3, D. Nice (SLADAS); 4, M. Smith (Romeford and Becontree); K: 1 and 4, D. Hills (WDAS); 2, J. Hayward (Deal A.S.); 3, T. Webb (EKASG); L: 1 and 2, J. Edwards (EKASG); 3, J. Draper (Tonbridge); 4, W. Chapman (SLADAS); La: 1, J. Edwards (EKASG); 2 and 4, J. Draper (Tonbridge); 3, E. Woby (EKASG); M: 1, J. Ronney (Bexleyheath); 2 and 4, T. Johnson (Polkstone A.S.); 3, R. Scouting (Ashford A.S.); N: 1, G. Hills (Bexleyheath); 2, J. Ronney (Bexleyheath); 3, C. and D. Bridgeman (EKASG); 4, A. O. Ronney (Bexleyheath); Nb-m: 1, G. Ronney (Bexleyheath); 2, E. Woby (EKASG); 3, F. Amos (Bexleyheath); 4, G. Nevins (EKASG); Nc: 1, J. Edwards (EKASG); 2, T. Laughlan (Haringey); 3, R. Bridgeman (Bexleyheath); 4, F. Scarr (EKASG); O: 1, F. Scarr (EKASG); 2, W. Chapman (SLADAS); 3 and 4, T. Laughlan (Haringey); P: 1, T. Webb (EKASG); 2, R. Somers (SELAS); 3, M. Smith (Romeford); 4, C. and D. Bridgeman (EKASG); Q: 1, T. Webb (EKASG); 2, S. Smith (Mid Sussex); 3, R. Bridgeman (Bexleyheath); 4, Mrs. F. Edwards (EKASG); R: 1 and 2, M. Pain (Polkstone A.S.); 3, T. Laughlan (Haringey); 4, G. Ronney (Bexleyheath); S: 1, T. Webb (EKASG); 2, C. and D. Bridgeman (EKASG); 3, R. Bridgeman (Bexleyheath); 4, J. Smith (Mid Sussex); T: 1 and 2, C. Cherrington (SLADAS); 3, F. Scarr (EKASG); 4, J. Kearsey (Deal A.S.); U: 1, P. Whiddell (Tonbridge); 2, Miss C. Edwards (EKASG); 3 and 4, C. and D. Bridgeman (EKASG); V: 1, 2 and 3, T. Laughlan (Haringey); 4, C. and D. Bridgeman (EKASG); W: 1, C. Cherrington (SLADAS); 2, J. Edwards (EKASG); 3, P. Whiddell (Tonbridge); 4, T. Webb (EKASG); Xc-m: 1, R. Scouting (Ashford A.S.); 2, E. O'Keefe (Tonbridge); 3, D. Bridgeman (SLADAS); 4, F. Scarr (EKASG); Xc: 1, F. Scarr (EKASG); 2 and 4, C. Cherrington (SLADAS); 4, M. Smith (Romeford and Becontree). Best Fish in Show—Aquarist Gold Pin: M. Draper (Tonbridge). Highest Pointed Society: Bexleyheath. Highest Pointed Lady: Mrs. F. Edwards (EKASG). Highest Pointed Individual: J. Edwards (EKASG).

AT the recent a.g.m. of the East Sussex Herpetological Society, Chairman Martin Carnon and Secretary Peter Martin were re-elected. The new Treasurer is David Moorhouse and Committee members Hazel Nolan, Caroline Ashbolt and Christopher Russell. The reports showed good progress had been made during the past year although it is hoped to increase the membership. A number of interesting talks, films, field trips and practical evenings have been arranged for the coming months and all interested in Reptiles and Amphibians in East Sussex are invited to contact the Secretary for details at 20 Silverlands Road, St Leonards on Sea, TN37 7DE. (Tel: Hastings 440895).

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

SOUTH WEST



MR. JOHN BARRINGTON, Senior Water Butler, Avon Division, described his work as Bristol A.S. Slides illustrated the cleaning out of keep ponds with mechanical diggers and the removal of surplus fish by the ton. Both familiar tasks but on a vastly different scale. Table Show results: Fantails: 1, 2 and 3, V. Capaldi; 4, P. Pearl. Bristol Shubunkins: 1 and 2, V. Capaldi; 3 and 4, W. Lornand. Schedules for Show on 15th September from V. Capaldi, 7a Washington Road, Bristol BS6 5BU (0272 426323).

MIDLANDS & WALES



THE Stafford A.S. held their a.g.m. on Tuesday the 8th of May, at Durnham Sports and Social Club, Tinsall Road, Stafford. The officers elected were Chairman I. McCarty, Secretary L. P. Linton, 280 Sandon Road, Stafford, ST16 5HEP. (Tel: 64606). Treasurer A. Wilson. Committee members I. Allcroft, A. Latore, C. Wilson and C. McCarty. Honorary Club member R. Hale, of Aquapet, Stafford. The society meets on the second Tuesday in the month.

NORTH



RESULTS of the Macclesfield A.S. open show held at Ryfel Park High School on 13th May. The fish nominated for Best in Show were the winners of the following classes: Goldfish and Comets, Riff Valley Cichlids, A.O.V. Catfish, Rasbora, Small Barbs, Large Cichlids, A.O.V. Livebearers. The winning fish was a *Pantodonichthys britanni* from the A.O.V. Catfish class owned by Barry Parr of Oldham Aquarist Society who along with The Aquarist Gold Pin also won a two foot tank, heater-stat, filter, pump, planting stick, plants and information pack.

Extra prizes were also awarded for Best Pair of Fish, J. and K. Corbett (Merseyside); Best Breeders Team, Mr. and Mrs. T. Marshall (Merseyside); Highest Pointed Fish other than Best in Show, Mr. R. Stephens (Blackburn) and Best Coldwater, Mr. and Mrs. Bobby (Sandgrounders).

Class (Guppies): 1, Mr. and Mrs. Evans (Blackpool); 2, Miss M. Daniels (Blackpool); 3, G. Jamon (Runcorn). Platies: 1 and 3, Mr. and Mrs. Baldwin (Sandgrounders); 2, D. Parkinson (St. Helena), Swoodale; 1 and 2, Mr. and Mrs. T. Marshall (Mersey-

side); 3, S. Downie (Ellensmere Port). Mollusks: 1, Mr. and Mrs. T. Marshall (Merseyside); 2, G. Janon (Rassau); 3, Mrs. M. Daniels (Blackpool). A.O.V. Livebearers: 1, J. and K. Corbett (Merseyside); 2, Mr. and Mrs. A. Goddard (Macclesfield); 3, R. Payne (Merseyside). Small Anabantids (up to 8 cm): 1, Mr. and Mrs. K. Robinson (Stretford); 2, Mrs. Price (Ellensmere Port); 3, J. and S. Crosswell (Preston). Large Anabantids (over 8 cm): 1, Mr. Hartley (Sandgrounders); 2, Mr. and Mrs. B. Baldwin (Sandgrounders); 3, Mr. and Mrs. K. Robinson (Stretford). Fishes: 1, D. Phillips (Merseyside); 2, S. Kent (Wrexham); 3, L. Evans (Blackpool). Small Cichlids (up to 10 cm): 1, Mrs. Price (Ellensmere Port); 2, J. Lynch (Merseyside); 3, D. Edwards (Ellensmere Port). Large Cichlids (over 10 cm): 1, R. Payne (Merseyside); 2, P. Edwards (Ellensmere Port); 3, Miss J. Fair (Potters). Anguils: 1, Mr. and Mrs. Evans (Blackpool); 2, Mr. Carrington (Buxton); 3, Miss A. M. Redman (Blackpool). Rift Valley: 1, Mr. and Mrs. A. Goddard (Macclesfield); 2, B. Wilson (St. Helens); 3, Mr. and Mrs. B. Baldwin (Sandgrounders). Small Barbs (up to 7.5 cm): 1, R. Stephens (Blackburn); 2, Mr. and Mrs. B. Baldwin (Sandgrounders); 3, Mr. and Mrs. T. Marshall (Merseyside). Large Barbs (over 7.5 cm): 1, Mr. and Mrs. B. Baldwin (Sandgrounders); 2, R. and S. Parr (Oldham); 3, Mr. and Mrs. Stevenson (Oldham). Small Characins (up to 5 cm): 1, Mr. and Mrs. R. Robinson (Stretford); 2, R. Stephens (Blackpool); 3, S. Unsworth (Macclesfield). Medium Characins (up to 12 cm): 1, Miss J. Fair (Potters); 2, T. Steel (Potters); 3, J. Lynch (Merseyside). Large Characins (over 12 cm): 1, Mr. and Mrs. F. Mills (Merseyside); 2, S. Rose (Ind.); 3, L. Evans (Blackpool). Toothcarp: Top Spawning: 1 and 3, D. Parkinson (St. Helens); 2, Mr. and Mrs. T. Marshall (Merseyside). Toothcarp Bottom Spawning: 1 and 3, D. Parkinson (St. Helens); 2, R. Williams (Ellensmere Port); 3, Miss A. M. Redman (Blackpool); 2, J. Lynch (Merseyside). Danios: 1, W. Graham (Stretford); 2, Mr. and Mrs. F. Mills (Merseyside); 3, D. Parkinson (St. Helens). Rasboras: 1, P. Stephens (Blackburn); 2, Mr. and Mrs. Stevenson (Oldham); 3, Miss S. Graham (Ind.). Corydoras and Brochis: 1, Mr. and Mrs. T. Marshall (Merseyside); 2, G. Kent (Wrexham); 3, Miss J. Baldwin (Sandgrounders). A.O.V. Catfish: 1, B. and S. Parr (Oldham); 2, Miss J. Fair (Potters); 3, Mr. and Mrs. B. Baldwin (Sandgrounders). Loaches: 1, Mr. and Mrs. Stevenson (Oldham); 2, Mr. and Mrs. T. Marshall (Merseyside); 3, Mr. and Mrs. B. Baldwin (Sandgrounders). Sharks: 1, Mr. and Mrs. B. Baldwin (Sandgrounders); 2, R. Williams (Ellensmere Port); 3, S. Downie (Ellensmere Port). Flying Foxes: 1, Mr. and Mrs. Stevenson (Oldham); 2, Mrs. Price (Ellensmere Port); 3, Mr. and Mrs. A. Goddard (Macclesfield). Breeders (Egglayers) A & B: 1, J. T. Morris (Northern C&D); 2, Mr. and Mrs. K. Robinson (Stretford). Breeders (Egglayers) C & D: 1, Mr. and Mrs. K. Robinson (Stretford); 2, J. and S. Crosswell (Preston); 3, P. Edwards (Ellensmere Port). Breeders (Livebearers) A & B: 1, P. Edwards (Ellensmere Port); 2, R. Williams (Ellensmere Port); 3, J. Lynch (Merseyside). Breeders (Livebearers) C & D: 1, 2 and 3, Mr. and Mrs. T. Marshall (Merseyside). True Pairs (Egglayers): 1 and 2, R. Stephens (Blackburn); 3, Mr. and Mrs. B. Baldwin (Sandgrounders). True Pairs (Livebearers): 1, J. and K. Corbett (Merseyside); 2, R. Payne (Merseyside); 3, Mr. and Mrs. B. Baldwin (Sandgrounders). A.O.V.: 1, P. Jones (Wrexham); 2, Miss S. Graham (Ind.); 3, Mr. Hartley (Sandgrounders). Goldfish and Comets: 1, Mr. and Mrs. Bibby (Sandgrounders); 2, Mr. and Mrs. R. Colley (Oldham); 3, Mr. Gault (Ind.). Shubunkins: 1, R. and D. Parr (Oldham); 2 and 3, D. Middleton (Buxton). Moors: 1 and 2, Mr. and Mrs. W. Finney (Macclesfield); 3, Miss J. Rose (Ind.). Fantails: 1 and 2, Mr. and Mrs. Bibby (Sandgrounders); 3, Mr. and Mrs. R. Colley (Oldham). A.O.V. Fancy Goldfish: 1 and 2, Mr. and Mrs. W. Finney (Macclesfield); 3, Mr. Gault (Ind.). A.O.V. Goldwater: 1, Mr. and Mrs. R. Colley (Oldham); 2, D. Parkinson (St. Helens); 3, Mr. J. Lynch (Merseyside).

THERE were 450 entries at Oldham & District A.S. annual open show held on the 2nd April at Werneth Park Oldham. Results

were as follows: Best Fish in Show: Mr. and Mrs. Baldwin (Sandgrounders). Guppies: 1, Mr. and Mrs. Collier (Stretford); 2, Mr. and Mrs. White (Bury); 3, Mr. and Mrs. McDonald (Merseyside). Mollies: 1, P. Larkin (Huddersfield); 2, Mr. and Mrs. Marshall (Merseyside); 3, K. Brent (PTFC). Swordtails: 1, Mr. Marshall (Merseyside); 2, Stephen Kent (Wrexham); 3, H. Matthews (Ind.). Plecos: 1, Don Parkinson (St. Helens); 2, D. T. Milner (Darwen); 3, Mr. and Mrs. Baldwin (Sandgrounders). A.O.V. Livebearers: 1 and 3, J. and K. Corbett (Merseyside); 2, Mr. and Mrs. Goddard (Macclesfield). Anabantids: 1, Mr. and Mrs. Goddard (Macclesfield); 2, Don Parkinson (St. Helens); 3, Mr. Pluck (Preston). Fishes: 1, P. Holden (Preston); 2, C. M. Jones (Wrexham); 3, R. Barlow (Accrington). Small Barbs: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Marshall (Merseyside); 3, R. and S. Parr (Oldham). Large Barbs: 1, Mr. and Mrs. Stevenson (Oldham); 2, Mr. and Mrs. Chadwick (Oldham); 3, Mr. and Mrs. Baldwin (Sandgrounders). Dwarf Cichlids: 1, Don Parkinson (St. Helens); 2 and 3, Mrs. D. Price (Ellensmere Port). Large Cichlids: 1, R. I. Payne (Merseyside); 2, D. Phillips (Merseyside); 3, J. and S. Crosswell (Preston). Anguils: 1, P. Holden (Preston); 2, A. M. Redman (Blackpool); 3, Mr. and Mrs. Stevenson (Oldham). Rift Valley: 1, Mr. and Mrs. J. Williams (Ellensmere Port); 2, Mr. and Mrs. Goddard (Macclesfield); 3, Mr. and Mrs. Waterhouse (HSG). Small Characins: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. and S. Parr (Oldham). RH: 1, Mr. and Mrs. Milner (Darwen). Large Characins: 1, K. Buckley (Bridgewater); 2, Lee A. Holden (Darwen); 3, D. T. Milner (Darwen). Rasboras: 1, Mr. and Mrs. Stevenson (Oldham); 2 and 3, D. T. Milner (Darwen). Danios: 1, Mr. and Mrs. Marshall (Merseyside); 2, Mr. and Mrs. Blackburn (Darwen); 3, Sandra D. Holden (Darwen). Minnows: 1 and 2, A. and E. Berry (Bridgewater); 3, D. T. Milner (Darwen). Sharks: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. Williams (Ellensmere Port); 3, G. Maddox (PTFC). Flying Foxes: 1, Mr. and Mrs. Stevenson (Oldham); 2, Lee A. Holden (Darwen); 3, R. Williams (Ellensmere Port). Toothcarps: 1 and 3, Don Parkinson (St. Helens); 2, Mr. and Mrs. Baldwin (Sandgrounders). Corydoras including Brochis: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Miss J. Baldwin (Sandgrounders); 3, Mr. and Mrs. Marshall (Merseyside). A.O.V. Catfish: 1, Sandra D. Holden (Darwen); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, D. T. Milner (Darwen). Loaches and Bettas: 1 and 2, Mr. and Mrs. Marshall (Merseyside); 3, Mr. and Mrs. Baldwin (Sandgrounders). Breeders (Egglayers) (1): 1 and 3, B. Brook (Huddersfield); 2, K. Lockwood (Huddersfield). Breeders (Egglayers) (2): 1, K. Buckley (Bridgewater); 2, Mr. and Mrs. Chadwick (Oldham); 3, D. T. Milner (Darwen). Breeders (Egglayers) (3): 1, J. Clarke (Salfersdale); 2, Mr. and Mrs. Marshall (Merseyside); 3, D. T. Milner (Darwen). Breeders (Livebearers) (1 and 2): 1, Mr. and Mrs. Marshall (Merseyside); 2, J. Lynch (Merseyside). Pairs (Egglayers): 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. Buckley (Bridgewater); 3, Sandra D. Holden (Darwen). Pairs (Livebearers): 1, J. and K. Corbett (Merseyside); 2, Mr. and Mrs. Marshall (Merseyside); 3, Mr. and Mrs. Baldwin (Sandgrounders). A.O.V. Tropical: 1, P. A. Jones (Wrexham); 2, Lee A. Holden (Darwen); 3, A. D. Atkins (Sandgrounders). Miss Tanks: 1, Mr. and Mrs. Collier (Stretford); 2, A. and E. Berry (Bridgewater); 3, Mr. and Mrs. Stevenson (Oldham). Common Goldfish and Comets: 1, C. Wallbank (Accrington); 2 and 3, Mr. and Mrs. A. Bibby (Sandgrounders). Shubunkins: 1, R. and D. Parr (Oldham); 2, Mr. and Mrs. Stevenson (Oldham); 3, S. Walsh (Accrington). Fantails: 1 and 2, Mr. and Mrs. A. Bibby (Sandgrounders); 3, Mr. and Mrs. Colley (Oldham). Veiltails: 1, A. Milligan (Preston); 2, W. Finney (Macclesfield); 3, A. Milligan (Preston). Lionheads: 1, J. Lynch (Merseyside); 2, C. Wallbank (Accrington); 3, B. Brook (Huddersfield). Moors: 1 and 2, W. Finney (Macclesfield); 3, B. Brook (Huddersfield). Orandas: 1, J. Turner (Accrington); 2 and 3, C. Wallbank (Accrington).

A.O.V. Fancy Goldwater: 1, Mr. and Mrs. Colley (Oldham); 2, W. Finney (Macclesfield); 3, B. Brook (Huddersfield). A.O.V. Asian or U.S.A. Goldwater: 1 and 2, Mr. S. Walsh (Accrington); 3, Mr. and Mrs. Colley (Oldham). A.O.V. European Goldwater: 1, D. T. Milner (Darwen); 2, Don Parkinson (St. Helens); 3, J. and S. Crosswell (Preston). A.V. Marine: 1, F. Morris (Altherton).

RESULTS of Bishop Auckland A.S. annual open show held on 15th April at Town Hall, Bishop Auckland. Class B: 1 and 3, J. McCutcheon (Gateshead); 2, A. Brown (Bishop Auckland); 4, N. M. Scott (Thornaby). B: 1, D. Russell (Stanley); 2, J. McCutcheon (Gateshead); 3 and 4, W. Taylor (NOVUS). C: 1, S. Tipper (Redcar); 2, D. Clark (Hexham); 3, N. M. Scott (Thornaby); 4, Mr. and Mrs. Roe (Bishop Auckland). Ch: 1, J. McCutcheon (Gateshead); 2, M. Conway (Bimbi); 3, P. Kelly (N. Aycliffe); 4, J. Middleman (Stanley). C: 1, S. King (Redcar); 2, J. McCutcheon (Gateshead); 3, J. Middleman (Stanley); 4, J. and L. Wilson (Redcar). D: 1, D. Morgan (N. Aycliffe); 2, R. and A. Carter (N. Aycliffe); 3, L. Burdick (Hexham); 4, W. and A. Grant (N. Aycliffe). D: 1, J. and L. Wilson (Redcar); 2, R. C. Hargreaves (N. Aycliffe); 3, H. Lake (Stanley); 4, S. King (Redcar). E: 1, J. Priestley (Stanley); 2, H. Lake (Stanley); 3, R. and C. Hargreaves (N. Aycliffe); 4, S. King (Redcar). E: 1, S. Brown (Bishop Auckland); 2, S. Tipper (Redcar); 3, N. M. Scott (Thornaby); 4, M. Hall (N. Aycliffe). F: 1, 2 and 3, L. Gray (Billingham); 4, W. S. Forrest (Thornaby). G: 1, 3 and 4, J. Kelly (N. Aycliffe); 2, A. Mason (Whitey). H: 1, S. King (Redcar); 2, J. A. Chapman (Ind.). S: 1, B. and J. Hoppingall (Castledale); 4, S. Tipper (Redcar); 3, 1 and 4, J. Middleman (Stanley); 2, A. Richardson (Gateshead); 3, Mr. and Mrs. Roe (Bishop Auckland). K: 1, A. Richardson (Gateshead); 2, D. Clark (Hexham); 3, N. Wilkinson (Bimbi); 4, W. A. Grant (N. Aycliffe). L: 1, P. Wade (N. Aycliffe); 2, S. Brown (Bishop Auckland); 3, W. A. Grant (N. Aycliffe); 4, D. Turnbull (Birtley). M: 1, S. King (Redcar); 2, W. Hornsby (Bishop Auckland); 3, J. Bower (N. Aycliffe); 4, M. Hall (N. Aycliffe). N: 1, D. Morgan (N. Aycliffe); 2, R. and J. Hoppingall (Castledale); 3, E. W. Hodgson (Peebles); 4, D. Morgan (N. Aycliffe). N: 1, D. Morgan (N. Aycliffe); 2, L. Burdick (Hexham); 3, J. Priestley (Stanley); 4, A. Brown (Bishop Auckland). O: 1, D. Wilson (Thornaby); 2, D. Morgan (N. Aycliffe); 3, Mr. and Mrs. Roe (Bishop Auckland); 4, W. Hornsby (Bishop Auckland). O: 1, H. Lake (Stanley); 2, Mr. and Mrs. Zamir (Bishop Auckland); 3, S. King (Redcar); 4, M. Middleman (Stanley). P: 1, H. Dagg (Usworth); 2, S. Tipper (Redcar); 3, Mr. and Mrs. Roe (Bishop Auckland); 4, D. Brown (Bishop Auckland). Q: 1, R. and C. Hargreaves (N. Aycliffe); 2, R. Holmes (Ind.); 3, B. Wilkinson (Birtley); 4, M. Hall (N. Aycliffe). R: 1, S. King (Redcar); 2, J. and L. Wilson (Redcar); 3, A. Furberough (Bimbi); 4, L. Hindle (Ind.). S: 1 and 2, B. and J. Hoppingall (Castledale); 3, L. Burdick (Hexham); 4, N. M. Scott (Thornaby). T: 1, M. Conway (Bimbi); 2, H. Lake (Stanley); 3, W. S. Forrest (Thornaby); 4, J. A. Chapman (Ind.). U: 1, L. Hindle (Ind.); 2, Mr. and Mrs. Roe (Bishop Auckland); 3, B. Jameson (F.M.G.S.); 4, S. Brown (Bishop Auckland). V: 1 and 2, A. Morrison (Usworth); 3, C. Allen (Cramlington); 4, A. Brown (Bishop Auckland). W: 1, A. Richardson (Gateshead); 2, P. Robinson (F.C.S.); 3, N. M. Scott (Thornaby); 4, D. Turnbull (Birtley). W: 1, B. Bradley (Billingham); 2 and 3, H. Garrall (Ashfield Plains); 4, K. Dodd (Bishop Auckland). X: 1, A. Mason (Whitey); 2, R. Braggins (Bishop Auckland); 3, S. King (Redcar); 4, A. Brown (Bishop Auckland). X: 1 and 2, Mr. and Mrs. Roe (Bishop Auckland); 3, J. A. Chapman (Ind.); 4, H. Lake (Stanley). Photography Class: 1, 2, 3 and 4, Mr. and Mrs. Zamir (Bishop Auckland). Best in Show, and winner of Aquarist Gold Pin: L. Gray (Billingham). A.B.S. Trophy winner, Class DC: W. Forrest (Thornaby).

AT the annual members show of Halifax A.S. held at Forest Cottage Halifax

Centre on 9th May. Mr. A. White won the Society Silver Rose Bowl and Best in Show Trophy. Mr. and Mrs. P. Swales came second and Mr. D. Shilds third out of 61 entries. The entries were judged by Mr. J. Nail, of Leeds.

Stretford & District A.S. open show results: Guppies: 1, Len Collier (Stretford); 2 and 3, Mr. and Mrs. White (Bury). Platies: 1, Mr. and Mrs. Marshall (Merseyside); 2, G. Kene (Wrexham); 3, Mr. and Mrs. Baldwin (Sandgrounders). Swordtails: 1, 2 and 3, Mr. and Mrs. Marshall (Merseyside). Mollies: 1, Mr. and Mrs. Marshall (Merseyside); 2, Mrs. M. Daniels (Blackpool); 3, L. Holden (Darwen). A.O.V. Livebearer: 1 and best in show, J. and K. Corbett (Merseyside); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mr. and Mrs. Goddard (Maccles). Small Anabantids: 1, Mrs. Price (Elliotters Port); 2, Mr. and Mrs. Robinson (Stretford); 3, Mr. and Mrs. Baldwin (Sandgrounders). Large Anabantids: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Karl Dillon (Lea); 3, G. Shors (Runcorn). Fishers: 1, D. Phillips (Merseyside); 2, C. Jones (Wrexham); 3, Mr. and Mrs. McDonald (Merseyside). Small Barbs: 1, Mr. and Mrs. Marshall (Merseyside); 2, T. Morris (N.A.G.); 3, S. Lawrence (Stretford). Large Barbs: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Chadwick (Oldham); 3, C. and A. Ledbetter (Stretford). Small Characins: 1, Mr. and Mrs. Robinson (Stretford); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mr. J. Lynch (Merseyside). Large Characins: 1, Mr. and Mrs. Coates (Darwen); 2, L. Holden (Darwen); 3, Mr. and Mrs. Miller (Merseyside). Small Cichlids: 1, J. and S. Crosswell (Preston); 2 and 3, Mrs. Price (Elliotters Port). Large Cichlids: 1, Mr. and Mrs. Edwards (Elliotters Port); 2, G. Shors (Runcorn); 3, J. and S. Crosswell (Preston). Rift Valley: 1, Mr. and Mrs. Goddard (Macclesfield); 2, A. Milligan (Preston); 3, Mr. and Mrs. Baldwin (Sandgrounders). Angels and Discus: 1, P. and S. Holden (Preston); 2, A. M. Redman (Blackpool). Corydoras and Brochis: 1, J. Lynch (Merseyside); 2 and 3, T. Morris (N.A.G.). A.O.V. Carfish: 1, T. Morris (N.A.G.); 2, Mr. and Mrs. Hands (Accrington); 3, A. Milligan (Preston). Loachis and Tetras: 1, Mr. and Mrs. Stevenson (Oldham); 2, Mr. and Mrs. Marshall (Merseyside); 3, Mr. and Mrs. Baldwin (Sandgrounders). Killifish (Top Spawning): 1, Mr. and Mrs. Marshall (Merseyside); 2, Mr. J. Lynch (Merseyside). Killifish (Bottom Spawning): 1, Mr. and Mrs. Baldwin (Sandgrounders). Rasbora, Danios and Minnows: 1, Mr. and Mrs. Stevenson (Oldham); 2, A. and E. Berry (Bridgewater); 3, W. Graham (Stretford). Sharks and Frogs: 1, Mr. Stevenson (Oldham); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mr. and Mrs. Hands (Accrington). A.O.V. Tropical: 1, P. A. Jones (Wrexham); 2, L. Holden (Darwen); 3, P. A. Jones (Wrexham). Pairs (Livebearer): 1, J. and K. Corbett (Merseyside); 2, A. and E. Berry (Bridgewater); 3, R. Payne (Merseyside). Pairs (Egglayers): 1, J. and S. Crosswell (Preston); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, S. Holden (Darwen). Breeders (Livebearer): 1 and 2: 1, R. Williams (Elliotters Port); 2, Mr. and Mrs. Edwards (Elliotters Port); 3, J. Lynch (Merseyside). Breeders (Egglayers) (1 and 2): 1, Mr. and Mrs. Robinson (Stretford); 2, Mr. and Mrs. Chadwick (Oldham); 3, A. and E. Berry (Bridgewater). Breeders (Egglayers) (3 and 4): 1, Mr. and Mrs. Robinson (Stretford); 2, D. Milner (Darwen); 3, J. and S. Crosswell (Preston). Single Tail Goldfish: 1, Mr. and Mrs. Colley (Oldham); 2, Mr. Regan (Merseyside); 3, Mr. Stevenson (Oldham). Twin Tail Goldfish: 1, Mr. Wallbank (Accrington); 2, Mr. Regan (Merseyside); 3, Mr. and Mrs. P. Hands (Accrington). A.O.V. Coldwater: 1, D. Milner (Darwen); 2, Mr. and Mrs. Colley (Oldham); 3, P. Hands (Accrington). Furnished Mini-Tanks: 1 and 3, Mr. and Mrs. Collier (Stretford); 2, Mr. and Mrs. Brightmore (Stretford). Juniors (Stretford only): 1, A. Ledbetter; 2, G. Heay; 3, O. Carridy. Stretford & District A.S. wish to thank all those who participated in the open show making it such a successful day.

CHANGE OF SECRETARY

Mr. C. Martin of 10 The Winners, New Church Farm, Skelmersdale, Lancs, was elected Secretary of the Skelmersdale and District

Aquarist Society. Change of Venue, Skelmersdale and District Aquarist Society now meet at the Skelmersdale Labour Club, Westgate, on the 2nd and 4th Wednesday of the month. Non members welcome.

SCOTLAND



Paisley and District A.S. held their 1st annual open show in Gallowhill Community Centre on 6th May. The event attracted 416 entries on the show bench with some 20 aquarium clubs and societies from all over Scotland being represented. As a result, competition for the 19 major trophies was intense.

Club officials were delighted with the large number of members of the public who attended the show (approximately 400) which exceeded even the most optimistic expectations. Every conceivable type of fish was represented from coldwater fishes, which included the common goldfish to the more exotic tropical and marine varieties. The class for the Best Furnished Tank was won by local member Mr. W. Dunbar which was particularly pleasing to the host Society. At the end of the day's proceedings, the show hall was packed to see Mr. A. Ramsie of Kirkcaldy Aquarist Society being presented with the Best Fish in Show Trophy by Councillor John McDowell of Strathclyde Region.

Anyone wishing to know more about the meetings of the Society should contact the Secretary, Mrs. I. Lindsay on 899 5772 or Club President, Mr. T. Currie at 277 3487, or come along to the next Club night on Tuesday 9th June in Paisley Museum at 7.30 p.m. All welcome.

Award winners were: Best Fish in Show: Coral Reef Trophy and The Aquarist Gold Pin, A. Ramsie (Kirkcaldy). 2nd Best Fish in Show: Danios/Tropics Trophy, H. A. Hoey (Dunfermline). Best Breeder (Egglayer): Paisley and District Aquarist Society Award, Y. and B. Downie (Dalkhous Community Centre). Best Breeder (Livebearer): Interpet Trophy, E. Duncan (Kirkcaldy). Best Furnished Tank: Petworld Trophy and £50 Voucher, W. Dunbar (Paisley). Best Paisley Member (Senior): Paisley Trophy donated by T.F.C., W. Dunbar (Paisley). Best Paisley Member (Junior): T.F.C. Trophy, G. Armstrong (Paisley). Best Coldwater: Mrs. M. Collier (Cowal). Best Livebearer: J. J. Wells (Dunfermline). Best Characin: T. F. Ramsay (Scottish). Best Barbs: H. A. Hoey (Dunfermline). Best Danio/Tropical Minnow: J. J. Wells (Dunfermline). Best Anabantid: A. Ramsie (Kirkcaldy). Best Loach/Shark: H. A. Hoey (Dunfermline). Best Carfish: G. Rae (Newbarn). Best Egglaying Toothcup: H. Smith (Livingston). Best Cichlid: H. Johnston (Scottish). Best Rasbora: J. J. Wells (Dunfermline). Best Pair (Any Variety): M. Marley (Whitburn).

ON the 8th May Edinburgh A.S. held a meeting in the club room which was given over to discussing the fish to be taken to an inter-club show at Livingston A.S. on Friday 18th May. At the club meeting on 22nd May a fish auction was held to help with club funds all fish were donated by the members. All enquiries concerning the club go to: J. Milligan (secretary), 21 Stevenson Drive, Edinburgh.

ON 3rd May Livingston A.S. were given a lecture by Mr. A. Scott about Lake Malawi Cichlids. The members enjoyed and appreciated the evening. An inter-club table show was held on 18th May against members from Edinburgh A.S. There were four classes the results were as follows: Cats: H.B. I. N. J. Ballantyne (EDIN A.S.); 2, J. Milligan (EDIN A.S.); 3, J. Wright (EDIN A.S.); 4, S. Oswald (EDIN A.S.). Killies: 1, H. Smith (LIV A.S.); 2 and 3, M. Clark (LIV A.S.); 4, P. Sutherland (LIV A.S.). Barbs A and B: 1, P. Sutherland (LIV A.S.); 2 and 4, J. Milligan (EDIN A.S.);

3, P. Sutherland (LIV A.S.). Danios/Tropical Minnows: 1, R. Fleming (LIV A.S.); 2, E. Gillies (LIV A.S.); 3 and 4, N. and J. Ballantyne (EDIN A.S.). The overall winners of the first leg Livingston A.S.

Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

JULY

1st July: DARLINGTON & DISTRICT A.S. are holding their second open show at the Eastbourne Comprehensive School, Darlington.

1st July: CHARD & DISTRICT A.S. Tenth annual open show, Furnham School, Furnham Road, Chard, Somerset. Details from Mr. D. Shepherd, 30 Furton Road, Chard. Tel: 04606 3085.

8th July: SCARBOROUGH & DISTRICT A.S. open show at Fringate County Primary School, Longwestgate, Scarborough. Further details from: Mr. P. Baddley, 8 Incliffe Crescent, Scarborough. Tel: 351952.

8th July: THE BILLINGHAM A.S. annual open show is to be held in the Billingham Community Centre, The Gateway, Billingham, commencing 1 p.m. Booking-in 11 a.m. until 1 p.m. We also hold an auction while judging is in progress. Please contact Club Secretary G. R. McGregor, 59 Cleston Avenue, Low Grange, Billingham, Cleveland TS23 3SL, or our Show Secretary, B. Shackcloth, 20 Woolston Road, Billingham for further details.

8th July: DUDLEY & DISTRICT A.S. open show to be held at the Hind Institute, Wolverhampton Road, East, Sedgley, West Midlands. For further details please contact Show Secretary, Mr. K. Wheatley, 89 Hillside Road, Wrens Nest Estate, Dudley; telephone: Sedgley 41256.

8th July: ROMFORD & BEACONTREE A.S. open show at Parkside Community Centre, Goodmayes Lane, Goodmayes, Essex. Schedules from R. Brown, 12 Tipton Crescent, Clayhall Avenue, Ilford, Essex.

15th July: N.E.F.A.S. Convention to be held at the Grange Community Centre, Throckley, Newcastle upon Tyne. Speakers are Mr. John Dawes (Assistant Editor to the Aquarist Magazine, Chief Consultant to Aquarist Foods). Subject: The Language of Fishes. Dr. Randolph Richards (University of Stirling). Subject: Fish Diseases. Tickets £1.00. Admission by ticket only. For further information apply to: Mr. J. English, Henderson Plaza, Throckley, Newcastle upon Tyne NE15 9DT.

15th July: The Lower Thames-side Section of the B.K.K.S. closed show at the Alpha Garden Centre, London Road, Wickford.

15th July: READING & DISTRICT A.S. open show to be held at the Southcote Youth Community Centre in Coronation Square, Southcote, Reading, Berks. For schedules please contact Show Secretary, C. Tomes on Reading 412373.

15th July: THE SANDGROUNDERS A.S. open show at Mead's Cop School, Mead's Cop Road, Southport. Schedules later from Bernie Baldwin, 10 Olive Grove, Southport, Merseyside PR8 6BG; telephone: 0704 43384.

21st July: KINGSTON & DISTRICT A.S. are holding their open show at Raynes Park Methodist Church Hall, Weopole Road, Raynes Park, London SW20. For further details please contact D. J. McKay, 12 Victoria Road, Twickenham or tel. 942 9021, J. Pollard.

28th July: MIDLAND Koi ASSOCIATION open show, Baginton Village Hall, Coventry. (Near Coventry Airport. Off A45). Further details from R. Cleaver, 59 Kennington Road, Earlsdon, Coventry. Tel: Cov. 799991.