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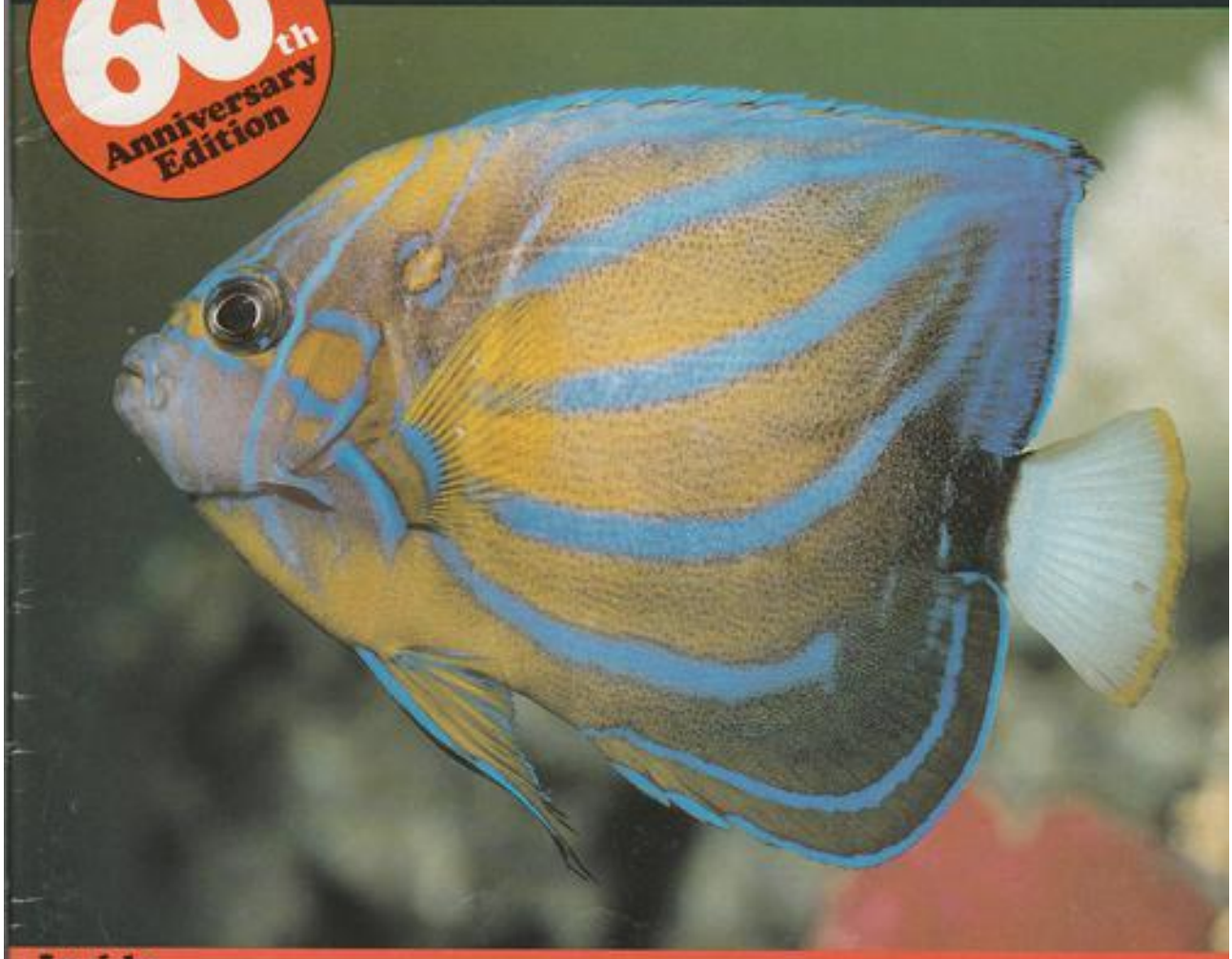
AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers

SPECIAL 60th Anniversary Edition



Inside

Australia Rules-OK? (marines from down under in colour)

REFLECTIONS (early days of fishkeeping)

Spotlight on the Ornate Paradise Fish

plus **Many Special Features**

COVER STORY *Photo: M. Gilroy*

Pomacanthus annularis is commonly known as the Blue Ring Angelfish (wrongly named the Blue King Angelfish in one of the popular general aquarium books). As with all other Angelfish species, its classification differs according to the authority consulted. Burgess regards them as belonging to the Family Pomacanthidae, a view shared by many of today's writers. However, other prominent ichthyologists, such as Nelson, consider them to constitute no more than a Subfamily, the Pomacanthinae, of the Family Chaetodontidae, this including them with the Butterflyfishes of the Subfamily Chaetodontinae.

Whatever the case might be, *P. annularis* remains one of the more interesting species for the tropical marine aquarium. As in many other of the thirty or so species of Angelfish, juveniles are marked completely differently to the adults. These markings are, in fact, so different that juveniles and adults could easily be thought to belong to separate species. Correct identification is further hampered by the close similarities between the juvenile phases of a number of *Pomacanthus* species.

P. annularis can grow up to 40 cm. (c. 16 in.), will accept a varied diet which should include a vegetable component, and has not yet been spawned in aquaria. (See Cover Stories for May, 1983, and February, 1984, for further details of Angelfishes).

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AQUARIST

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Title page heading for Vol. 1 No. 1 May, 1924

THIS year *The Aquarist & Pondkeeper* celebrates its sixtieth anniversary, its Diamond Jubilee. As the first publication of its kind in Britain, this magazine has catered for the needs and interests of discerning fishkeepers continuously for over half a century but for the interruption of the war years. Others have come and enjoyed a short spell of notoriety but quality, as always, has ensured our survival.

Some of the changes which have occurred during this period are reflected upon by our contributors within the pages of this issue. The young enthusiasts of today accept without question the facilities which are available to them for the pursuance of their hobby but they may be interested to learn of the difficulties besetting their forebears when innovation was so vital in order to keep aquaria tenable with heating, aerating and filtering the aquatic environment presenting a multiplicity of problems in lieu of the devices on hand today. Availability of fishes from all quarters of the globe has been revolutionised by air transport with the consequence of an unlimited variety of species filling the dealers' tanks. Aquarist societies have proliferated and new specialist societies have been formed for those absorbed with particular groups and families.

The practice of keeping fish as a hobby has become a science and not a little knowledge of chemistry, biology and electrical circuitry is a prerequisite of aquarium keeping now with trial and error methods becoming less employed and less essential.

New species continue to be discovered and bred under aquarium conditions and new forms of old favourites appear in the shape of 'man-made' varieties. Some are beau tiful and others bizarre to the poi of ugliness and frailty but all pla the stamp of progress on the hobb which continues to grow with unabate acceleration worldwide. Why th should be stems from a multitude causes, many of them social a environmental but speculation on th phenomenon has no place her Suffice it to say that the future of t hobby seems assured and we loo forward to the next sixty years wi confidence that there will still aquarists in the year 2044 and 7 *Aquarist* for them to read.

Regrettably, some readers have m with difficulty in obtaining occasion copies of their magazine and whi we applaud the analagous referen to gold dust by those searching f their favourite magazine, we inter to turn such scarcity into a gener abundance and superior distributio will assist in this endeavour. Mea while, will any reader experiencin difficulties in this connection plea write to us affording full details his supplier so that we can remed matters at source.

Laurence E. Perkins

A few of the advertisements appearing in the Aquarist during the nineteen twenties

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

terrapins and hibernation . . .

Should my red-eared terrapins be allowed to hibernate?

Even if they are fully grown and hence could possibly withstand hibernation, most terrapin-keepers maintain their charges at a constant, warm temperature throughout the year.

Do not forget that terrapins like (in addition to a constant, warm temperature) a good varied diet, a clean aquarium with a small area of dry land and occasionaly access to sunshine!

livefoods and breeding . . .

I have heard an awful lot about live foods and know they are essential if you are trying to breed fish. What are your comments?

To begin with, live foods of aquatic origin are a potential danger since they may introduce diseases or pests into your aquarium. Live foods such as earthworms and whiteworm are much safer—but not a good balanced diet. Some fish do need live foods, either to actually get them to accept food in the aquarium following importation or (perhaps) to condition them for breeding. However, factors such as correct water quality are equally (if not more) important. When trying to breed some fish I would say that many of the fish we keep today can be bred very successfully on a varied diet of good quality dried foods. In fact this was brought home to me recently during a visit to West Aquarium (Europe's largest breeder of tropical fish) when I asked Joachim Jutte (who is in charge of fish breeding at West Aquarium) whether he used live foods. He pointed to a rack of tanks each containing a pair of tiger barbs and stated that the fish spawn every 14 or so days for 3-4 months and lay many hundreds of eggs—all without any live food at all!

starting out . . .

I am just about to set-up a 39 in. tropical community tank. Can you recommend a good filter and a good aquarium handbook?

I personally would use a good quality polyfoam cartridge filter in your tank, powered by a small, quiet but efficient air pump. Ask your local aquatic shop to recommend some models, but remember that the cheapest is not necessarily the best!

There are, of course, a great many books on fishkeeping currently available to aquarists. For the money I do not think that you can beat "The Practical Encyclopedia of Freshwater Tropical Aquarium Fishes" by Dick Mills and Gwynne Vevers (Salamandar, about £9·00). As a beginner, you will find this book (available direct from *The Aquarist*) very helpful, yet its factual content will remain useful to you for many years to come.

treating fish . . .

How do I use sodium chloride (salt) to remove leeches from fish, and what is mercurochrome and how is it used to treat fish?

Use cooking salt *not* table salt. To remove leeches from large pond fish, infected fish have to be placed in a bath containing 15 level tablespoons per 10 litres of water. Maintained here for 15-30 minutes, the leeches usually fall away or can be picked off. This is useful for treating fish which are susceptible to certain other chemicals.

Mercurochrome may be obtained from most chemists or from BDH Chemicals in Poole, Dorset. The required stock solution is 2% in water. It is a useful antiseptic—dilute 1:9 with water to paint onto wounds, fungus, etc.

Further information on these and other treatments may be found in: "Diseases of Fishes" by C. Van Duijn (Charles C. Thomas, Springfield, IL., 1973); "Textbook of Fish Diseases" by E. Amlacher (TFH Publications, 1970); or by contacting a local vet.

C.A.

Coldwater

overhaul . . .

I have a well set-up coldwater tank and give it the weekly servicing. How long will the tank function well without a complete clean out?

So much depends on the conditions. The more fishes there are in the tank and the more food given will regulate the time a tank can be left without a complete clean out. If there is a fair amount of plants and the tank is not over-stocked with fishes, the tank could run quite well for several years. I have had them go for ten years with only the weekly servicing. The amount of plant life should be controll-


Arthur Boarder


Vivian De Thabrew


Hilda Allen


Graham Cox


Eberhard Schulze

ed, thinning out and removing some runners occasionally. It is not wise to allow the plant life to become too rampant as at night when the plants are not giving off oxygen, and especially in warm weather, the lack of oxygen could kill the occupants, especially the larger fishes. These require more oxygen and they will suffer far more quickly then smaller ones. When the tank is eventually emptied it should be well sterilised.

coloured tanks . . .

Do you think that by using a coloured tank for rearing fry, it would influence the colour of the young fishes, say a blue one help the colour of a shubunkin or a red one a goldfish?


The colours of some fish, such as tench, are affected by surroundings

I do not think that coloured glass would make any difference. However, there is no harm in trying. Use a few fry as an experiment but do not be too disappointed if no result is achieved. It is a fact that if some fish are put in a clear glass tank for exhibition purposes, they can lose colour. If a green Tench is taken from a pond and placed in such a tank, it will very quickly lose a great deal of its dark green colour and look very washed out.

breeding pond . . .

I intend to make a breeding pond for raising Shubunkins. Have you any suggestions as to the shape I should use?

The main point to consider is that there should be a very shallow part where the spawning nests can be anchored. Goldfish, and many others prefer to spawn in shallow water where fishes would not normally swim. In 1937 I made such a pond which is depicted in my book "Coldwater Fishkeeping". This had a narrow neck with shallow water where spawning nests were always anchored and where the fishes always spawned. There was also a small segregating pond joined by a tunnel under the path around the main pond. This could be divided off if needed. I also made a small frame with fine plastic netting which was placed over the narrow end of the pond in spawning times to prevent cats from taking the fishes which would often lie on top of the nests, half out of the water. **A.B.**

Plants

light and heat . . .

I am having trouble growing my plants in my 3 ft. tank. I have an outside box filter and one bio-foam filter.

When I first set the tank up a year ago I used Aquarian Peat under 3 inches of gravel. The lighting is one 2 ft. 6 in. Grolux, one 2 ft. Truelight and one 2 ft. Northlite. These are left on 13 hours a day but the plants just seem to wither and die.

I am sorry you have been experiencing difficulty in growing plants. Unfortunately you do not give me sufficient details concerning the conditions in your tank for me to give you very specific answers, but I will give what information I can from what you have told me.

Your rooting medium and filtration appear to be adequate; it is a good idea to use some aquarium peat under the gravel as most tropical aquarium plants prefer slightly acid water conditions. Your medium should be ideally at least 3½in.-4in. deep to allow for good root growth. Your lighting appears to be a bit excessive, two × 40 watt tubes should be sufficient, left on for 8-10 hours per day maximum. Too much light will force the plants, weakening their cell structure, so that they will soon die off.

Two crucial factors which you do not mention are the water temperature and the species of plants you are attempting to grow. The most suitable temperature for any given species depends entirely on its native habitat. Plants from the Malaysian, Indonesian, Indo-Chinese, East African and South American regions usually require high temperatures. Plants from India, Sri Lanka and Bangladesh require slightly lower temperatures. The higher range is from 72°-84°F. However, many plants, like the Cryptocoryne species, prefer a cooler range of 68°-74°F. In the aquarium the aquarist must play safe and opt for a temperature range which will be favourable to a wide spectrum of plants coming from many regions of the world. A range of 70°-76°F should be acceptable to most popular plants available to the aquarist. Of course, you must also make sure

that the temperature also suits your fish, so that the ideal solution is to keep fish and plants from the same part of the world in your tank, to establish an ecological balance. Otherwise a sensible compromise must be reached. I suspect from what you tell me of the short life of your plants that your temperature is probably too high, which would again force the plants and weaken them.

I enclose some plant information pamphlets as a further guide to cultivation.

Some Crypts thrive at cooler temperatures V.T.

Koi

measuring liners . . .

The largest pond I can make is 15 ft. × 10 ft. and is 4 ft. deep, can you please tell me the size of liner I need?

The size of the liner required is equal to the length and width of the pond plus the depth of each side which in your case of a more-or-less rectangular box-shape is 15 ft. × 4 ft. × 4 ft. and 10 ft. × 4 ft. × 4 ft. respectively.

However, it is always advisable to take the liner say 4 to 6 inches above the surrounding ground level in order to prevent contaminated water seeping into the pond from any adjoining lawn or flower beds usually treated with chemicals at some time or other.

For this purpose you should add another 1 ft. to both the length and width giving a final size of 24 ft. by 19 ft. The liner can be stretched slightly as it is pulled and folded into shape while the pond is being filled with water, and should allow the excess amount of liner to be draped over a concrete, stone or brick plinth built around the perimeter of the pond.

A slope to the centre of the pond where a bottom drain should be located will not materially affect the size of the liner and you should also provide for an overflow pipe to maintain a constant depth of water inside the pond in the event of torrential rain, or when adding fresh water to flush away surface debris that is invariably collected.

A retaining wall of choice can be constructed to cover the edges of the liner, and this will serve the double purpose of protecting the fish from marauding cats and hopefully your Koi from jumping out of the pond. This has happened all too often when the water has been near enough at ground level. H.A.

Marine

changing to marines . . .

I have kept tropical freshwater fishes for seven years now and would like to start a marine aquarium. My tank measures 48 in. × 12 in. × 18 in. I would like to use your idea of reverse-flow undergravel filtration by adapting an external power filter to operate an undergravel filter. Please can you tell me how reverse flow U/G filtration works?

I would like to have living-rock and live corals also. Please can you tell me how to look after these?

1. *Reverse-flow U/G filtration.*
This is a system of filtration for any type of aquarium which I developed in the 'fifties and first recommended in the later editions of my book 'The New Seaquarium System' in the late 'sixties.

Efficient filtration must be regarded essentially as two different processes as follows:

(i) *Mechanical filtration* — this term describes the purely *physical* act of removing gross, visible particles of detritus, faeces, etc., from the water thus producing good water clarity.

(ii) *Biochemical filtration* — this term describes the de-toxification of the aquarium or pondwater by billions of 'good-guy' bacteria, i.e. nitrification bacteria which live within the filtrant media itself. This process is sometimes referred to by the obsolete term—"biological" filtration since the process is actually carried out by living creatures, i.e. the nitrifying bacteria.

The most efficient, reliable and cost effective of all forms of filtration is the good, old-fashioned, simple air pump operated undergravel filter. As you go around the shops looking at dealers' tanks you will notice that 99% of them use airlift operated U/G filtration in all their aquaria for the reasons outlined above. The only drawback of airlift U/G filtration is that about 8% by weight of invertebrate and fish excretion is composed of a *non-biodegradable*, fibrous, ferrolignin complex called *sea-humus*. This sea-humus slowly accumulates in the coralsand covering the U/G plate and must be syphoned off once each month to prevent clogging of the filtrant medium. You then top up with freshly prepared synthetic sea-water at the correct S.G. and temperature according to the geographic origin of the creatures which you're keeping. Coincidentally, this 5 minute, once-monthly job freshens up the entire aquarium and reduces the level of dissolved *nitrates* substantially. *There is no need whatsoever to remove any of the creatures, rock or plants from the aquarium when undertaking this work.*

In the paragraph above I said that this infrequent (but vitally essential) little maintenance job was the only 'drawback' of the air-operated U/G filter. The truth is that even the vastly more expensive external or internal power-filter operated reverse-flow filter *also* has the draw-back that every week or 10 days the powerfilter has to be stripped down and cleaned out also. I'm afraid that there is no way that any aquarium, car, motor-bike or mistress can possibly be run indefinitely without a little care and attention being lavished on it—or her! If you're not prepared to make this minimal effort to sustain the creatures which the Almighty has entrusted to your care you'd best stick to stamp-collecting or watching the Idiot's Lantern.

2. *Living Rock and live corals.*
The only special requirements for the successful culture of these enchanting creatures are:

(i) *Light*—as many *white* fluorescent lights as you can pack, cheek-by-jowl into your hood—12 hrs. per day minimum.

(ii) *Vitamins*—regular, i.e. at least once-weekly, usage of 'SeaVita' vitamin additives and 'SeaTrace' trace element booster. Both vitamins and trace elements are taken out of solution by invertebrates, algae and, to a lesser extent fishes, at a tremendous rate.

An invertebrate tank kept in peak condition at the Sansui Aquarium owned by Waterlife Research Industries Ltd

G.C.

Discus

breeding failures . . .

I have been keeping tropical fish for four years now and the first time I saw Discus I knew it was the fish for me, so about three years ago I bought six young Discus about two inches in size. They are now between four and five inches. I have two which have paired off and have spawned 12 times but they have eaten their eggs or fry each time. On the sixth spawning they got to the wriggling stage, on the seventh they got to the free-swimming stage and on the eighth they reared one fry for seven days. I was very excited at the time and at this stage it was looking good. While I was out they spawned again but on the seventh day they ate the young. I was terribly disappointed.

From then on they have eaten their eggs on every third evening up to the 12th spawning. With the six Discus I had two Clown Loaches and two Bronze Catfish. I thought my trouble might have been due to too much commotion in the tank; I therefore put the breeding pair in a 3 ft. × 15 in. × 12 in. tank. The same thing happened again. They were eating the eggs on the third evening, so I put another male with the female, but the same happened again. After another four spawnings I tried leaving the female and male alone with the eggs by separating them with a sheet of glass but the eggs still got eaten. They are Browns.

I have the book "Discus" by Tony Silva and Barbara Kotlar among many others. What I am getting at is that there are two methods of raising Discus fry artificially. I have bought all the ingredients as mentioned in the book and I am thinking of having a go. What do you think about this or do you think my fish will rear any fry if just left alone?

Now anout my set ups. My 3 ft. tank has a bare bottom with one piece of bog wood and six Amazon Sword plants which are held down with rubber suckers and a piece of slate which they have been laying their eggs on. Filtered by a Sacem SF 500 power filter with a spray bar, the water conditions are: temperature 84, GH 6, KH 4. My 4 ft. tank is also filtered by a Sacem SF 500 power filter. This is my display tank. I have about 2 inches of fine gravel on the bottom with three pieces of bog wood and jungle Vallis. My water in both tanks is filtered through a layer of filter wool, active carbon, peat fibre and another layer of wool. The water conditions are the same. In this tank I have now got four Brown adult Discus 4 to 5 inches and three young Green Discus. 1½ inches, two Clown Loaches 3 inches and two Bronze Catfish. By the way, I have had the Green Discus two months and they look more like Browns to me.

I feed my fish three times a day; beefheart; bloodworms, glassworms, FD tubifex and Flake. I change five gallons of water in my 4 ft. tank and two gallons in my 3 ft. tank every two weeks. I use Growlux tubes on both tanks.

Sorry for the long letter but I felt I had to tell you everything. Can you help me please? Have you any suggestion to help me breed? What do you think of my set up? I am using plastic plants in my 4 ft set up to make this tank look nice. I have been reading *The Aquarist* for two years and your column is the first I turn to!

I can certainly understand your frustration but I myself had to wait for more than 30 spawnings before I ever raised any Discus babies. The worst I know is more than 52 spawning. Sometimes, of course, the pair is just not suitable and will never leave the eggs alone. Sometimes, even when one thinks one has achieved it, they will unexpectedly eat the young fry. Pairs like that are really no good and ought to be split up. Often a new partner will completely change the whole thing and suddenly they will stop eating the eggs. If you have other fish why don't you try this. Also, you must remember that not every Discus fish will make a parent!

Your set-ups, water conditions, etc. seem OK, except perhaps your plastic plants. I have never liked plastic plants and since there is a variety of live plants you can keep with Discus fish which like the same quality of water, e.g. temperature, hardness, pH, I see no real reason to use plastic ones. Plants, or growing plants, provide one of the best 'sweetner' and filtration systems of any water and should be used whenever possible. I know it can be very difficult to get them started in a Discus fish tank but since I feel it is essential for the well being of the fish every effort ought to be made.

The only other comment I have to make is about the 'packing' of your filter. I am sure they would work more efficiently if a coarse type of filtering material was used at the inlet and no fine wool. Also, one should not use peat and carbon together in one operation: what peat will put into the aquarium, carbon will take out.

E.S.

ON THE TEST BENCH

by Ian Sellick

Sera 800ER Power Filter

YET another range of power filters! Sera have introduced to the U.K. market a range of three power filters, numbered respectively the 250, 450 and 800ER in allusion to the pump head's nominal flow rate in litres per hour. These filters have the unusual and useful feature of a common canister, the only difference being in the output of the pump. Theoretically therefore, you only need buy a new pump to uprate your filtration system.

I have been trying out the top of the range model, the 800ER. This has a provisional output of 800 litres (nearly 180 gallons) per hour, although this diminishes with loading of the filter canister, especially as the media start to clog.

At a price of just over £60, this filter is priced mid-way between the comparable output Eheim (c. £80) and Fluval (c. £50) models. Like the Eheim, it is a single inlet/outlet filter, but has a single vertically mounted motor driving the impeller via the normal system of magnetic coupling. On the 800ER, there is a rheostat fitted that may be used to adjust the flow of water. At first, I thought this feature somewhat superfluous, but now find it quite useful to turn down the filter to low while feeding the fish in the tank it serves, avoiding washing food particles all over the tank, and also preventing too many being picked up by the filter before the fish can get them! This feature would be of particular value to the marine invertebrate keeper.

Moulded in brown plastic, the filter canister has a central vertical internal division, and four grilles to allow up to four separate media to be used. Both water inlet and outlet are in the lid, water passing from the aquarium, down through the first two media, and then back up the other side of the filter body through two more compartments before being pumped back into the tank. I must admit that I found this system somewhat fiddly to use, especially when changing the filter media after a period of use. The top two semi-circular compartments are no real problem, respectively the first and last filter chambers, but the bottom two, which I used containing an ammonia-removing substrate and charcoal, are more difficult. The tendency is to tip the canister up to remove the media so you need to hold one back while removing the other. No nylon bags for such media are provided with the filter, but I would recommend their use to make media changing easier! Perhaps this is why Sera suggest using these bottom two compartments for permanent filter media to establish biological filtration.

Pump housing showing electronic regulator and metal clips holding lid

Nearly all power filters I have come across filter water flowing up through the filter media; in the Sera filters, the first two compartments have a downwards flow. As there is no real spreader at the top of the first compartment, efficient use is not made of the filter media.

The filter lid is held in place by five detachable metal clips that are quite sturdy, but do have an annoying habit of falling off just when you don't want them to! Full marks, though, to Sera for resisting the temptation for fragile plastic.

One thing I didn't like about the lid is the fact that the top grille is not loose, as it is in most other filters, but held in place by a Philips-type screw. As this grille really needs cleaning every time the media are changed, it is an unnecessary chore to undo the screw. It is also another small piece to lose down the sink!

The filter is provided with an adequate length of approx. ½ inch diameter brown ribbed flexible hose, two flexible concertina pattern joiners similar to the Fluval type, an inlet tube with a strainer, and a unique spray bar. This tube is telescopic, with a hole at each end, the idea being that it should be placed with one opening at the water surface, the other at the level of the gravel, to give an even flow. In practice, I found it best just to use the broader portion of the tube (the only part the piping supplied will fit, incidentally) and mount it like a conventional spraybar. The return water from the filter sprays out of the large diameter hole in the bar with considerable force, thoroughly agitating the surface and providing a good flow round the tank.

The suckers for the piping that came with the filter were most disappointing; apart from the fact that they were the wrong size, which I take to be a one-off packing error, the clear plastic sucker with metal clip is not a type I like. Sera would do well to follow the plastic clip, neoprene-type sucker of other makes such as Eheim and Fluval.

My final grumble concerns the instructions supplied with the filter. These are frankly hopeless, especially to the aquarist who might be buying his first power filter and not know the basics of setting one up. The cutaway photograph on the leaflet does not help; the text suggesting the use of Biopur, a ceramic high absorption volume medium that acts as a biological substrate, whereas this is not illustrated.

This photo has certain parts labelled 1-17, but these numbers aren't referred to. I suspect part of the problem is an inaccurate translation from German, viz. "*The 4th chamber is designated to special filter mediums e.g. (granulated peat) doing heavy duty filtration as required in case of filter carbon if improper drugs were used, to absorb any other toxic matter or in tropical aquariums for Sera-peat granules*". Much of the rest of the leaflet contains similar gibberish. A clearly worded leaflet, with a good explanatory diagram would be easy to insert into each box. Perhaps this is something the U.K. distributor could look into. There is no mention in the leaflet about additional items such as taps, quick-release couplings, etc., nor spare parts which contrasts with the very ful information on these aspects given particularly by Eheim, and also for instance by Hagen for the Fluval range.

I have used this filter on a 100 gallon tank with a collection of mbuna for nearly three months at the time of writing. The tank is heavily stocked and biological filtration is provided by undergravel filters. However, since using the 800ER the water does seem to have an added sparkle as particulate matter is efficiently removed by the very good water flow generated.

With the proviso that there are a number of small grumbles that need looking into, this is a good, powerful filter, and should carve out a niche for itself in the highly competitive external canister power filter market.

Sainpa Airstone

Over the years, the humble airstone has probably been the subject of more experimental comings and goings than any other single item of aquarium equipment. Many of the newer types are still with us, but the bonded sand version scores generally for cheapness, which means it can be replaced every time it clogs for very little outlay. This can, however, be a nuisance in many instances especially as these airstones are not very efficient at allowing air to pass without causing back-pressure on the pump that is running them, leading to accelerated diaphragm and valve wear. In hard water areas they get clogged more quickly, and changing the airstones in undergravel filters is a bind, in some models of UG almost impossible.

Here, then, is a new approach to the problem, a plastic airstone that is constructed of thousands of beads fused together into the traditional cylindrical shape. The air that can be passed through this diffuser (the word *airstone* seems inappropriate) is quite exceptional, with much less back-pressure on the pump. Yet the bubbles themselves are nearly as fine as those generated by a traditional stone. This makes for a more efficient undergravel filter for any given size of pump, as more bubbles will move more water. Although it is really too early to give a definite life span, there appears to be virtually no deposition of calcium salts from our 250ppm hard water onto the plastic, almost as though it is non-stick Teflon!

As the traditional airstones need replacing every two months to maintain an adequate through-flow of air, this is quite an advantage. If the Sainpa diffuser lasts four times as long, it will pay for itself at £1·12 against the 28p I usually pay for the sand type, and with a distinct convenience advantage in one less chore to do in the fish house.

You will note I keep referring to its use in undergravel filters; I do use airstones free in the tanks as well as in undergravel filters, but here I frankly found the buoyancy of the Sainpa diffuser a nuisance. No matter how well you catch the airline under rocks, my fish (cichlids of course!) always seemed to dig it out when it then floated to the surface. A more thorough attachment to the substrate would no doubt solve this, but this small minus in no way detracts from the fact that this seems a very useful new addition to the available range of air diffusers.

Distributed to the trade by C. J. Skilton, the 3cm long model retails at £1·12 and there is a 6cm version at £1·43.

OSCAR

G. Robinson

A brief history of the MARINE AQUARIUM

by
Graham F. Cox

INASFAR as it has been possible to research the early development of the home marine aquarium, it would appear that one man above all others first began to generate interest in the keeping of marine life in the home. This Englishman, **Philip Henry Gosse,** during the period 1850-1860 produced numerous newspaper/magazine articles and handbooks explaining how to collect, transport and care for native British marine fishes, algae and invertebrates. A very important contributory factor to the 'great marine aquarium mania' which rapidly spread through the more wealthy households of Britain at this time had been the swift development of a national **railway network** which made it possible for both the *nouveau riche* middle-classes created by the Industrial Revolution and the already-wealthy upper classes to visit the seaside on a regular basis for annual holidays and even at weekends for those living reasonably close to the coast.

In the case of London especially, the new railway system also facilitated the shipment of closed seawater containers and living creatures from professional collectors based in seaside towns to a new breed of livestock dealer who specialised in the sale of small marine specimens to the new hobbyists. Foremost amongst these professional aquarists was a London dealer named **W. Alford Lloyd** who progressed from a small shop in Portland Road, Regents Park to become the designer of many of the new **Public Aquaria** which began to appear in a number of Europe's principal cities during the period 1850-1900.

Due to the lack of availability of small air pumps, water pumps, synthetic sea salts, filtration systems, water quality test kits, etc., together with an almost total lack of understanding of the intricate operations of the nitrogen cycle within a small closed-circuit aquarium, it is sad to record that the majority of would-be Victorian aquarists only succeeded within a few days in converting an excitingly novel home marine aquarium, which had been the talk of the local 'smart set', into a foul smelling liquid morass. The elegant Victorian drawing rooms were clearly not enhanced by these new-fangled, glass-fronted indoor cess-pools and so the home aquarium craze was virtually extinct by the early 1860s, having lasted for only 10 years or so.

We now have to progress forward in time almost a century, until the late 1950s before we again see the birth of any interest in maintaining home marine aquaria.

The intervening 100 year period had seen aquarium technology in both theory and practice progress very rapidly. The small, electrically operated **air pump** appeared, first in all-metal piston form and later as the vibrator-actuated rubber diaphragm type. These pumps made it possible to aerate the aquarium water, at the same time reducing its carbon dioxide content and increasing the dissolved oxygen level. Almost simultaneously the **airlift principle** was applied to the home aquarium. It was known that if air was injected into the base of a vertical submerged tube, the resulting air/water mixture would rise within the tube a distance of a few centimetres above the level of the general aquarium water level. This water, containing the aquarium creatures' excretory products, could then be caused to pass through a bacterially active filtrant medium such as sand, gravel, glass-wool (or, slightly later, plastic filter-wool), or charcoal and then gravity-fed back into the aquarium. A few years later a number of German companies such as **Eheim** and **Nuova** began to manufacture miniaturised complete aquarium filtration systems for the home aquarists. These devices were quickly dubbed 'power filters', as opposed to the air-lift operated internal or external box filters. They relied for their operation on a fractional horsepower rotary electric motor to drive a centrifugal impellor which sucked the water through a watertight plastic box containing the filtrant media.

Glass-enclosed electrical aquarium heaters and thermostats in much the same form as they exist today (but sealed with natural rubber bungs which slowly perished in the water), had already appeared in the 1920s. This development facilitated the birth of tropical freshwater fishkeeping in the home. The prices of even the more common freshwater species from the tropics were, however, due to remain astronomically high by today's standards until the advent of the plastic bag and intercontinental jet aircraft in the 1950s.

All the above developments are, of course, of crucial importance to all aspects of the maintenance of all small home aquarium with the dual exceptions of the submersible heater and thermostat. Neither of these latter two pieces of equipment is either necessary or desirable in the indoors maintenance of aquaria housing Temperature Zone creatures, whether they be of seawater or freshwater origin. In the writer's view, the four most significant developments which made possible the unique explosion of interest in the domestic culture of marine-life from the 1960s until today are listed below in decreasing order of importance.

1. Synthetic Sea Salts. Various fomulations for re-constituting seawater from a mixture of blended dry chemicals dissolved in tapwater had appeared in scientific literature

At the London Aquarium, under Waterloo Bridge on the South Bank of the Thames, new imports of tropical marine fish were displayed as well as tropical and native freshwater fishes in the late forties and fifties. This *Grammistes sexlineatus* and the accompanying Octopus were photographed there at that time and were among the many marine exhibits as yet presenting difficulties in keeping by the marine hobbyist. Eric Bowler of South Coast Aquatic Nurseries, the curator and proprietor of the Aquarium, was one of the pioneers who took risks in importing many varieties of very expensive specimens in an endeavour to find methods of keeping them under aquarium conditions

since at least the 1920s. However it wasn't until the early 1950s that these formulations had become sufficiently sophisticated to support the life of the more delicate marine life-forms. The development of these artificial seawaters, at first only in universities and marine biological research centres but later commercially, meant that no matter how far one lived away from the coast, crystal clear seawater which was free of all pathogens and parasites could be prepared from a standing start within a matter of a few hours and could then be held permanently in reserve for periodic partial water changes.

This single evolutionary step away from the expense and inconvenience of transporting natural seawater home from the sea shore cannot be over-emphasised. Had synthetic seawater been available to Gosse and Lloyd, together with small air-pumps, then the sudden upsurge of interest in the native marine aquarium in the middle of the nineteenth century would probably never have foundered.

2. Undergravel Filters. This remarkably simple and fool-proof yet extraordinarily efficient filtration system didn't manifest itself as a means of successfully keeping delicate tropical marine creatures alive until the closing years of the 1960s. Undergravel filters operated by small-diameter airlifts which drew water from a network of perforated plastic tubes located below the tank's floor covering of fine gravel had been available to the freshwater hobbyist for at least a decade previously but it wasn't until the all-over fitting, perforated plastic base plate type, operated by one or more large-diameter air-lifts appeared in the late 'Sixties, that ever-increasing numbers of marine aquarists of relatively modest means found that they could successfully keep tropical (or native) marine creatures alive in home aquaria. Prior to this development, only a few relatively wealthy aquarists, who could afford the *de rigeur*—and unsightly—ancillary equipment such as one or more powerfilters, protein-skimmers, ultra-violet sterilizers and ozonisers had felt able to attempt to keep tropical marine-life at home.

3. Silicone Rubber Sealants. Two of the many problems facing early marine aquarists were **corrosion** of the metal framework of the aquarium and the **toxicity** of both these corrosion products and the mastics used to seal the glass panels into the aquarium frame.

In the mid-1960s, as a technology spin-off from the American space exploration programme, an entirely new family of adhesives/sealants were developed known as **silicone rubber.** This new material adhered to glass so strongly that, if two pieces of glass were bonded together using silicone sealant and then set aside for the full 24 hour silicone curing period, any attempt to separate the two glass sheets would result in the breaking of the glass rather than the failure of the silicone/glass bond.

Initially the full significance of this fantastic new material didn't dawn on marine aquarists. They didn't realise that by using slightly thicker glass than had previously been used to glaze plastic-coated steel-framed aquaria, and the new silicone rubber adhesive to bond the five plates together, a totally corrosion-free, non-toxic all glass aquarium could be built. Until as recently as 1971, almost all Britain's commercial aquarium tank manufacturers were still offering plastic-coated, steel-framed aquaria which, if they used silicone rubber at all in their construction, simply used it as an internal sealing strip to seal off the glazing mastic from contact with the water. In 1984 not a single mass production manufacturer of steel-framed aquaria survivies.

4. Combined Heater Thermostats. Another pitfall awaiting the early tropical marine aquarist was of an electrical nature. Irrespective of whether he used an internal glass-encased thermostat or an external thermostat sensing the water temperature through the glass, somewhere he had to have a mains voltage electrical connection between the heater and thermostat. Seawater is a very searching liquid, so that sooner or later it would find its way into this electrical connection and being also an excellent conductor of electricity, would cause a short circuit. Such is the perversity of Nature on these occasions that the short-circuit would almost always occur within a few minutes of the aquarist retiring for the night, on a frosty winter evening just after the central heating had switched off for six hours, and with the "short" also taking out the aeration and filtration! It is not difficult to imagine the sight facing the hapless aquarist next morning.

'A submarine scene' from a drawing by L. R. Brightwell F.Z.S.

In the winter of 1967/68 an entirely new type of heating apparatus appeared on the U.K. market, i.e. the combined heater/thermostat which is now virtually the only type of aquarium heating equipment on sale. The great significance of the combined heater/thermostat to the marine aquarist was that the electrical connections between the heater and thermostat were made **within** the all-enveloping glass tube so that only one mains cable emerged from the instrument for connection to a mains plug.

It is clearly impossible in such a brief article to chronicle all the developments in home marine aquarium keeping since its inception in 1850 until to date. To treat such a huge subject adequately would require a sizeable

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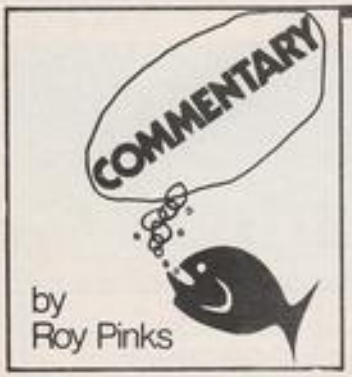

I AM reminded that *The Aquarist*, founded in 1924 as *The Amateur Aquarist*, is now 60 years old. We, that is, the magazine and I, thus appear to be much of an age, and a brief backwards look will not be out of place. I was about seven or eight when I first became attracted by creatures which live in water, and this was encouraged by my weekly visits (to spend pocket money) to a children's boating lake on the outskirts of Epping Forest, and the many hours I spent in the paddle boats gave me plenty of time to get on friendly terms with much of the wildlife (plants apart—they tended to foul up the paddles!) and it was not long before I began to fill every sort of container I could lay hands on, first with water, and then with anything interesting I could net.

At that time we took our guidance from two periodicals. There was a weekly, *Water Life*, which cost threepence and a monthly, *The Aquarist*, which cost a shilling (prices approximate). The impatient and impoverished bought the former, but both were excellent value and contained articles by some of the great craftsmen of the hobby like Hems, Boarder, Hardy, Evans and Perkins. It was a feature of the time that articles were largely facts and real experience (supported by photos), and back numbers of both of these journals are invaluable sources of reference which time has not diminished. I very much regret the present tendency to flood magazines with a series of pictures of the sex life of fish—excellent photographic technique, no doubt, but of little lasting value to the student.

The student, indeed, was constantly appearing in one article or another, which underlined the involvement of schools with the study of water life. This is rather lacking in today's magazines, which is something of a pity, as publicity certainly helps to encourage further study and helps to convince students that they are tackling worthwhile subjects. The enterprise and ingenuity in many establishments was always of interest and often sparked off reactions by outsiders, who sometimes copied and sometimes improved: they communicated what they did more often than not because they had fewer distractions than now exist in our pace of living. Altogether, the hobby had a bigger place in our lives because there were not things like radio and TV to move it into a minor role.

One thing was certain in the earlier days. We all had much more respect for the creatures we kept than we now do. This was partly because they cost a lot of money, especially tropicals, which we had to keep at all costs. Electricity was not part of every home then, and many beginners heated their tanks with a splendid oil heater called The Little Marvel, which marketed (I believe) at about five shillings—a princely sum. My own first guppies went into a tank warmed by a wax night light, which was like a flat candle and only lasted a few hours. That particular project came to an abrupt halt after about two days, as the heat cracked the slate base of the tank in the middle of the night, and the consequences of the almighty burst were bandied around the house for many months to come. I was encouraged to keep lizards after that particular episode, and again the two magazines I have mentioned gave me all the information I needed.

One of the things I particularly remember about the thirties was the family nature of the hobby fostered by the aquatic press. Nothing was too trivial to publish, and I would look forward eagerly to readers' letters and the articles for beginners to give me further impetus. Another source of great interest was the advertising, and I would avidly study all the bargain offers (particularly for plants) before sending off my postal orders for this or that. I can recall a Common Lizard being delivered to my home at 10 p.m. one night, excellently packed in a cardboard transit box: it came by hand of a railway worker who was pedalling home on his bicycle, and who took it as just part of the service to deliver immediately livestock which might otherwise suffer by a wait at the local railway station. How times have changed!

On the other side of the picture we were very much learners when it came to making our tanks look wholly decorative. Solid angle iron frames painted green, surmounted by pyramid shaped covers made from perforated zinc were straight from Victorian thinking and remained inviolate for many years. The all glass tank, supported by modern electrics, electronics and artistic know-how is a revolution in itself, and has helped to enable the tank to harmonize with the home on equal terms to the video and unit furniture. The Continentals have weighed in, too, by teaching us how to use plants skilfully and with purpose.

It always was the purpose of *The Aquarist* to address the beginner and the old hand alike, and I think it has fulfilled this most faithfully. It is certainly a tribute to all concerned that it has done its job for all of 60 years, and I wish it a century and more —a sentiment I am sure all readers will support. In particular I hope it will continue to counsel craft rather than haste, and that it will go on encouraging readers to try their hands at new things, as nothing palls quicker than the illusion that one knows all and has done all. The beginner will perhaps most appreciate the efforts of the editor to welcome him and to keep him on the straight and narrow: after all these years I still feel I am learning about fish, and enjoy the articles for beginners rather more than the more specialised subjects. I wish all concerned with the magazine every success in continuing to keep up with its readers and with the times in which they live.

SPOTLIGHT

Malpulutta kretseri Deraniyagala, 1937

by John A. Dawes

Photograph:
Courtesy of Aquarian Fish Foods

DESPITE having several common names, such as the Ornate Paradisefish or the Mottled Pointed Tail Gourami, *Malpulutta kretseri* is, more often than not, referred to simply as *"kretseri"* by Anabantoid enthusiasts. Besides being more scientifically correct, this last name has a further advantage in that it presents considerably less of a mouthful than either of the others.

M. kretseri was described in 1937 by Deraniyagala, a Sri Lankan ichthyologist, after receiving an aquarium specimen from L. de Kretser (hence the specific name). The generic name, *Malpulutta*, is derived from the Sri Lankan words for flower (*mal*) and for another native fish, the Combtail—*Belontia signata*, (*pulutta*). While the significance of the "flower" part of the name is difficult to evaluate, the *"Belontia"* half reflects the fact that both fish are related in some way. In fact, they both belong to the Anabantoid family Belontiidae. Other members of this family include the Paradisefishes (*Macropodus* spp), the various *Colisa* and *Trichogaster* species and all the *Betta* species (some of which should be regarded as *Pseudobetta*, according to Richter, 1981).

Malpulutta is a monotypic genus, i.e. it is represented by the single species, *M. kretseri*, which is endemic to Sri Lanka. Early reports of the distribution of the species on the island indicated its existence in the north as well as the south. Today, it is believed to be restricted to the Southwestern Ichthyological of its geographical range, the major ones are thought to be pollution, largely by seepage of pesticides into streams, and exploitation for the aquarium trade. Deforestation may also play a significant role in the decline of *Malpulutta* populations in the wild when trees are cut in areas where the shaded streams inhabited by the species occur (Senanayake and Moyle op. cit.).

According to the 1981 report by the International Union for the Conservation of Nature and Natural Resources (IUCN), conservation measures had been proposed but none had yet been taken at the time of publication. There was one gleam of hope, however, in that a revision of the Flora and Fauna Protection Ordinance was actually considering the total protection of this and other threatened Sri Lankan fish species. At the moment, though, *M. kretseri* is officially regarded as vulnerable by the IUCN. This category is reserved for those species which are "believed likely to move into the Endangered category in the near future if the casual factors continue operating".

Being well aware of the precarious state of *Mulpulutta* in the wild, the Anabantoid Association of Great Britain has gradually obtained specimens over the past few years with the aim of encouraging the establishment of aquarium stocks through a captive breeding programme. Although some success has been achieved, progress is slow. Some of the main reasons for this are that this beautiful little (c. 5 cm.)

vegetation or under a broad submerged leaf. At 28°C (82°F), the eggs hatch out in about two days and the fry become free-swimming two to three days later. First foods should consist of Infusoria or a suitable alternative. Despite the greatest care, some fry will die when they reach the stage during which the labyrinth (auxiliary respiratory organ) begins to adopt its permanent role. This occurs when the fry are approximately 10-14 days old. As all those aquarists who have bred any of the Anabantoids know, this quite normal. However, when it comes to *Malpulutta kretseri*, the problems seems to be compounded by an apparent reluctance to spawn. My own pair, for example, are nearly two years old and have only successfully spawned once.

We can only hope, therefore, that perserverance will produce results and that it will not be too long before we can boast of thriving aquarium stocks of "Kretseris", thus helping in some way to reduce the pressure that is currently experienced by wild populations.

For further details of *Malpulutta kretseri* and other Anabantoids, contact the Anabantoid Association of Great Britain, c/o Allan Thompson (Secretary), 4 Nelson Avenue, Nelson Village, Cramlington, Northumberland, NE23 9HG, England.

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A brief history of the Marine Aquarium

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book and a great deal of international research. For example, it would have been of great interest to examine in depth the vital parts played by the pioneer importers of marine life—men such as **Eric Bowler** (South Coast Aquatic Nurseries), **Max Gibbs** (The Goldfish Bowl), **Jack Goodman** (Chiswick Aquarium), **Colin Roe** (Shirley Aquatics), **John Dawson** and more recently **Richard Sankey** (Tropical Marine Centre)—since without the tenacity, investment and dedication of these men (and many others) there would never have been a marine hobby in the first place.

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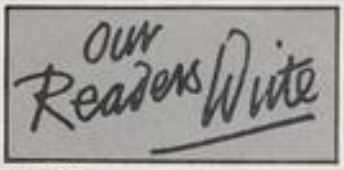


Dear Sir,

I read with great interest Mr William Ross's article "Mystery fish of Saudi Arabia" in the May, 1984 edition of *Aquarist and Pondkeeper.*

I have recently returned from an eight year stint as curator of the Al Ain Zoo and Aquarium, Abu Dhabi, United Arab Emirates. This is the largest and most comprehensive zoological collection in the Middle East, if not Asia, and situated very close to the border with Oman.

In the zoo we used the fish *Tilapia mossambica* in all outside pools for the control of mosquitos and as a pollution monitor. The fish were highly prolific, breeding when even as small as 7 cm but rarely growing over 25 cm in length. Fish were occasionally used for feeding in the zoo. Being so numerous they were incredibly easy to catch, an unbaited length of string being sufficient to pull out several in a couple of minutes. It was not unknown for visitors to catch fish though we did not encourage this. Our visitors came from all over, even driving down from Kuwait just to visit the zoo. Hofuf is about mid-way on such a trip.

Pools were drained and cleaned on an irregular basis and not necessarily restocked immediately. Yet fish would appear as if by magic. This mystery was solved when we discovered that some fish were living, breeding and thriving in underground pipelines supplying water around the zoo.

I am not suggesting that either of these points are an answer for Mr Ross's fish as I regret I am not familiar with the conduit system in Hofuf but it does open another avenue towards a possible explanation.

There always will be mysteries in Arabia, but a simple explanation will surely be found for most. What concerns me most is that if these fish should breed unchecked they will surely wipe out the endemic species. *Aphanius dispar* is small and quite widespread; it may be considered a local fish but can't possibly hope to compete with the much larger *Tilapia. Gambusia affinis holbrooki* was, of course, an introduced species over much of the Middle East and Asia as a means towards mosquito control. It is a small, hardy fish and seems to co-exist happily with local fishes; no doubt studies were done before introductions were made. The *Tilapia.* will take over, of that I'm sure. I've seen how rapidly they can reproduce in Middle Eastern conditions. Much of the so called 'civilized world' has already been messed up, in some cases irreparably by fish introductions. It's a pity that this stupidity has spread as far as Hofuf. I'd like to think that the fish Mr Ross caught were the only specimens.

I wonder if Mr Ross is familiar with the excellent article "The freshwater fishes of the Arabian Peninsula" by Keith Edward Banister and Margaret Anne Clarke published by the Ministry of Information and Culture, Sultanate of Oman. This describes no less than nine species and is by no means comprehensive. I am aware of a 'blind cave fish' caught in Southern Oman a few years ago but I don't believe it has been scientifically described as yet. It fair whet's ones appetite to the possibility of the discovery of further endemic species.

Wishing Mr Ross the best of luck in his fish hunting.

Yours sincerely,

PETER DICKINSON.
16 Cambria Road,
Old Colwyn,
Colwyn Bay,
Clwyd, North Wales.

Australia Rules...OK!

by Martyn Haywood

EVERY once in a while something happens in the aquarium hobby that sets the pulse racing of even the most experienced fishkeeper. For the tropical fishkeeper it may be the development of a new strain of discus or the discovery of a new and beautiful catfish. For the pondkeeper, the sight of a truly champion quality koi might turn the trick. But for the marine hobbyist the arrival of a shipment from Australia is always the cause for excitement.

The Great Barrier Reef, which embraces the north-east coast of Australia, is home to some of the most exotic and beautiful marine fishes in the world. Occasionally we are privileged to have the opportunity to acquire specimens for our tanks. Not only are there many species endemic to Australia but even those species which may also be obtained from other seas seem to take on an intensity of colour which makes them stand out from the crowd.

Most marine fishkeepers will have seen, or kept, that most beautiful of triggers, the Clown Triggerfish, but the Filipino specimens fade into comparative insignificance when faced with one of Australian origin, where the familiar white spots are replaced with patches of sky blue. Similarly, an Australian Harlequin Tuskfish, always a spectacular animal, virtually glows, so vibrant is its colour. However, it is the endemic species and a few more widespread but particularly rare fish which catch the imagination.

Foremost among the endemics are the angelfishes and butterflies. Best known among the angels is probably the Scribbled Angel, *Chaetodontoplus doublayi*. This splendidly showy fish has a chocolate brown body covered with lighter scribbled markings, hence the common name. Its dorsal and anal fins show electric blue stripes while a bright yellow band runs from the base of the tail, along the base of the dorsal fin and down across the gill cover to the pectoral fins. The Scribbled Angel makes a marvellous aquarium specimen—it is among the easiest Chaetodontoplus species to start feeding, taking the usual frozen foods but also requiring a large proportion of vegetable matter in the diet. They are less inclined to damage sessile animals than most other angelfish when kept in mixed fish and invertebrate communities and, after a short settling-in period, are almost always out on display.

A close relative, but less often seen, is *Chaetodontoplus personnifer*. Here the body is the richest velvety black, the tail is yellow and a broad, nearly pure, white band reaches from the shoulder to the yellow pectoral fins. This fish is a little more reluctant to feed than its cousin but if it is kept in a fish and invertebrate tank with plenty of rockwork, it invariably learns to recognise the offered food. A good vegetable food should figure prominently in the diet for although if will accept the more meaty foods quite readily, *C. personnifer* needs the plant material to keep in peak condition.

Among the butterflyfish the most readily recognised is *Chaetodon reinfordi* as this gorgeous fish has appeared in many books but few people have had the privilege of seeing the live animal. To describe *C. reinfordi*, a silvery gold body with four dark bands edged with orange-gold, cannot do the fish credit. This is one of those fish which seems to ooze an air of indefinable quality. Unfortunately it is just as finicky as it is beautiful. If water conditions are not exactly to its liking, and that means perfect in every way, then it will frequently go down with oodinium. Even when conditions are right the next hurdle is to get this fish to eat. Probably the best chance of success lies in introducing it into a well stocked invertebrate tank—this on the basis that it may peck at the sessile animals and so learn to take alternative foods to its native corals. More often, unfortortunately, they do not feed at all and so no harm is done to the invertebrates. Like many of the Indo-Pacific butterflies which feed mainly on coral polyps, this fish is one of those which, because of the failure rate in captivity, is best left in the sea.

A much better bet, and a less expensive one, is the Golden Butterfly, *Chaetodon aureofasciatus*. This charming fish has a tarnished gold body which shades brown towards the tail. A dark band runs down through the eye and just behind this is a liquid gold stripe from which the fish derives its specific name. While these can by no means be described as one of the easiest butterflies to keep, equally they are by no means impossible.

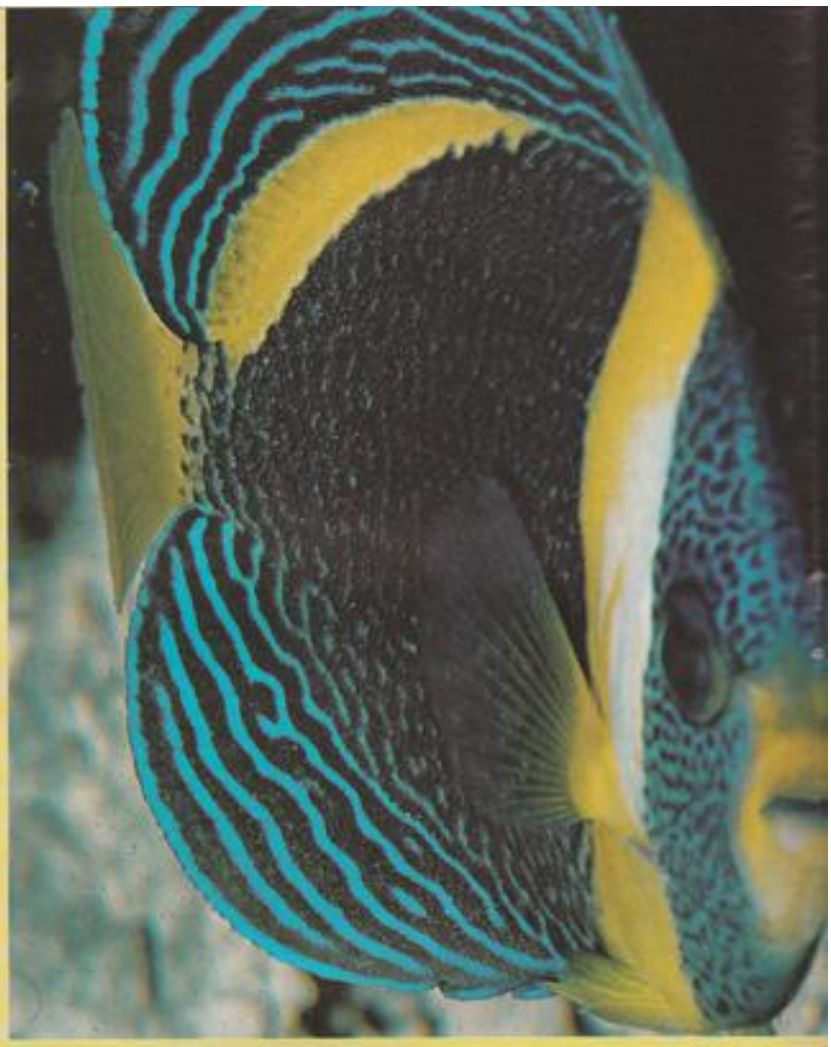
Given good conditions, unassum-

ing tank-mates and plenty of hiding places. Golden Butterflies usually soon learn to take commercially available foods. Live brine-shrimp is a good starter food and they also enjoy various shellfish. Having said this, this fish is not happy on a one meal a day regime. They will usually only take small amounts at any one time and so need feeding little and often.

The real star among Australian butterflies to my mind however is the Black Copperband, *Chelmonops truncatus*. All marine hobbyists will be familiar with the common Copperband, *Chelmon rostratus* but in Chelmonops the banding is black rather than copper coloured. There is also a distinctive eye-spot in the soft rear part of the dorsal. This fish comes from waters somewhat cooler than most tropical marines but seems to have no problem adjusting to temperatures in the low to middle seventies Fahrenheit. Black Copperbands, like their relatives require a low nitrate level or they will not feed satisfactorily. Given good water conditions and a few meals of live-brineshrimp, or other suitably sized live food, they will learn to take various frozen foods. Once feeding well they make good, if somewhat shy, aquarium fish.

Another black and white fish, though one which is considerably easier to keep and therefore of more immediate appeal is the Blue Lipped Clown, *Amphiprion latezonatus*. This again is a fish with class. It is big and beefy, a king among clownfish and a real joy to keep. The pale blue lipstick markings, unique among clownfish, are a bonus in a fish that is everything that might be desired of it.

It is impossible to consider Australian marines without including that most peculiar, rare and interesting animal, the Pinecone or Pineapple Fish. This cute little creature, rarely more than three or four inches long, looks exactly like a golden pinecone. The scales are raised and pointed, rather like those of a Pearlscale goldfish, and the black edging gives the pinecone



effect. The eye is almost invisible and at first sight they seem to have a disproportionately tiny mouth. When feeding however on small fish, shrimps and the like, the mouth opens like a Gladstone bag to enable the fish to take prey up to half its own length. While by no means an easy fish to keep, and one that is always expensive, the avid fishkeeper finds these risks worthwhile for the display put on at night. Just below the eyes there is a small bioluminescent organ which glows a luminous blue green colour at night. It is very eerie to stand in pitch blackness watching a tank containing three or four of these fish. Pale blue lights drift and flicker through the tank, disappearing only to reappear seconds later in a different part of the tank. Possibly these lights are used to lure food in its natural habitat.

There are many other Australian fishes which appear from time to time on the British aquarium market but those mentioned are among the most popular and frequently seen. Unfortunately a combination of circumstances makes these fish among the most expensive in the hobby so for many people they will be beyond reach but for the fortunate few Australia offers some very fine animals.

Vivid blue fin markings and light scribbling across the body are the hallmarks that make the Scribbled Angel, *Chaetodontoplus doublayi*, an aquarium gem

The Black Copperband, *Chelmonops truncatus* is only rarely available within the aquarium trade, unlike its very similar cousin, *Chelmon rostratus* which is very common

The Pinecone fish, *Cleipops gloriamaris* is one of nature's oddities and makes a delightful, if very expensive, aquarium resident

The very beautiful *Chaetodon reinfordi* is often very difficult to begin feeding and only experianced hobbyists should attempt to keep them

Tomorrow's AQUARIST

SPENCER OSWALD'S LECTURE

Some Aquatic Societies actively encourage their younger members and beginners to play as active a part in activities as possible in the hope that this will lead them to develop their skills in fishkeeping and (equally important) their knowledge of fish.

Edinburgh A.S., one of the oldest Societies in the British Isles, is very aware of the potential of its newer members and tries to get them involved from the outset. One such member is sixteen-year-old Spencer Oswald who recently lectured to Edinburgh A.S. on various species of *Synodontis*.

Below is a summary, submitted by Spencer via the E.A.S. Committee, of his excellent talk. We publish it here because it shows the tremendous amount of research that went into the exercise, and in the hope that other Societies will find the idea attractive and useful enough to incorporate into their own programme of activities.

Synodontis come from Africa and live in big lakes and slow-moving rivers. They are in the Mochokidae family which includes *Brachysynodontis* and a few others. There are only very few catfish like them. Many swim upside-down, hence the name Upside-down Catfish.

The most common two *Synodontis* are *S. nigrita* and *S. nigriventris*. *Nigrita* is a brown to peachy colour with dark brown spots, becoming larger on the back than on the head. The spots on a fully grown *nigrita* should be at least 2 mm × 2 mm across.

Nigriventris is the true Upside-down Catfish as it rarely swims the right way up. Its belly is black instead of its back.

The cheapest *Synodontis* can cost from £2 to £3. Large *nigrita* can vary. The more expensive *Synodontis* such as *angelicus filamentosus* and *flavitaeniatus* and a few others can

Synodontis angelicus

cost around £50 to £70 for a three-inch specimen.

The only way to identify a *Synodontis* if you are a beginner is by the high dorsal fin which forms into a spike in some species. They also have feathery whiskers underneath the mouth, and a mousy look to the face.

Some *Synodontis* coming from Lake Tanganyika and Malawi are territorial and, therefore, require a good deal of space. For example, *S. schall* looks a beautiful catfish to the inexperienced catfish enthusiast so he buys it thinking it's just another *Synodontis*. Once it settles down *S. schall*, being vicious, starts chasing the other catfish. It also grows very big and starts outgrowing the tank. However, this only happens to a few of the *Synodontis* species like *schall*, *njassae* and *nigrita*.

When *Synodontis* are chased, they sometimes make a grunting noise which usually scares the chasing fish. If this doesn't work the second defence comes into action. They have spines on the first ray of the dorsal fin and on the pectoral fins which get stuck in the enemy's mouth and gills and usually kills them.

An expert can usually tell the difference between *Synodontis* by the Humeral process of the face mask of the fish, but if it is not a "Nigrita-type", there is an easier way, such as in *Synodontis alberti*. This has very long maxillary barbels. Others have trailing dorsals like *decorus* and *filamentosus*, but it is the *Synodontis* which look like *nigrita* that get most of us confused.

The maxillary barbels in *Synodontis* are rather short for a catfish. These are the barbels at the side of the mouth used for feeling. The mandibular barbels are used for tasting and situated underneath the mouth. They are very sensitive and, if they are cut or bitten off, they may not heal again.

Synodontis have been introduced to this country in the last few years. They are quite hardy fish and will eat anything, but should be fed with live food at least once a week and on a good flake food a few times a week.

★ ★ ★ ★ ★ ★ ★

FUN-FISH WINNER

This month's prize of a **free six-month subscription to** *Aquarist & Pondkeeper* goes to fourteen-year-old **Andrew Dodds, of 240 River Road, Dunmurry, Belfast, Northern Ireland** for his highly colourful (sorry for the black and white reproduction), humorous and highly original drawing of *Badis badis*, the Chameleon Fish.

At the other end of the spectrum, as it were, what would *Goodea gracilis* (one of the Mexican Livebearers), an Angelfish or a Devil's Hole Pupfish (an endangered species of Killifish) look like? If you have any ideas send them in to:

Fun-Fish Competition
c/o The Consultant Editor,
Aquarist & Pondkeeper

The Yorkshire Aquarist Festival

by John A. Dawes

This year marked a milestone in the life of the Yorkshire Aquarist Festival organised by the Yorkshire Association of Aquarist Societies: its tenth anniversary. If the hustle and bustle of the intense activity experienced during the 18th and 19th August can be taken as a sign of its state of health, then Y.A.F. can look forward to a long, successful and healthy future.

Needless to say, success does not fall from the sky as if by magic. It takes enthusiasm, hard work, and steel-like determination. Having witnessed the gradual transformation of the hall at Doncaster Racecourse from a large, empty space to one full of interest, colour and spectacle, I can say that this year's Y.A.F. Committee exhibited an abundance of all three qualities.

Further proof of this became evident on the Saturday in the competent way that potential problems surrounding the smooth running of the lecture programme were tackled and successfully overcome. To Norman Bolton, the Show Secretary and Floor Manager, I extend my own personal vote of thanks for getting me out of a tight spot concerning projection facilities, thus ensuring that my lecture could take place without undue inconvenience to the audience.

On the subject of lectures, the programme included contributions from Chris Andrews, Keith Barraclough, Les Holliday and Vivian de Thabrew as well as my own. In addition, there was a Questions Forum during which representatives of Specialist Societies faced wide-ranging queries from the audience. As usual, these activities took place in the Gainsborough Bar which had been suitably provided with blackouts for the purpose.

In the Lonsdale Bar, there was the annual popular programme of cartoons running both on Saturday and Sunday from 12 noon to 6.00 p.m.

There are always so many things to view at Y.A.F. that, inevitably, something would get left out if one were to attempt to list them all. However, for those unacquainted with these events, it may come as a bit of a surprise to learn that there are even stands selling jewellery, pottery, flower arrangements, shells, house-plants and paintings. To regular visitors (particularly the "non-fish-fanatics"), these stands are regular, colourful and welcome additions to this major fish-keeping event.

Of course, the emphasis is on aquatics and this year was no exception with all the big names of the industry in attendance, offering as wide a range of goods as ever, from foods to books, tanks, equipment, bogwood, plants and fish.

On the competitive side, the tableaux were, again, excellent, many of them showing the depth of thought and artistry that we have come to expect from our leading Societies. The best of the fish were, once more, of the very highest quality. The number of entries for the Fish of Fishes competition showed a further improvement on previous years and provided the judges, yet again, with the incredibly difficult job of selecting a winner. In the end, this coveted prize went to a magnificent *Botia nidthimunki* owned by Mr. and Mrs. Hooley of Worksop A.S. The Best Fish in Show went to Mrs. Doris Cruickshank of the Catfish Association of Great Britain, the Best Exhibit award was won by Mr. L. Price of Rothwell & Wakefield A.S., the Society with Most Points was shared by the Hobbies Centre Aquatic Group and Doncaster A.S., and the top prize in the Tableaux section went to Bradford A.S.

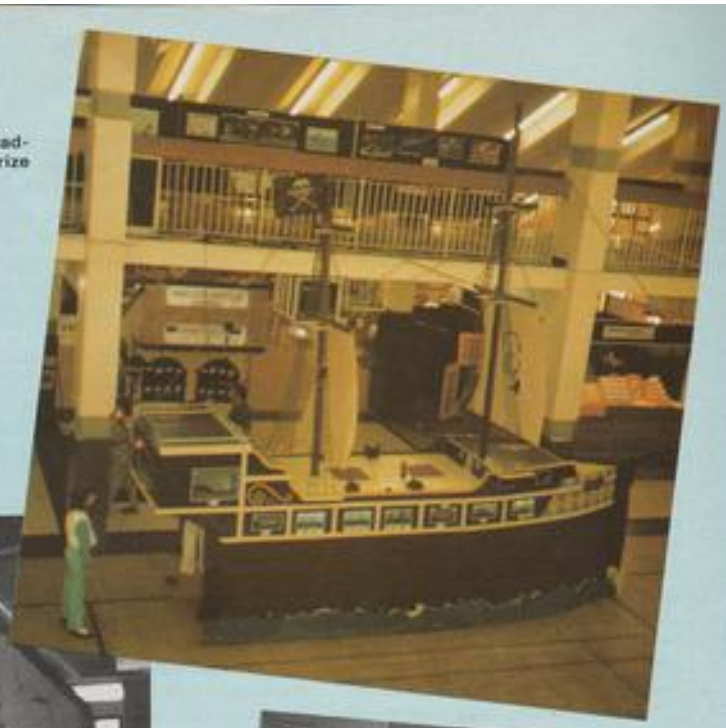
The challenge is now on for next year's top awards. No doubt it will be admirably met by all the committed aquarists who regularly make Y.A.F. the success it is.

The full list of top prizes for this year's Festival is as follows:

Tableaux: 1st, Bradford A.S.; 2nd, Hobbies Centre A.G.; 3rd, Darwen A.S.; 4th, Huddersfield A.S.; 5th, Wyke A.S.
Fish of Fishes: 1st, Mr. and Mrs. Hooley (Worksop A.S.); 2nd, Mr. K. Webb (Scarborough A.S.); 3rd, Mr. T. Stansfield (Darfield A.S.).
Best Fish in Show: Mrs. D. Cruickshank (C.A.G.B.).
Best Exhibit: Mr. L. Price (Rothwell and Wakefield A.S.).
Society with Most Points: Hobbies Centre A.G. an Doncaster A.S.
Furnished Aquarium (Society Entry): Darwen A.S.
Tropical Freshwater Furnished Aquarium (Individual Entry): Mr. and Mrs. B. Walsh (Darwen).
Marine Furnished Aquarium (Individual Entry): D. Haagensen (Hull).
Aquascape (Individual Entry): Mr. Milner (Darwen).
Novelty (Individual Entry): Mr. K. Lancashire (Doncaster).
Guppies: P. Lunn (S.O.D.I.T.).
Platies: Mr. and Mrs. Johnson (S.J.S.).
Mollies: B. Heppinstall (Friends of Lydgate School).
Swordtails: Mr. and Mrs. Marshall (Merseyside).
A.O.V. Livebearer: H. Smith (S.L.A.G.).
Small Barbs—up to 10 cm.: Mrs. D. Cruickshank (C.A.G.B.).
Large Barbs—Over 10 cm.: Mrs. D. Cruickshank (C.A.G.B.).
Small Characins—Up to 7 cm.: J. Lynch (Merseyside).
Large Characins—Over 7 cm.: B. Leafe (Mexborough).
Rasboras: Mr. and Mrs. T. Groom (Doncaster).
Danios: R. A. Johnson (Piscene).
Minnows: Mr. and Mrs. Campbell (Ashby Fishkeepers).
A.V. Aphyosemion: Mr. and Mrs. T. Groom (Doncaster).

Photographs over page
Continuation of awards on page 47

The Yorkshire Aquarist Festival

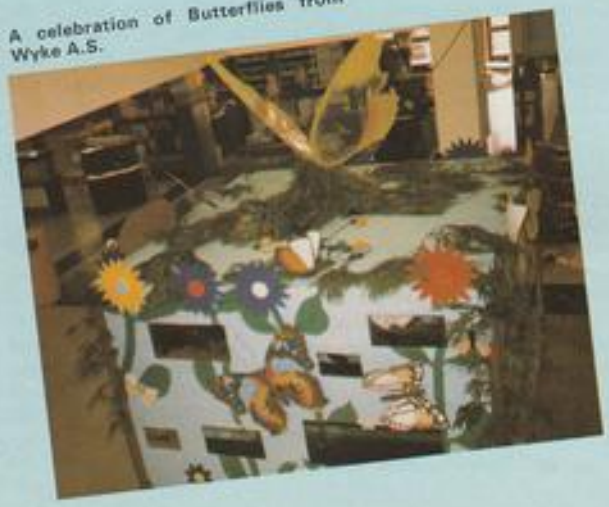


This magnificent Galleon from Bradford A.S. deservedly won first prize in the Tableaux section

The Hobbie's Centre draw attention to endangered species

Darwen A.S. received 3rd prize with this Tableau which had a three dimensional effect

A celebration of Butterflies from Wyke A.S.



A Tableau to commemorate the Olympics from Huddersfield A.S.

by Eric Hardy

Most guide-books to Wales give the impression that its fishes are almost all salmonoids to lure anglers to profitable fisheries, plagued by migrating eels up to Lake Bala. The Welsh Water Authority recently claimed the first transfer of bream into North Wales, releasing 500 fat fish from Llangorse Lake into Anglesey's Llyn Maelog, already well populated with perch, roach and eels. Bream were, however, introduced earlier to Llyn Helyg in Clwyd, a shallow, muddy lake with carp, pike, roach, tench, but no eels. I have old notes of bream, obviously introduced, being fished from the River Vyrnwy and the lower Dee. Anglesey has no close season for breeding coarse fish.

Anglesey already had perch and roach in lakes at Valley and Bodorgan. In Liverpool, practically all the water at the International Garden Festival has been occupied by Dytiscus water-beetles, flying in at night.

Most aquarists have used *Elodea* as an oxygenating plant, but have you noticed how the traditional domination of ponds, rivers and canals by the classic species *elodea* is being replaced rapidly in England by another American, *nuttalli*, especially in the Home Counties? It only appeared in 1950 in Esthwaite Water in Lakeland, and 1966 in Hampshire. It is still rare in Wales (only at Talybont, and Llangattock in Brecon) and absent from Scotland.

Poisonous plants

Both fish and aquarists may die from poisonous plants. Goldfish in a garden pool died from eating laburnum seeds falling from overhanging trees. Plant-poisons are used in the Congo and other areas to stupify fish for capture. Poisonous *Anamirta cocculus* fruits are called "fish-berries." A useful new English translation of Pfrohne and Pfänder's *Colour Atlas of Poisonous Plants* (Wolfe Scientific Publications, £30) details chemical composition, identification, symptoms and treatment for many wild and cultivated plants with 130 colour-plates in its 291 pages. It errs in stating only two people are known to have died from plant-poisoning in Britain in the last 15 years, from fly agaric toadstool and laburnum. I can add two further documented deaths, one from hemlock water-dropwort at Caernarvon in 1872. No mention is made of fine-leaved waterdropwort whose potent seeds cause severe giddiness and earned its rural nickname "horsebane" from their paralysing effect when horses crop them. Though another umbellifer, fool's watercress, *Apium nodiflorum*, is not usually fatal, it earned its name from the trouble it causes.

All waterside umbellifers are troublesome and should be avoided, including wild celery. Lesser spearwort is mentioned, but not equally harmful water-side great spearwort. Both were used in western Scotland to raise blisters with a compact of crushed leaves. In fact, all the buttercup family excepting water-crowfoot are harmful with toxic alkaloids when flowering. Fewer

Dytiscus marginalis, night-time invader of the Liverpool International Garden Festival

deaths have occurred from waterside cowbane presumably because farmers eradicated it.

Linked with aeration is the fish's blood-circulation, a simpler, single circulation than that of amphibians, via kidney and liver. The renal (kidney) portal system overcomes the problem of eliminating water. Water temperature influences the heat of their blood more than is often assumed under the popular description of "cold blooded". Aquarium-fish are usually 2°F warmer than their tank water; fast-swimming fish like tuna are warmer blooded, 5° above the water. An Indian flying barb, *Esomus danricus* inhabiting hot streams has a blood-temperature reaching 112°F which no "warm blooded" human could live with. Goldfish acclimatise to an outdoor pool survive winter freezing better than indoor fish suddenly placed in the pool.

Anaemia

Severe anaemia may sometimes occur in fish like eels without much handicap, their rate of blood-clearance through the gills being adequate. The larval elver arrives without blood-pigment and certain Antarctic ice-fishes, *Champsocephalus*, have perfectly colourless, haemoglobin-free blood without any restricted activity. It is known that fish activity is not slowed down when their blood is overloaded with carbon dioxide and no longer able to absorb oxygen. The number of red blood-cells is affected not only by temperature, but is reduced in seawater, when carbon dioxide decreases.

Differences in blood-plasma (the watery fluid carrying the blood cells) is used to differentiate race or sub-species of fish, notably our Atlantic salmon with a Celtic race which survived the Ice Ages in Wales, western England and southern Ireland, and an arctic race which recolonised northern and eastern rivers. Some fishes' blood, or serum, especially of eels, is more toxic than others, increasing heart-beat and breathing, causing cramp, a danger if any gets in human eyes when killing eels, and only 0·1 ml/kg of eel-blood killing a rabbit.

Some deep sea Stomiatoid fish have such narrow-bore capillaries that their red blood-cells are unusually small rods or globes with no nuclei, to ensure rapid exchange of gases with their higher content of haemoglobin due to a higher surface-to-volume ratio.

Yorkshire Aquarist Festival

Continued from page 43

A.O.V. Killifish: M. L. Price (Rothwell and Wakefield).
Siamese Fighters—True Colours: C. Carter (Ashby Fishkeepers).
Siamese Fighters—Multi-colour: Mr. and Mrs. Brackenbury (H.C.A.G.).
Small Anabantids—Up to 10 cm.: P. Griffiths (Mexborough).
Large Anabantids—Over 10 cm.: A. Thompson (Bradford).
Endemic Rift Lake Cichlids: Mr. and Mrs. Byron (Ashby Fishkeepers).
Angels: Mr. and Mrs. Nelson (Ashby Fishkeepers).
A.O.V. Cichlids—Up to 10 cm.: B. Heppinstall (Friends of Lydgate School).
A.O.V. Cichlids—Over 10 cm.: R. I. Payne (Merseyside).
Corydoras, Including Brochis: P. A. Ashton (Rothwell and Wakefield).
A.O.V. Catfish Armoured: D. T. Milner (Darwen).
A.O.V. Catfish Naked: Mrs. D. Cruickshank (C.A.G.B.).
Botias and Loaches: Mr. and Mrs. Brackenbury (H.C.A.G.).
Sharks: Mr. and Mrs. Brackenbury (H.C.A.G.).
Foxes: Lee A. Holden (Darwen).
Pairs Livebearers: H. Smith (S.L.A.G.).
Pairs Egglayers: R. A. Johnson (Piscene).
Breeders Livebearers 1": Mr. L. Price (Rothwell and Wakefield).
Breeders Livebearers 2": Mr. and Mrs. Johnson (S.J.S.).
Breeders Livebearers 3": D. Barrett (S.L.A.G.).
Breeders Livebearers 4": E. Cheetam (Huddersfield).
Breeders Egglayers "A": Mr. and Mrs. Ryan (Rothwell and Wakefield).
Breeders Egglayers "B": Mr. L. Price (Rothwell and Wakefield).
Breeders Egglayers "C": Mr. and Mrs. Campbell (Ashby Fishkeepers).
Breeders Egglayers "D": Mr. L. Price (Rothwell and Wakefield).
A.V. Female Livebearer: C. Taylor (Wyke).
A.V. Female Egglayer: Mr. and Mrs. Brackenbury (H.C.A.G.).
A.O.V. Tropical: L. Barker (Wyke).
Native Marines: Mr. and Mrs. G. Flint (Doncaster).
Common Goldfish and Comets: Mr. and Mrs. Silk (S.J.S.).
Shubunkins, Bristols and Londons: R. D. Parr (Piscene).
Fancy Goldfish, Moors, Fantails, Orandas and Lionheads: Mr. and Mrs. Silk (S.J.S.).
Breeders Coldwater: Mr. and Mrs. R. Slee (Pocklington).
A.O.V. Coldwater: Mr. and Mrs. Carey (York).
Aquarium Plants: R. and J. (H.C.A.G.).
Amphibians and Terrapins: T. Tolhurst (Wyke).
Crabs, Shrimps and Lobsters: R. and J. (H.C.A.G.).
A. Aquatic Paintings (Age 8-10): Rex Isaacs.
B. Aquatic Paintings (Age 5-7): Jane Mellor.
Aquatic Paintings (Age 11-16): Lee Holden.
Aquatic Paintings (Over 16): Isobel Rushton.
Aquatic Photographs (All ages): D. Haagensen.
Aquatic Handicrafts (Age 5-14): Julie Kitching.

A-Z of the Aquarium

Karyology

KARYOLOGY is the study of the contents of cell nuclei (nuclear cytology). The most significant of these in terms of inheritance are the chromosomes. These small strand-like structures carry the genetic information that is characteristic for each species and unique for each individual.

For example, they carry the genetic message that "tells" a cell that it is a fish cell. More particularly, they tell cells that they are, e.g. Swordtail cells and not Piranha cells. At an even finer level, they carry the information which distinguishes, say, a Lyretail Swordtail from a Hi-fin Swordtail.

Most of the time, chromosomes are very difficult, if not impossible, to see. However, as cells prepare to divide, they become quite visible. At one particular stage (Metaphase), they align themselves in such a way that it can be quite easy to count them and classify them according to type, the resulting "record" being known as a Karyotype.

The study of Karyotypes can reveal fascinating details about species, including their evolutionary history and their relationships with other species.

For example, the number of chromosomes for each species is more or less fixed (though some variation may occur). If, however, a particular species carries a number of chromosomes which is a multiple of that carried by closely-related species, the chances are that some "block" duplication has taken place (Polyploidy). In addition, if the number of chromosome arms is also a multiple of the basic number, it can sometimes be inferred that actual fusion of chromosomes has taken place (Robertsonian Fusion).

Gourami cells, chromosomes are visible in the centre cell

This is, in fact, thought to be the case with the Carp (*Cyprinus carpio*) and the Goldfish (*Carassius auratus*). These fish carry the same number of chromosomes as most other Cyprinidae but have approximately twice the number of chromosome arms. One possible explanation is that Polyploidy has taken place followed by Robertsonian Fusion.

Karyotypes have also revealed that relatively few species of fish have clearly identifiable sex chromosomes, e.g. like the X and Y chromosomes in mammals. This offers a possible explanation for the flexibility of sex determination in some of the well-documented "aquarium" species, such as Damsels (including Anemonefish) and Wrasses.

Lighting

THERE is a great deal of controversy surrounding the subject of aquarium lighting. Most arguments centre around the quality and quantity of light that needs to be provided. Since both will vary depending on numerous factors, including the numbers and species of plants and/or animals present, the likes/dislikes of individual aquarists, the presence/absence of toxic wastes or peat-stained water, the nature of the water itself (salt or fresh), the desirability of healthy algal growth (as in marine invertebrate tanks), etc., there is little likelihood of agreement ever being reached.

In the end, trial and error, plus individual circumstances, will determine what system, if any, is adopted.

The following guidelines may, however, be found helpful in coming to a final decision.

Type of Lighting	*Some Advantages*	*Some Disadvantages*
Tungsten (Incandescent) Bulbs	Cheap to install; reasonable lifespan; can stimulate good plant growth.	Relatively expensive to run; risk of implosion; generate a great deal of heat; unsuitable for most surface-nesting species of fish; bulky—may not fit inside some modern hoods.
Fluorescent Tubes	Cheap to run; variety of light quality available to suit different needs; fit inside most aquarium hoods; emit light at relatively low temperatures.	Require starter unit; expensive to install; expensive to replace.
Spotlights	Penetrate deeply—therefore good for large aquaria; "cool" spots emit light at relatively moderate temperatures (compared to "normal" spots); reasonably priced.	Bulky—do not fit inside conventional hoods; generate a great deal of heat; expensive to run.
High Pressure Mercury Bulbs	Brilliant penetrating light suitable for deep tanks; inexpensive to run; long-lasting.	Bulky—do not fit inside conventional hoods; generate a great deal of heat; very expensive to install; require starter unit; expensive to replace.

Knife Livebearers

There are two species of Knife Livebearers, *Alfaro cultratus* and *A. huberi*. They are found in the wild in clear, shaded waters from Guatemala and Honduras southwards to Panama, largely along the Atlantic seaboard of these countries.

Alfaros are "typical" livebearers in that males have a gonopodium developed predominantly from the 3rd, 4th and 5th rays of the anal fin, via which they can inseminate females with spermatophores (packets of sperm); the females can store these spermatophores and use them during the course of many months to fertilize successive batches of eggs; these eggs are retained within the females until they hatch (at intervals of between 8 and 10 weeks), resulting in the production of broods of fry (as opposed to eggs) numbering up to around thirty.

At one time, Knife Livebearers were thought to be sufficiently different to the other members of the Family Poeciliidae to be regarded as constituting a Subfamily by themselves, the Alfarinae.

***Alfaro cultratus* male. Knife Livebearers are now regarded as members of the Subfamily Poeciliinae (Parenti, 1981)**

The most immediately apparent characteristic of Alfaros, which separates them from other Livebearers, is the possession of a "keel" made up of scales stretching from behind the gonopodium to the base of the caudal fin. It is this feature that gave rise to the common name for both species, although the development of the keel is generally less pronounced in *A. huberi*.

In 1963, Donn Rosen brought them into the same Subfamily as *Poecilia*, the Poeciliinae (as defined by Garman in 1895), basing his conclusions on the shortness of the gonopodium, the degree of specialisation of some associated structures and other skeletal and egg characteristics.

Since most authors have adopted Rosen's classification, this is the one that appears in virtually all books which feature these fish.

In 1981, a different classification was proposed by Lynne Parenti (Bulletin of the American Museum of Natural History, Vol. 168: Art. 4) which, while appearing at first sight to be very similar to Rosen's, actually lowers the status of the Family that has hitherto been known as the Poeciliidae to that of a Subfamily, the Poeciliinae.

The "new" Poeciliidae of Parenti's classification includes two other Subfamilies consisting of egglaying species which, nevertheless, all share several fundamental characteristics (see Lynne Parenti's article on Killifish Classification in the June 1984 issue of *Aquarist & Pondkeeper*).

Luciocephalidae

The Family Luciocephalidae is monotypic in more senses than one: it is the sole representative of the Suborder Luciocephaloidei and contains a single genus, *Luciocephalus*, which, in turn, contains a single species, *L. pulcher*, commonly known as the Pikehead.

This, at least, is the classification suggested by Nelson (Fishes of the World, 1976). However, as is often the case with individual species which share certain characteristics with others but, nevertheless, have "problematic" characteristics of their own, the Pikehead has long been the centre of a certain amount of disagreement between ichthyologists.

The most significant characteristic that this species shares with its closest relatives is the possession of an auxiliary respiratory organ known as the labyrinth. Other well-known labyrinth-bearing fishes are the Gouramis, Climbing Perches, Fighting Fishes, Paradisefishes, Combtails and Snakeheads. (See A—Z, April 1983 and August 1984).

In all the above, the labyrinth arises from the modification of the first epibranchial bone (part of the gill skeleton). To a large extent, it is the importance given to this structure that determines the closeness or distance afforded to the various species by respective ichthyologists. For example, Liem (1963) suggested that, despite the fact that the labyrinth arose from the same bone in all cases, this was not necessarily a sign of closeness but, rather, the result of convergent evolution. Gosline (1968 and 1971), however, took a different view and placed them all in the same Suborder, the Anabantoidei.

Some features which are characteristic of *Luciocephalus* (in addition to the labyrinth) are an enormously protractile (extendable) mouth in keeping with its predatory habits, a very posteriorly placed dorsal fin, a deeply notched anal fin, pelvic fins consisting of one spine and five soft rays (including a long threadlike one), complete absence of a swim-bladder and (most unusually of all) a total lack of spines on both the dorsal and anal fins.

In the wild, *L. pulcher* is found in the Malay Peninsula and Archipelago where it attains a size of around 18cm (approx. 7 in.). It can be kept in aquaria, with a certain degree of difficulty, in soft, slightly acid water at around 28°C (82°F) on a diet of large livefoods.

***Colisa lalia* Labyrinth organ (A— outlined) showing relationship to gill apparatus**

Coldwater Jottings

by Frank W. Orme

INCREDIBLE; is it really possible that ten years have passed since Jubilee issue of the *Aquarist and Pondkeeper*, with its cover illustration of a family group gathered around a decorative aquarium, was published? But, yes it is. This year is the sixtieth birthday of the magazine and, whilst some other periodicals may be older, it proves that *A & P* has remained consistently popular with aquarists of different generations, throughout the years.

A. E. Hodge, F.Z.S. published the very first issue in May of 1924 and, acting as editor, guided it along the path that ensured its place within the fishkeeping hobby. Since his death in 1936, there have been other editors, and each has managed to provide

A. E. Hodge F.Z.S.

a magazine catering for the readership of the time; a magazine that both entertained and enlightened in a readable manner that proved capable of attracting and informing all aquarists —whether beginner or experienced 'Old-hand'—without any lowering of standards. We are fortunate in our present Editor, Laurence E. Perkins, who has maintained those same standards whilst trying to mould the magazine to meet the interests of the modern fishkeeper. In addition, John E. Young as Advertising Manager is largely responsible for successfully attracting so many advertisers, which helps to keep the price of *A & P* at a competitive level. Each, in their own particular way, is responsible for the continued success of this popular magazine (which has outlived previous competitors) and must be congratulated upon their achievements.

If past performance is any guide, it seems more than possible that the *Aquarist and Pondkeeper* will, forty years hence, still be alive to celebrate its one-hundred years of publication and association with the fishkeeping hobby.

One of my earliest copies of *The Aquarist* is a 1948 issue, priced at 1/- (one shilling) or 5p in present-day currency. At that time A. Fraser-Brunner, F.Z.S. was the Editor, and he was backed-up by an Advisory Board which read like something out of an academics 'Who's who". Aquatic Birds and Mammals; Pond Life—E. Bridgstock-Choat, F.Z.S., F.R.S.A., F.R.M.S., F.R.A.I. Aquatic Insects—L. C. Bushby, F.Z.S., F.E.S.; Ray Palmer, F.Z.S., F.E.S. Aquarium Plants —Alfred Ashford. Fancy Goldfish—George F. Hervey, F.Z.S. Fish-house Construction—J. T. Alcock. Genetics —Margery G. Elwin, B.Sc. Marine Zoology—Dr. H. Leon Gauntlett. Pond Plants—Frances Perry, F.L.S. Reptiles and Batrachians—J. W. Lester, F.Z.S. In addition, the magazine offered a Water Examination and Post-mortem Examination of Fishes by W. Harold Cotton for a fee of 2/6 (half-a-crown) or 12½p nowadays.

Amongst the contents was a report on the National Aquarist Society's Exhibition; articles about marine aquaria, breeding and rearing the Giant Danio, Newts, notes on Geckos, water-powered air pumps, and breeding the scaled Fantail by the renowned Arthur Boarder. All of which proved the front cover claim that the *Aquarist* was "the original monthly magazine devoted to aquarium, pond and reptile keeping." That claim holds true to the present-day, as it will, no doubt, continue to do in the future.

Despite the problems caused by the dry, sunny weather of June/July, at which time these words are being typed, I have found that the high temperatures have promoted very good growth of the season's young fish. This comes as no surprise of course, but it is always nice to see young three-quarters-of-an-inch fish double their size in a matter of weeks in an outdoor pond. Warm water stimulates the appetite of the fish, and this has to be satisfied by more frequent feeding, and this results in increased growth. Although I do not believe in continuous artificially high water temperatures, I do welcome these natural increases, knowing that there will be some fluctuation. Eventually the temperature will start to fall and the fishes appetite will decrease to some degree, in the meantime they have grown without any unnatural forcing.

If it has not already been attended to, any young fish which were raised during the year should now be given a final inspection and culling to ensure that only the best are carried over the winter. The selected few should be allowed plenty of swimming space, in a tank of adequate proportions. There they can be accustomed to the natural temperature variations of late autumn, in readiness for the coming winter. Unless strict culling is practised it will soon be found that space is running out, and this will present difficulties if any future fish breeding is intended. The sensible fish breeder will never allow the stock, young or adult, to exceed the available space. Regular, judicious culling of young and adult fish will ensure that only the best specimens are kept, and the stock will be maintained in manageable quantities, this, coupled with a planned breeding programme, will gradually improve the overall quality of the fish.

WHAT IS YOUR OPINION?

by B. Whiteside, B.A., A.C.P.

'Photographs by the Author'

WELCOME TO the Diamond Anniversary issue of *The Aquarist & Pondkeeper*. It's amazing to think that despite the coming and going of so many magazines, *The Aquarist* continues and chalks up 60 years. It's a great tribute to those who founded the magazine in 1924 as *The Amateur Aquarist*; to our present Editor and Advertisement Manager, and to long-standing contributors and leading experts such as Mr. Arthur Boarder and Mr. Jack Hems. It rather frightens me when I think of the fact that I've been a regular contributor since my student days in 1964. I was young then!

Sometimes I'm asked what I do when my interest in aquarium-keeping wanes. I'm pleased to say that my interest has never waned—since I began keeping fish in the late forties. My earliest memories revolve around goldfish bought at a fair and sticklebacks caught in a river. My paternal grandfather provided me with a couple of large glass jars from his shop and they sufficed until my father bought me my first aluminium-framed aquarium—which, incidentally, is still going strong, unlike a series of angle-iron framed tanks, numbers of which rusted to the point where they became useless; however, I still have two angle-iron tanks that have been in use for a good many years, as well as two plastic-framed ones and a second aluminium-framed one that my father bought for me shortly after I got my first tank.

I began this feature in 1967, expecting it to last a few months. It still beings in a pleasing number of letters each month—although sometimes the length of *W.Y.O.* becomes excessive. As I've just been asked to cut my monthly feature to two pages, to leave more space for other articles, I'd better begin to tail off my introduction.

I'm writing this in the third week in July and the blazing sun and water restrictions continue. The use of hosepipes has been banned for some weeks now, where I live, and a couple of nights ago water restrictions began with the local supply now being cut off from 7.00 p.m. until 7.00 a.m. daily. Tank topping-up exercises must now be done during the day, and not at night. An annoying aspect is when the levels in tanks, boilers, etc. get lowered during the evening, and then begin to fill up again about 7.30 a.m. with loud, long roars as water replaces air and streams of bubbles gurgle up pipes. Roses in the garden are blooming beautifully, despite the drought, but the green patches in my brown lawns look unsightly!

Miss Denise Symon is 15 years old and lives at 49 Tassie Street, Shawlands, Glasgow. She says: "Although I have kept coldwater fish for a few years I only started to keep tropical fish about a year ago. I would like to tell you something which still amazes me when I think about it. About a year and a half ago I kept four (black) moors in a tank on a shelf. One night, by accident, the hood of the tank was left open. My family were going out for the night; but while we were out one of my moors—called Jack—decided he would like to see the outside world.

"He jumped from the tank and landed about five feet below on a small table. I returned and went to feed the fish—when I discovered that there were only three. I looked down—and there was my fish, not moving. By this time he was actually stuck to the table. I picked him up in the net and put the net into the tank; but his poor, little body just floated. I was just about to dispose of him when I caught sight of him moving his pectoral fin. Running back through I quickly prepared a sick tank for him. Although Jack was blind in one eye and had only one pectoral fin, he fought hard to live and about a month later One-Eyed Jack was as fit and capable as any other fish. His fin grew again, and the only noticeable thing wrong was his blindness; and he was no longer a velvet black colour but a brown colour. He lived happily in a larger, community, coldwater tank—with a secure lid. Sadly, One-Eyed Jack died about a month ago; but this little fish's battle to live will never be forgotten by us."

I've occasionally told the tale of a friend who, on finding his large goldfish drying up on the floor, administered a couple of drops of brandy down the fish's throat using an eye-dropper. It still died—but it probably died happy. . . .

From Miss Denise Symon to Master Simon Evans takes us from Scotland to No. 2 Highams Close, Rowley Regis, Warley, West Midlands. Simon says: "I have left school, after taking all my G.C.E. and C.S.E. examinations; and so, with all this extra time on my hands, I have decided to put pen to paper. I have two freshwater tropical tanks—I hope to acquire more soon—and I have been an aquarist for about three years, on and off. My 36 in. × 12 in. × 18 in. tank contains golden gouramies, tiger barbs, coolie loaches, sucking loaches, kribensis, dwarf gouramies, a blue acara, a pair of zebra danios and a few livebearers. The zebras are now about two years old and have proved extremely hardy; they survived the winter in coldwater in an unheated room. This was due to a heater failure in a small tank. All the other occupants perished; and as I had lost interest in fish at that time, I did not replace the heater for the two remaining fish. Nevertheless, they were the first fish to take up residence in my new set-up at Christmas, 1983.

"The tank is lit by two 40 watt

Honey gourami—*Colisa chuna*

tungsten bulbs and the plants grow quite well. It is filtered by a small Uno Polyfilter, which works extremely well and represents excellent value for money. In the June issue you asked for readers' experiences with *Vallisneria* and Amazon sword plants. This is quite a coincidence as these are the two plants that grow best in my tank.

"My other tank measures 36 in. × 12 in. × 12 in. and is planted, but, as yet, unstocked with fish. I have not quite decided what fish I'll keep; but I will probably just visit my local dealer and see what suitable fish take my eye. I hope my letter does not contain too many spelling or grammar mistakes. Good luck (sic) for your future years as an *Aquarist* contributor."

Photograph 1 shows a honey gourami, *Colisa chuna*. Please drop me a line if you have successfully kept this species.

Mr. K. Froment wrote the following letter from 97 Vectis Road, East Cowes, Isle of Wight. "I have been keeping coldwater fish for about ten years now and have kept quite a selection. At present I have a very beautiful pumpkinseed which had a mate until about a year ago when, during spawning, he killed her. Apparently this happens quite often. I'd like to know if there are any books about these fish as I cannot find any in book or pet shops." (Anyone able to advise Mr. Froment? B.W.)

"I have ten 36 in. tanks in a cupboard alongside the living room; they contain several types of goldfish, two pairs of bitterling, some white cloud mountain minnows peacock-eyed sunfish, gudgeon and stone loach, which were sold to me as weather loach; and in the pond there are about 35 goldfish, shubunkins, golden rudd, roach, mirror carp and a few fantails. The goldfish spawned in late March and I rescued about a net full of eggs which were put into an old bath that's installed in my kitchen. They hatched in about four days and there are about 400 fry doing very nicely.

"The bitterling spawned about three weeks ago in some mussels I purchased recently. Unfortunately I was unaware of the actual spawning date; but what brought it to my attention was the white clouds all grouped around the mussels. On closer inspection I found that they were eating the bitterling fry. Alas, I was unable to save any.

"My wife has just set up a 72 in. × 14 in. × 17 in. tropical tank that includes about ten different sorts of fish. I should be grateful if you could direct me to any person who also breeds coldwater fancy goldfish with the intention of selling. The shops on the island are very poor as regards this aspect of the hobby; most of them keep only two or three tanks for these purposes. Hope you can help."

Sorry I can't help, Mr. Froment. I don't know anyone who breeds coldwater fish to sell; however, if anyone reading this falls into this category I'm sure Mr. Froment would be pleased to hear from him or her.

Photograph 2, taken by Robert Robinson, in colour, shows a flowering waterlily and one of the fish in one of his two garden ponds. The fish collection includes several attractive koi; and on a recent visit I photographed Robert hand-feeding his pond fish. The fish were very tame and took food flakes from his fingers. The evening light wasn't the best for pond photography so I used a polarizing filter for the first time and it certainly cut down the reflection from the pond surface seen through my camera's view-finder. Despite my using a 400 ASA film, I could only manage 1/30 sec. at f 1·7 when the filter was in place. I've also been trying out my new camera outfit to photograph some of my fish in colour. Through-the-lens flash facilities are useful in this type of situation, with a dedicated flash unit placed on top of the tank's cover glass—although it means that a rather expensive extension lead is required to retain the dedicated facilities with the flash unit remote from the camera. I got back some coloured prints, about 2/3 of which were good; but my slides have not yet returned—presumably because of the summer rush. Incidentally, I find that the firm Bonus Print produces good prints, reasonably quickly, at very reasonable costs. Envelopes for posting off films to them may be obtained in post offices.

My thanks to Mr. Eberhard Schulze, of The Highgate Aquarist, for sending me a sample of an Oxydator to try out —plus samples of various cures, treatments and test kits. I hope to report on them soon. I was also pleased to receive a little gem of a power filter, called a Mini-Powerstream, from Dr. Neville Carrington, of Interpet. More news soon. My thanks to Dr. Carrington for his invitation to visit Interpet once again; and to Mr. R. K. Field of Avenue Fisheries for his invitation to see his koi—the largest of which costs £3,450! I hope to visit Avenue Fisheries in a couple of days' time; and that will be followed by a visit to The Highgate Aquarist. I can't wait to see those koi, and those discus! Perhaps I'll be able to share my visits later in photographs and articles in *The Aquarist*.

Please send me your opinions on the following: (a) breeding small cichlids; (b) feeding aquatic plants; (c) your marine tank; and (d) your favourite type of pond or aquarium filter.

I was sorry to hear from one striking miner that he has been unable to afford to buy this magazine since April.

Part of Robert Robinson's pond

How the 'Aquarist' changed my life

by Dr. Neville Carrington
Managing Director of Interpet

I DO NOT know if my father bought his first issue of *The Aquarist* March/April 1936, after he bought his first fish, or if this issue stimulated his interest. The old issues I have, published some 12 years after the magazine was founded by A. E. Hodge, have a kind of pioneering charisma which always provide a source of stimulation when I read them. Excellent as are the present day magazines, they inevitably lack this feeling of covering new ground, which comes through in earlier issues.

In some ways, fishkeeping and related interests have not changed since 1936. In other ways changes reflect advances in technology. Mail order houses were already offering aquatic goodies to the public but the range of products on offer was very limited and oriented towards coldwater fishkeeping. Many people were heating their aquariums by gas or paraffin. Few electrical heaters and thermostats were available. Airpumps were not common. Outside filters were inefficient and expensive. Sub-gravel filters and power filters had not been invented.

One of the difficulties in producing aerators was that much of the country was on Direct Current (DC) so that vibrator pumps and even the modern disc driven piston pumps would not work. Thermostats also are generally unsuitable for DC. The first glass tube heater I can find advertised is the ESES in January/February 1938. The equivalent cost would be £5·95.

There was therefore much more of an emphasis on reptiles (*The Aquarist and Pondkeeper* also incorporated *The Reptilian Review*) and coldwater species. The study of pond life was also encouraged and was presumably much easier then since more people lived in the country and so much of our wildlife inheritance had not been built over.

Several of the advertisers are certainly well known still to the trade and some to the public. In this 1936 issue, L. Cura & Sons, Robinson's Fisheries and Philip Castang were offering Mail Order (the actors change —the play remains the same!). Chas. Palmer, Perry's and Shirley Aquatics were all advertising. Other advertisers have changed the course of their business, for instance, L. Haig of Newdigate merged with Gerrard & Sons and is now part of a laboratory supply company, no longer selling to the aquatic public.

Some of the 1936 contributors are well known to readers today. Jack Hems and Eric Hardy have articles in my early issues, written in much the same interesting styles as today!

At this time when my father's interest in fishkeeping started, the family home was in Chipping Norton, Oxfordshire, where he had the pharmacy at 18 High Street, now Boots The Chemist, and I was born above his shop. He built a small fish-house in the back yard with only coldwater fish. Some form of water circulation was arranged on a gravity basis. He also built several ponds in the garden.

His particular interest appears to have been Fantails and Bristol Shubunkins.

We moved to Dorking during the war, and I believe he was encouraged to keep his first tropicals, some guppies, in a 12 in. × 8 in. × 8 in. tank, by Mr. Frederick George, who was a dental technician. Soon after the war, Mr. George was trading from a converted Nissen Hut, in his back garden, quite near where our factory is now, and I can remember he seemed to have very good fishes such as, Thick Lipped Gouramies, Rosy Barbs and Ruby Barbs. By 1948 he was in business trading from Harrow and Dorking under the name of George Fletcher. Other dealers we used to frequent also advertised in the 1948 issues of *The Aquarist*, as it was called by then. Particularly, we spent a lot of time at South Western Aquarists in Balham, and Phillips Aquarium in Kennards, Croydon, happily still in existence.

Soon after this time I had (moderately successfully) formed a local aquarium club and built a large fish-house where my hobbies of tropical fish-keeping and model engineering both took precedence over my school work! I had various fish, such as Flame Fish, Beacons, Rosy Barbs, and Angel Fish, which I advertised through the small ads. column of *The Aquarist*. I also obtained a distributorship for a paraffin stove for heating fish-houses, but I was the only aquarist who thought this was a good idea—apart from my own, I never sold one!

My father gave talks to other Clubs, and he was approached when talking to the Horley Society by someone who had an idea of a liquid food for feeding baby fish. I developed the idea whilst studying pharmacy at college (yet another distraction from my studies!) and we started selling the product to the person who suggested the idea to us. The first advertisement I can find appeared in the March 1953 edition of *The Aquarist* under the name of The Harlequin Aquaria Company. Another advertisement appeared in the next issue. It was only after this that we realised that we were not being paid for the stock we had delivered to Harlequin and customers were not being supplied! We took over our own distribution and that is how we started in business.

I have drawn up a table of prices, related to the value of the pound today, to compare fishkeeping approximately every 10 years since 1936. I was surprised to find that fishkeeping is actually relatively cheaper now than it was in 1936. There has been a tendency for some items such as electrical apparatus, to become slightly more expensive in the past decade, mainly due to the need to meet more stringent electrical regulations, but the list of tropical fish and plants in general have dropped relatively due to better production and cheaper air freight. The relative cost of aquaria has dropped due to improvements in technology.

An analysis of the number of dealers and the number of advertisements in *The Aquarist* reflects a slight drop in interest in 1954 and a steady growth to 1974. The 1984 figure presumably reflects the present recession. The price of *The Aquarist* is relatively cheaper than in 1936.

If my father had not bought those *Aquarists* in 1936; if we had not had the stimulation of reading *The Aquarist* over the years; if the advertising had not been successful—I wonder what I would be doing now?

COMPARISONS FROM 1936 TO DATE

Prices related to the £ in 1984

Details	1936[1]	1948[2]	1954	1964	1974	1984[3]
	£	£	£	£	£	£
Subscription to *Aquarist*	0·90	0·53	0·61	0·63	0·74	0·80
Goldfish 2-3 in.	0·25	0·46	—	1·09	—	1·35
Comets 2-3 in.	1·02	0·79	—	1·09	—	1·40
Shubunkins 2-3 in.	2·54	8·00	1·03	1·09	—	1·48
Kigoi 6-7 in. (1984—Koi)	3·81	—	—	—	—	12·80
Angel Fish (Small)	1·02	—	1·03	0·78	0·51	0·55
Black Mollies	5·09	3·19	1·03	1·25	0·64	0·60
Dwarf Gouramies	2·04	4·00	1·03	1·09	1·13	1·25
Flame Fish	1·25	5·32	1·03	—	0·58	0·50
Vallisneria (Spiralis)	0·25	0·20	0·17	0·23	0·12	0·14
Aquarium 24 × 12 × 12	25·43	26·52	—	18·00	28·77	12·00
Books—Exotic Aquarium Fishes (Innes)	25·43	15·17	—	46·98	—	8·95[4]
Airpumps (Small/Med.)	30·51[5]	19·97	9·27	8·61	9·34	8·00[6]
Separate Heaters	9·66	7·19	5·15	3·13	2·35	4·80
Separate Thermostats	—	9·85[7]	7·42	4·70	3·51	5·32
Combined Heater-Thermostats	—	—	—	7·05	5·50	8·28
Liquifry	—	—	1·03	0·78	0·64	0·79
No. of pages of text (approx.)	23	28	21	58	118	42
No. of pages of advertising (approx.)	19	23	10	18	48	30
No. of dealers advertising (approx.)	36	42	24	37	80	68

Notes:

1. This was the first date available for inspection.
2. 1948 was chosen so that things had a chance to settle a little after the war!
3. 1984 journals do not normally show the price of fish—presumably since the country is better served by supplies now.
4. Innes: not available 1984 equivalent book.
5. Airpumps only just becoming commonplace.
6. Whisper 300.
7. EsEs.

B.A.F

Bigger than ever in 1984

THE British Aquarists' Festival has always been advertised as the largest show of its kind in Europe.

Due to further expansion this year one could probably boast that it is now the largest show of its kind in the world!

After the amazing response to the 1983 Festival the organisers have decided to practically double the floor space at the show to enable visitors to look around with greater comfort than ever before.

For those hobbyists who have not visited the British Aquarist Festival recently, I can only say you have missed one of the best opportunities of all time to see so many fish and so much equipment all under one roof.

At this years' Festival you will be able to visit trade stands from all parts of the British Isles, which between them, will supply you with all your fishkeeping needs at keen competitive prices.

You will be able to browse around the tableaux, many built to a novelty design and which accommodate the fish in the competitive classes.

There will be photographic, painting and handicraft displays. The themes for these are aquatic which helps to further the interests of the hobbyist.

For the youngsters and young at heart some cartoon films will be shown, and for the more dedicated, there are lectures on both days of the show.

Also featured is the Champion of Champions competition sponsored and organised by this magazine, the final contest of the year to establish the finest specimen in the country. Only winners of 'Best Fish' at open shows throughout the country are eligible to enter this class.

So, don't miss out on this opportunity. Come along with the family and visit the 33rd British Aquarists' Festival, at the Belle Vue Exhibition Halls, Manchester on Saturday and Sunday, 3rd and 4th November 1984.

Alan Darby.

Reflections

moved more slowly and the outbreak of World War Two had a bad effect on the hobby. Dealers had to close down (for a long or short period, anyway) and many hobbyists, if young enough, were called up for service. Yet a nucleus of keen freshwater tropical aquarium keepers got through the war and were ready to start off again as soon as hostilities ended. The same can be said of German aquarists. Highly respected dealers in some of the most devasated areas of Germany succeeded in holding on to small stocks of exotic fish. Herman Härtel, of Dresden, was one of such men.

After the war, new techniques in aquarium keeping were aired at club meetings, shows and in the aquarium press. The introduction of all-glass

An aerator of 1929

tanks, joined along the edges with an inert sealant, made the destructive effect of rust on metal frames a thing of the past. Also, more powerful and, at the same time, quieter air pumps became available. These were followed by air pumps of revolutionary design which improved the efficiency of external or undergravel filtration. Flourescent lamps took the place of tungsten illumination. Above all, sea-salt mixtures which, dissolved in water from the mains, enabled the marine aquarist to keep exotic species he never dreamed he could keep before; for even our tougher native saltwater species lived short lives (as a rule) when placed in seawater collected from favoured, but not pollutant free, spots around our coasts. Incidentally, the ease with which a large tank could be filled with synthetic seawater and stocked with wondrously coloured fishes brought a new vision of underwater life into our homes. Indeed, there is nothing in art so beautiful as the colours of nature, and we find them all in an artistically set up freshwater or saltwater aquarium: in microcosm, perhaps, but there all the same.

BOOK REVIEW

A Natural History of the Coral Reef, *by Charles R. C. Sheppard.* Foreword by David Bellamy. Published by Blandford (1983). Price: £8·95. ISBN 0 7137 1268 6.

"Someone once said . . . that its destruction (the rain forest), because of short-term negligence and profit, was like stripping a Rembrandt for its canvas. With a coral reef too, its assets are priceless and depend on it being and remaining a mosaic of connected form and living pattern".

These are the closing words in Charles Sheppard's book which, in my opinion, must be about the best

authoritative, but exceedingly readable, account currently available on what makes a coral reef tick. This excellent book offers a well-documented insight into the ways in which reef organisms, many of which we have become familiar with in the marine hobby, relate to each other and to their environment as a whole. It is not, however, a catalogue of species of fish and invertebrates, so anyone expecting this will be disappointed. Yet, had such a catalogue been included, there is no doubt whatsoever that the book, and the fascinating story it tells, would have both suffered dramatically.

Marine hobbyists will certainly recognise many of the species mentioned but they will see these in a new light —their "true" light. For example, there are photographs (accompanied by text) of corals fighting(!), flatworms mating, a parrotfish sleeping in its "cocoon", upside-down-fish in caves, "urchin" and "brittlestar" shrimps, a Remora hitching a ride on a diver, and many others.

The global or unifying approach taken by the author is clearly reflected in the Chapter headings which include, among others: A Sea of Coral, Animal Architects, The Survival Problem, Daily Rhythms, Labyrinths in the Reefs and World of Twilight.

There is a useful bibliography consisting of standard and recent works (up to 1982) which provides the interested reader with numerous opportunities to take his/her knowledge on to a more advanced level. The index is comprehensive, yet uncluttered, and the overall layout is both attractive and well-designed.

Although the text often deals with complex issues and terminology, these are invariably described or defined in a very readable manner. Even so, I feel that a Glossary is a virtual "must" in a book such as this. It is, therefore, a bit surprising to find that it has been omitted (or overlooked). Likewise, a few simple, sectional diagrams would have gone a long way towards providing a fuller understanding of certain organisms, e.g corals and anemones in Chapter 2—Animal Architects.

In spite of this, I can thoroughly recommend this book to *all* aquarists, not just marine hobbyists, whose duty it must be to gain as much understanding as possible of the natural history of the organisms under their care.

John A. Dawes

FEDERATIONS FESTIVALS & US

British Aquarists Festival

THE Federation of Northern Aquarium Societies has, for the past thirty-three years, staged an annual festival known as the British Aquarist Festival. Over the years this festival has gained fame and prestige throughout the British Isles as being the biggest national Aquarist display and competition in Britain.

To hold a festival as large as ours, sponsorship is necessary, and the *Aquarist and Pondkeeper* has sponsored and supported us, to further the fishkeeping hobby, for thirty-three years.

Initially the *Aquarist and Pondkeeper* financed the whole festival to enable us to gain in stature and capital to stage further festivals. A great contribution to the fishkeeping hobby! Gradually we became more self-supporting. The *Aquarist and Pondkeeper*, though not now sponsoring the whole festival, still takes an active part and each year provides us with printing, advertising, 50% of prize monies and stages the Festival's Champion of Champions competition.

Their help and financial sponsorship to the Festival will always be appreciated by our federation. Because of the *Aquarist and Pondkeeper's* initial sponsorship and continued support we can now boast that ours is probably the largest event of its kind in the world.

Societies belonging to our Federation hold open shows, dates and results are freely advertised in the Society news columns of the *Aquarist and Pondkeeper*. A society holding an open show can apply to the *Aquarist and Pondkeeper* for the Gold Pin award to present to the best fish in their show. This award is donated by the *Aquarist and Pondkeeper*, and most societies take pleasure in applying for it.

Our relationship with the *Aquarist and Pondkeeper*, affectionately called 'A & P', has been a long standing and happy one. Our Federation would like to take this opportunity to thank it for its continued support and wish it a happy 60th Anniversary.

Alan Darby.

Yorkshire Aquarists Festival

THIS year we celebrated our tenth Festival, a time to take stock, to look back to its beginning some ten years ago, and a time to look at the progress that has been made. Here in Yorkshire we are always conscious of the fact that we owe a great deal to the small group of aquarists who started the first Aquarist Festival here in Doncaster. They could quite rightly be called the magnificent twelve for they had both faith and courage; faith that aquarists from far and wide would support such a venture and courage to put up their own money as finance. The faith they had in the aquarists certainly paid dividends, the benefits of which are still being seen today with aquarists from far and wide still coming to see us year after year. There was also a feeling in Yorkshire that what was being done elsewhere in the country could be done here and through these people we now have one of the major events of its kind in the country maintaining during its growth the spirit of friendship that is so important to us all. The fact that people come to see us year after year is something that gives us a great deal of pleasure and encouragement for without such people all festivals would suffer. During the ten years the Festival has seen and undergone quite a number of changes throughout which I am proud to say it has always had as its priority the aquarist and the furthering of interest in this fascinating hobby of ours. Over the years the aquarists themselves have proved that there is no better way of making new friends and learning more about the hobby than at festivals such as ours. During the ten years the Yorkshire Aquarist Festival has had the support of *The Aquarist and Pondkeeper* which has made a major contribution to fish keeping, and to the promoting of our Festival. This help has never gone unnoticed as indeed the relationship between us, which has been a very happy one, serves to prove. The magazine, like ourselves aim to further the interest in the hobby. Together we can do so much in bringing aquarists together on a friendly basis; what more could one ask for? On behalf of the Y.A.F. the Y.A.A.S. extends our thanks to all at *The Aquarist & Pondkeeper* who have helped or been involved in any way with this relationship. Long may we both continue to the benefit of all aquarists.

B. BOYDEN,
Chairman Y.A.F.

Scottish Aquarists Festival

IN 1972 a group of Scottish Aquarists, mainly from Lanarkshire A.S. decided it was time Scotland had its own

FEDERATIONS FESTIVALS & US

Festival type show. *The Aquarist & Pondkeeper* were approached with the idea and asked for backing by way of sponsorship. Their reply was that they were very interested but only if the Federation was involved as they could not sponsor individual Societies.

This magnificent cut glass decanter and set of glasses was presented to 'The Aquarist' in recognition of its sixtieth anniversary by the S.A.F. management committee in May of this year

A joint meeting was therefore arranged between Lanarkshire A.S., Federation of Scottish Aquarist Societies and *The Aquarist & Pondkeeper*. The outcome of all this was that the first **Scottish Aquarist Festival** was held in Motherwell Civic Centre on 21st and 22nd April 1973. Since that first Show, with an attendance of 800, many changes have taken place with only two of the original Committee still remaining in office.

Throughout the 12 years *The Aquarist* has proved to be a loyal and faithful sponsor to S.A.F. John Young, Advertisement Manager, has attended every year and Arthur Boarder wrote the first ever S.A.F. Report in *The Aquarist*, after his visit to the Show. *The Aquarist & Pondkeeper* has been the main supplier of all printed material, supplying catalogues, schedules, handbills, etc. every year free of charge, and a very good relationship has been formed between the personnel of both organisations.

We at S.A.F. think the Show gets better every year. This year the attendance was over 3,000 with 20 tableaux and 15 trade stands. The S.A.F. Committee have over the years strived for better quality in all aspects of the Show and it was following this policy that we decided to take over the catering after the second year and thanks to the dedication and hard work of our kitchen staff, this facet of the Show is now the envy of other Show organisers. This same policy led us to modest profits, with most of our profit being put back into the Show by way of prize money, expenses, hospitality, etc., with the remainder helping to keep the Federation financially healthy. Our future plans are to include a new class for fish which have won a 'Best in Show' award in the previous year. Arrangements are now in hand for this and we hope to include it in our 1985 Festival.

In conclusion, we thank *The Aquarist & Pondkeeper* for all they have done in the past, congratulate them on their 60th Anniversary and look forward to a continuing successful relationship.

D. Wilson.

S.A.F. Chairman.

OSCAR

G. Robinson

Meet the Societies

HARTLEPOOL CORAL-FISH SOCIETY

The H.C.-F.S. Logo

Heniochus acuminatus
(photo courtesy of Aquarian)

MARINE fishkeeping, despite its enthusiastic following by dedicated aquarists, is not yet "serviced" by as many Societies as the freshwater hobby. It is, therefore, always a pleasure publicising the activities of those Marine Societies that do exist.

The Hartlepool Coral-Fish Society was formed in 1978 "to promote the keeping of marine fish and invertebrates as a hobby". As the Society has expanded, so has the geographical distribution of its members. Originally, the vast majority came from around Hartlepool itself but now they also come from Middlesbrough, Stockton, Newton Aycliffe and Terryhill.

Whereas most Societies hold their meetings in Halls or Pubs, the H.C.-F.S. meets at members' houses. Seeing as the membership stands at around 40 at the moment, there is, clearly, no shortgage of venues. Because of this, we cannot, as is our tradition, give you details of a regular meeting place but suggest that you get in touch with the Chairman, Mr. A. Thompson, (see below) for further details.

Meetings take place every two weeks and are informal, a particularly strong feature when it comes to helping new members feel at ease. Despite the informality, there are talks, quizzes, slide shows, videos, raffles and a regular question time. The emphasis, therefore, is on the exchange of views and information, a feature which is reinforced by the complete absence of competitive Table Shows from these meetings.

Several other facilities available to members are also worth noting. For example, the Society buys marine salt and frozen food in bulk, thus ensuring members of a regular supply. The small profit made is ploughed back into the Society to provide further facilities. A particularly useful one is the availability of a complete aquarium set-up which any member can have in case of emergency.

Other activities include a display at the annual Hartlepool Town Show, regular attendance at B.M.A.A. lectures, and the offer of talks and slide shows to other Societies.

Subscription Rates:
£1.50 per annum, plus 25p per meeting.

Apply to: Mr. A. Thompson, 3 Topcliffe Street, Hartlepool, Cleveland. Tel: Hartlepool 78055.

MIDLAND TROPICAL AQUARIST SOCIETY

The M.T.A.S. Logo

Labeo bicolor, The Red-tailed Black Shark

SOME Societies exist for showing purposes, others are not in the least bit interested in this aspect of fishkeeping while, still others, cater for the needs and expressed wishes of as wide a range of aquarists as possible.

M.T.A., which was formed in 1969, falls squarely within the last category, having members who range from "owners of fish houses to those with a few tanks around the house or a single tank in the lounge, some of whom are keen to compete in Shows or to learn how to show fish . . . (while) others have no interest in showing whatsoever".

Originally, there were 17 founder members from the south side of Birmingham who got together because they felt a need for a Society to help further their knowledge of the hobby. As with many societies, the M.T.A. can boast of a nucleus of dedicated members who contribute wholeheartedly to the wide range of Society activities. Some of these experienced members are specialists in one or other aspect of fishkeeping and are always more than willing to assist novice aquarists.

The logo of the M.T.A. is noteworthy because of its subtlety. It consists of a Red-tailed Black Shark set against a green background, which represents plant life, an aspect of the hobby that is far too often neglected.

Another interesting feature of this Society is its possession and use of an extensive library holding over one hundred books on most aspects of fishkeeping. It even includes some early bound copies of the 'Aquarist & Pondkeeper,' so it must be good! Members are allowed to borrow most books on a monthly basis, although some volumes and documents are available on a reference-only basis.

In addition to the more usual activities that are organised on meeting nights is a fishkeepers' equivalent of Call my Bluff—the mind boggles!

If you, therefore, wish to join an imaginative, thriving Society, then drop in on any second Wednesday of the month at 7.45 p.m. at Holy Souls R.C. School, Mallard Close, Acocks Green, Birmingham.

Subscription Rates:
Adults, £3·50; Juniors, £1·50.

Apply to: Mr. Laurie Smallwood, 23 Lindsworth Road, Kings Norton, Birmingham B30 3RP.

NEWS...

Tongham A.S. Club table show held at Victoria Hall, Ash on 19th July. Judge: D. Ford. Class 3b—Rift Valley Cichlids: 1, R. Cooke, Pseudotropheus minutis. Class 19—Single Tail Goldfish: 1, A. Pearce, Single tail goldfish. A.O.V.: 1, S. Hawkins, Brachydanio maculatus.

* * *

Gateshead A.S. open show. Class Ba: D. Russell (Stanley). B: J. Priestley (Stanley). Ca: P. Barrow (Gateshead). Cb: J. McCutcheon (Gateshead). C: R. Brogdan (Bishop Auckland). Da: D. Morgan (Newton Aycliffe). Db: G. Errington (Stanley). Dc: B. Porteous (Thornaby). D: B. Corner (Gateshead). Ea: Mr. and Mrs. Marsden (Bimbo). E: J. Priestley (Stanley). F: J. Skillcorn (Ind.). G: B. Corner (Gateshead). H: S. King (Redcar). J: M. Cockerill (Redcar). K: A. Richardson (Gateshead). L: R. and T. Kirkup (Carnaria). Ma: J. Bowser (Newton Aycliffe). M: D. Morgan (Newton Aycliffe). No-t: C. Freeman (Houghton). Nb-m: D. Morgan (Newton Aycliffe). O: M. Middlemast (Stanley). P: J. Tingling (Bimbo). Q: A. J. Morrison (Usworth). R: G. Learoyd (Gateshead). S: D. Morgan (Newton Aycliffe). T: G. Hall (Throckley). U: L. Hindle (Novo). V: A. Morrison (Usworth). Wa: Harrison (NCFFS). W: J. English (NCFFS). Xb-m: R. Brogden (Bishop Auckland). Xc-t: M. Conway (Bimbo). Xu-w: D. Hall (NCFFS). Best Fish in Show: J. Priestley (Stanley). Best Exhibitor: S. King (Redcar). Best Visiting Society: Redcar.

* * *

THE Wycombe Marsh A.S. meet on the 1st and 3rd Thursdays at 8.30 p.m., at the Young Adult Centre, Wycombe College, Queen Victoria Road, High Wycombe, Bucks.

Meetings this year have consisted of a bring-and-buy sale, FBAS aquatalks on Barbs and Anabantids. Talks by Trevor Butler, Bob Essen and Dick Mills.

Future meetings are as follows: 6th September: FBAS aquatalk on Angel fish. 20th September: Visit to an aquarium shop. 4th October: Bring-and-buy Sale. 18th October: Talk by Danny Blundell on Koi.

Further details can be obtained from the Secretary, Jeff Woodbridge, telephone: High Wycombe 882875.

* * *

North Avon A.S. had a very pleasant meeting on 16th July when they enjoyed a slide illustrated talk given by Mr. S. La Thangue on fish from the Rift Valley, which received deserved appreciation, we shall undoubtedly be hearing more from him in the future. The water supply authorities are as usual being thoughtless towards us, this time by uninformedly introducing Chloramine into the supply at random, resulting in reports of fish fatalities. This problem was discussed and must certainly requires investigation. We were pleased to welcome seven new members, and we look forward with the expressed hope of the safe and successful delivery of another two members within the next few weeks. All enquiries regarding the Society will be answered, and should be addressed to the Secretary, R. W. Cummins, 1 St. Anne's Close, Cadbury Heath, Warmley, Bristol BS15 5EH.

* * *

MEMBERS of the **Dorchester Tropical Fish Society** wish to thank the *Aquarist & Pondkeeper* for the splendid article about their club featured in the "Meet the Society" series in July. As a direct result of this article we have received numerous enquiries, not only about our Open Show, but also on the club itself and how to join with a subsequent increase in membership. Thank you *Aquarist & Pondkeeper*, keep up the good work.

This is an ideal opportunity to give all aquarists a final reminder of our 4th Open Show to be held on Sunday 16th September, at the Boy's Brigade Hall, Weymouth Avenue, Dorchester. Engraved trophies and award cards will be awarded to all class winners; award cards to second, third and fourth places. The F.B.A.S. Championship Trophy this year is for Class Dc (Rift Valley Lake Cichlids). *The Aquarist* goldpin, together with the Committee Cup 1982, goes to Best Fish in Show. As well as 35 annual class winner trophies, other "special" annual trophies include the Colin Clarke Shield for Best Tropical Fish, Tyre Services Shield for Best Coldwater Fish, Sue Hallett Trophy for Best Livebearer and finally the Greasby Trophy goes to the Highest Pointed Visiting Society.

We do hope as many aquarists as possible will be able to attend our show, which promises to be even bigger and better than in previous years. For further information and show schedules write to the Show Secretary, Barry Symes, 5 Arnhem Green, Dorchester, Dorset 1XJ 2PS or telephone the Show Manager on Dorchester 67557.

* * *

North Avon A.S. were very busy at their last meeting in May, making final preparations for their forthcoming "Open Show" on 16th June. All the major arrangements had been made some while ago, but there was the usual loose ends to be tied up. A table show in the category A.V. Tropical resulted in 1st, 2nd, 3rd and 4th places going to P. Long, K. Ashmead, N. Curry and Mr. and Mrs. Hughes respectively. Four new members were signed up, namely, Michelle and Richard Davies, and Mr. and Mrs. Alan Southwick, to whom we extend a warm welcome. We offer our grateful thanks to Mr. Young and the *Aquarist and Pondkeeper* for their assistance in publicising our Society. Our 5th "Open Show" will be over by the time you read this report, but arrangements are already in hand for our 6th to be staged at the same venue on 15th June, 1985. If you have any enquiries to make of us, come along to any of our meetings, held at Hanham Folk Centre, High Street, Hanham, Bristol on the third Monday each month, or contact R. W. Cummins, 1 St. Annes Close, Cadbury Heath, Warmley, Bristol BS15 5EH. Tel: 0272 673999.

From Aquarists' Societies

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.

7th October: A. & D FISHKEEPERS SOCIETY is holding its open show at Hillocks Community Centre, Common Road, Sutton-in-Ashfield, Notts. Schedules can be obtained from F. S. Draycott (Secretary), 7 Ely Close, Mansfield Woodhouse, Mansfield, Notts. NG19 6JT.

14th October: PRESTON & DISTRICT A.S. autumn auction to be held at Preston North End Supporters Club, Deepdale Road, Preston. Further details from the Secretary, Mrs. J. Cresswell, Chorley 69312.

14th October: DONCASTER & D.A.S. open show at Don Valley High School, Stonecliffe Rise, Scawthorpe, Doncaster. Further information from H. Ackroyd. Tel: 858476.

20th October: ILFORD & DISTRICT AQUARIST & PONDKEEPERS SOCIETY Golden Jubilee 1984 Annual Exhibition of Fish at the Ilford Town Hall, Ilford, Essex. Doors open 11 a.m. (approx.)

21st October: BRITISH CICHLID ASSOCIATION Convention '84 at the Lanchester Polytechnic, Coventry. A.G.M. 11 a.m. Cichlid only auction followed by illustrated lecture by Tony Ribbink re "Lake Malawi and its fishes". Tickets available from D. Monk, 35 Kirkmeadow, Bretton, Peterborough. Price £7 for non-members. £5 for members. (Auction items restricted per member and must be pre-booked.)

21st October: SOUTH LEEDS A.S. are holding their open show at Collingham Memorial Hall (near Leeds). More details from Mr. M. Tomkinson, Leeds 775551.

21st October: BISHOP AUCKLAND A.S. Mini open show, St. James I Community Centre, South Church Road, Bishop Auckland. Benching 11.30-1.30 p.m. Further details from R. Brogden, Spennymoor 816666.

28th October: CENTRAL MIDLANDS CICHLID GROUP auction of fish and aquatic accessories at the Peace Memorial Hall, Penkridge, Staffs. Auction commences at 1 p.m. Further details from Maureen Hall, 71 Saxon Road, Penkridge, Staffs. Tel: (078 571) 3944.

NOVEMBER

2nd & 4th November: BRITISH AQUARISTS Festival. Belle Vue, Manchester. Details and schedules from J. V. Hall, 54a Carr Road, Calverley, Pudsey, Yorks. LS28 5RH.

4th November: ESSEX & EAST OF LONDON A.S. 5th Convention at St. Augustine's Church Hall, Birkbeck Road, Bush Green, Romford, Essex, commencing at 2 p.m. There will be two speakers, Jim Chambers on "Live Bearing Fishes" and a speaker from the Koi Society. Part of the afternoon will be taken up by a Krypton Factor Type of Quiz which is being organised by Ilford A.S. Tickets £1 can be obtained from Dave Henman, 1 Windmill Meadows, Aythorpe Roding, Dunmow, Essex. S.a.e. please.

11th November: BRADFORD & DISTRICT A.S. are holding their open show at Clayton Village Hall, Rrvenyke Road, Clayton, Bradford. Further details can be obtained from the Show Secretary, Mr. K. Lister, 1 Ilbert Avenue, Batley, Bradford. Tel: 0274 683735.

17th November: CATFISH ASSOCIATION OF GREAT BRITAIN Convention will be held this year at Aylward Lower School, Windmill Road, Edmonton, London N18. Our main speaker will be Mr. Heiko Bleher of Germany, fish collector, importer and photographer.

Dates for the diary

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

OCTOBER

7th October: HALIFAX A.S. open show at Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Schedules on request. S.a.e. please to David Shields, "Cobblestones," Gainest, King Cross, Halifax HX2 7DT, or ring for details Halifax 60118.

7th Oct: The **DEREHAM A.C.** are holding their second annual Fish Show at the Memorial Hall, Dereham Norfolk.

7th October: DALKEITH COMMUNITY CENTRE A.S. will hold its open show at the Centre. The Show Manager is: John O'Sullivan, 28 Park Avenue, Loanhead, Midlothian EH20 9BE.

7th October: NEWBURY & DISTRICT A.S. 12th open show at the Corn Exchange, Newbury. Schedules from Mrs. Iris Gale, 5 First Avenue, Ravenswing Park, Aldermaston, Berks. Telephone: Tadley 3130.

AT LAST.—English bred fancy coldwater fish available to the trade. Varieties ready now include Veiltails, Calico Lionheads, Red and White Lionheads, Red Bubble Eyes, Red Orandas, Red and Black Orandas. These are available in standard and exhibition quality fish. I can also offer the best selection of Betta Splendens in the Country with fish bred from top U.S.A. show stock. Colours include Red, Blue, Green, Yellow, White, Black, Brown, Butterfly. Trade only. Shops interested please write or phone for list. Weekly deliveries of fish along with livefood (Daphnia, Bloodworm, Tubifex) if required in London, Kent, Sussex or Surrey. G. Lewis, Ranchu Lodge, Stone Street, Westenhanger, Nr. Hythe, Kent. Tel: 0303-66741.

STUART TURNER Surface Pump 2·000 G.P.H. £70 o.n.o. Exchange for Fish House Air Pump. Farnworth 77460.

ALL GLASS AQUARIUMS.—5 ft. × 2 ft. × 2 ft., £50. 4 ft. × 2ft. × 2ft., £40. 4 ft. × 15 ins. × 18 ins., £20. 3 ft. × 15 ins. × 15 ins., £9. T. E. Tolley, 3 Palfrey Road, Stourbridge, West Midlands DY8 3RB. Tel: Stourbridge 375502.

SPECIALIST SOCIETIES

CATFISH ASSOCIATION OF GREAT BRITAIN—For further information send s.a.e. to: Mr. M. Rooney, 3 Spencer Avenue, Hove, Sussex BN3 8BZ.

THE BRITISH KOI-KEEPERS' SOCIETY, over 15 years experience in the care of Koi, monthly magazine, local sections, subscriptions £7·00 single, £7·50 joint, Europe £12·00, elsewhere £20·00. Cheques/Postal Orders to the B.K.K.S. Membership Secretary, A.P. 35 Coppleridge Drive, Crumpsall, Manchester M8 6PB.

SOUTHERN LIVEBEARERS AQUATIC GROUP. Many area groups, quarterly magazine, slides and information sheets. Enquiries to: F. S. Draycott, 7 Ely Close, Marsfield Woodhouse, Notts. NG19 8JT.

ANABANTOID ASSOCIATION OF GREAT BRITAIN

Alternate monthly magazine and newsletter. Membership fees: Adult £5·00; Under 18s, O.A.P. and Unemployed, £2·50. For further information please write to: Mr. A. Thompson, 4 Nelson Avenue, Nelson Village, Cramlington, Northumberland NE23 9HG.