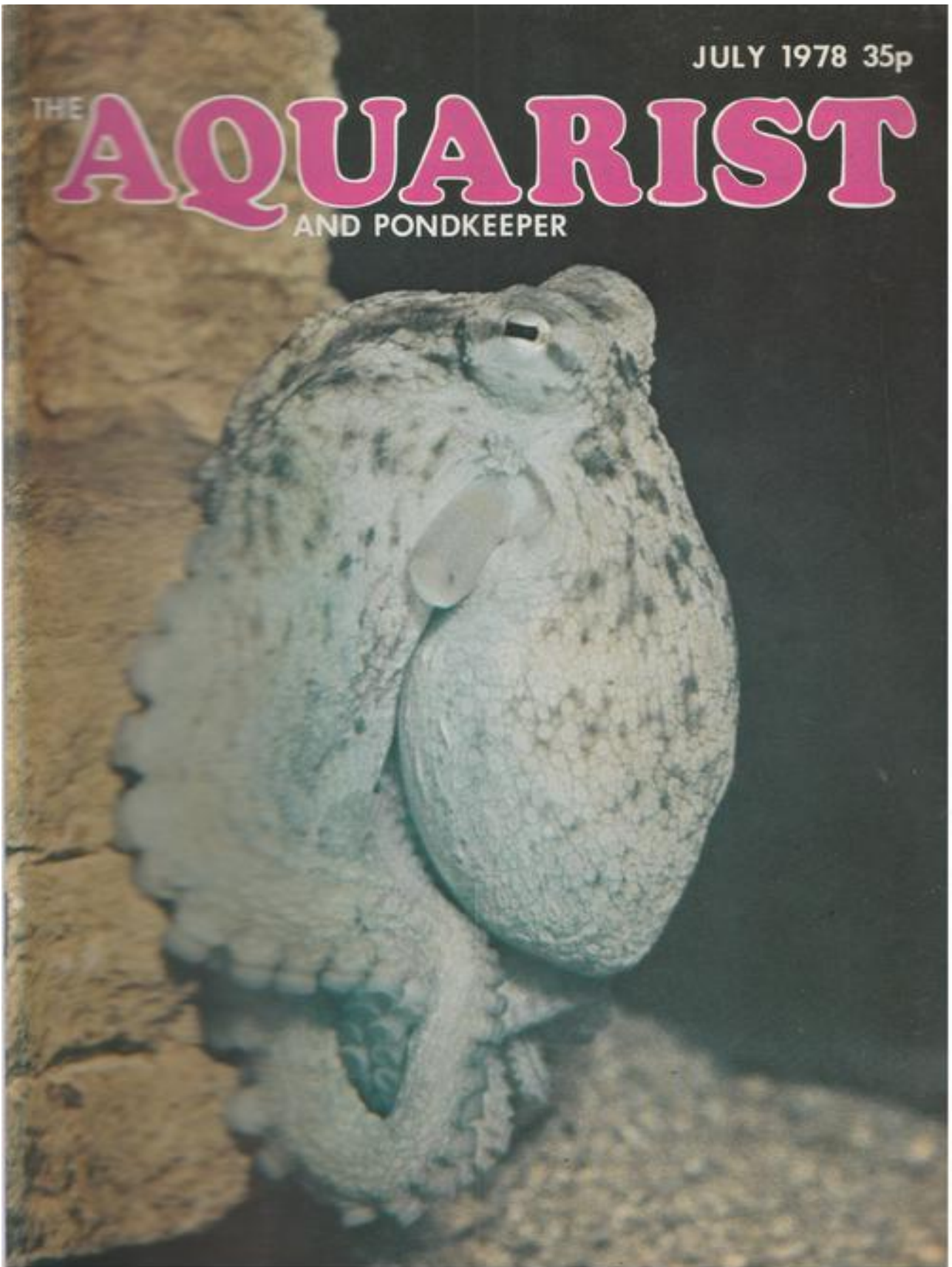


JULY 1978 35p

THE **AQUARIST**
AND PONDKEEPER





THE AQUARIST AND PONDKEEPER

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Common octopus.

July, 1978

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SOME EXPERIENCES OF AN AQUARIST IN ZAMBIA

by C. Melhuish

GLEN MELHUIH comes from Mufulira, a Copper Mining town in the Copperbelt Province of Zambia. He works as a Research Agronomist and is stationed on a Research Station 14 miles from Mufulira.

The Kafue River, which is the second largest river in Zambia, and forms a tributary of the Zambesi, is situated quite close to his home and the numerous streams which feed it provide an excellent opportunity of studying the local fish fauna of which many barb species provide excellent material for the aquarium. He has been working in Zambia since August 1965, but an interest in tropical fish-keeping took place initially in 1969 when he located the commonly occurring *Barbodes barilodes* from a nearby stream which also happened to be the home of three other barb species, one of which is *Barbodes eutaenia*.

It is very unfortunate that *B. barilodes* does not transport well.

It occurs in fast flowing streams and likes sandy bottoms. Most barb species in Zambia can tolerate very low temperatures of between 40°-50°F during the winter months. These Zambian barb species prove a difficult exercise to identify from existing literature owing to their sub-species status and complex. Added to this constraint is the great variation that often occurs within each population. However, it was not until October 1972 on his return from the Far East that he became more involved in his hobby when he built the second all-glass tank in Zambia.

A keen interest now followed in his breeding tropicals after making the first batch of breeding tanks. The first species he bred was the Zebra danios in December 1973. This provided a stimulus to breed more difficult species, and to date he has bred 34 species excluding all varieties of livebearers, with the main emphasis on breeding Angels and the various tetra species. One of his best successes with breeding Angels was his first spawning of ordinary veiltails which were left to rear their young and which

incidentally provided a fascinating study of parental care. Photographs of this spawning were taken and fish photography now became a keen adjunct to his hobby. Tanks of between 1-5 gallons are used for breeding most tetra species and 6 gallon tanks are commonly used for breeding angels, with a piece of slate as the spawning receptacle. Spawning media for tetras is often *Osmunda* fibre roots, *Myriophyllum* or *Nitella*, in conjunction with glass rod trays as an additional precaution against parents eating their eggs. Sponge filters are used in all cases and their use has proved invaluable. All breeding is carried out in atypical water conditions giving a reading of 0.5 dH (total hardness) and a pH of 7.4 which has to be acidified with acid phosphate. A favourite pastime of the fry is to hug the lower sides of the sponge filters only to dart out for food and to return. Fry are fed for the first day or two on Fry Treet and Liquifry before being fed on brine shrimp for four weeks, and then followed by newly hatched mosquito larvae and supplemented with dry foods. Breeding and rearing of mosquito larvae is the only constant complaint of his wife, who fully participates in all other activities. Cultures of white worms and grindal worms are difficult to maintain throughout the year under Zambian conditions, so as a substitute mosquito larvae are used.

Tetra species commonly bred include, Black Widows, Head/Tail Lights, Penguins, Black Neons, Lemon, Pretty and Serpae Tetras. He uses W. Jocher books on the spawning of problem fishes which he finds are excellent reference books. At present he is attempting to breed the more difficult species such as Bleeding Heart Tetras, Cardinals and Harlequins.

This might appear strange to many people but Zambia, situated between latitudes 8°-18° south, in the tropics, is subjected to great variation in daytime and night temperatures, together with extremely cold

Continued on page 137



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

TROPICAL QUERIES

My neighbour has a 24 in. by 15 in. by 12 in. aquarium on a landing well lighted by a tall window. A dozen or so small tropical fish that move about in a forest of plants always look in the pink of condition. My own 2 ft. tank, which I set up a few months ago, is a dismal failure. The fish spend a lot of time gasping at the top of the cloudy water and my plants, unlike those in the tank of my neighbour, look a perfect mess. Where am I going wrong?

In all probability you have made the mistake of trying to keep too many fishes in the accommodation provided. This is not uncommon among novice aquarium keepers and invariably leads to trouble. Then again, it is not unlikely that the fish are fed too generously and far too often. I suspect your neighbour is not guilty of this error, which soon leads to a polluted compost, rotting plants and cloudy water. A good growth of plants is dependent upon the right quality and duration of natural or artificial light they receive daily, and the correct choice of species. I suggest that you send 20p. to this office for a copy of our publication entitled *A Beginner's Guide to Fishkeeping*.



Spotted Danio

Is the spotted or leopard danio as easy to keep and breed as the ordinary zebra, spotted or opalescent danios and please let me know its maximum size and suitability as a community fish.

July, 1978

by Jack Hems

Brachydanio frankei flourishes well in any clear, well-aerated aquarium maintained at a range of temperature in the lower to middle seventies (°F). The male attains a length of about 2½ in., the female grows slightly larger and fuller in the body than the male. The leopard danio is quite inoffensive and makes a showy and active addition to a community tank.

Is it true that Leer's gourami breeds best in water not more than about 7 in. deep?

It does seem that *Trichogaster leeri* is more ready to spawn in shallow rather than in deep water and that the resulting fry grow faster, and with fewer losses, when there is little or no great depth of water over their heads.

Would a pair of *Eitropius maculatus* settle down well in a community tank?

E. maculatus is not a pugnacious fish. All the same it is not ideally suited to the ordinary community tank because it calls for hard and alkaline water with more than a trace of pure salt (not refined table salt) in it. In short, for *E. maculatus* to live long and well it should be given special conditions.

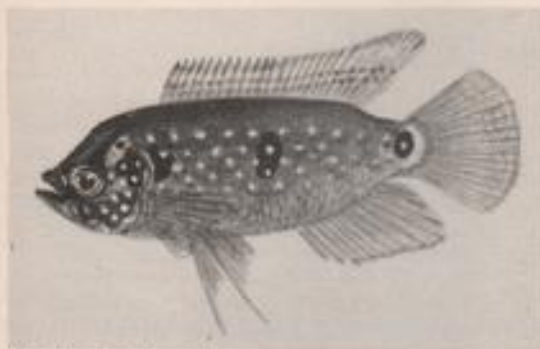
Not long after I switched off my air pump the other night water ran down the air tube and out of the pump onto the floor. Fortunately, I noticed this self-siphoning action before any damage was done to a new carpet. Are there many pumps on the market which are equally unreliable?

All ordinary air pumps should be located several inches above the top of the aquarium. This will prevent water over-spilling into the air tube and thence running into the mechanism of the pump and onto the floor.

Several months ago, I bought a catfish under the name of *Ompok bimaculatus*. It was quite

small and glassy silver when I introduced it into my aquarium. Now it is about 7 in. long and less silvery transparent on the sides. Please can you tell me the maximum size of this fish, its country of origin, and whether it normally changes colour as it increases in size?

O. bimaculatus attains a length of about 18 in. and, in the natural state, ranges over India, Thailand, Burma, Sri Lanka, and then to Indonesia. As it ages, this species does become more leaden coloured overlaid with a greeny blue to blue sheen. A series of dark spots or irregular markings, forming a narrow stripe, adorn the sides.



Hemichromis bimaculatus

I have just purchased a pair of *Hemichromis bimaculatus*. I have read that this species uproots and tears up plants. Would it be all right if I used plastic plants in a 36 in. by 15 in. by 12 in. tank equipped with an under-gravel filter, for I am not at all keen on a bare-looking tank?

Plastic plants sold by a reputable dealer would prove quite safe in your tank. Some pieces of non-calcareous stone such as granite or slate would please the fish and afford decoration, too.

How should I go about breeding *Corydoras paleatus*?

Firstly, make certain you have a pair. If the two sexes are present, then give them water with an alkaline reaction and a temperature in the upper sixties or lower seventies (°F). Feed the fish generously on a mixed diet of gnat larvae, chopped earthworms (or a substitute for natural livefood such as shredded raw lean meat), whiteworms, and the like, and furnish the tank with some lumps of well-washed stone placed on a carpet of sand. Some well-soaked peaty debris spread round the stones is desirable. Egg-laying commonly occurs after the female has assumed a bloated appearance and the male has spent some time swimming about and after her in a noticeably excited manner. Extruded eggs, carried between the pursed ventral fins of the female, are pressed to

stones, areas of the glass or broad-leaved plants after these have been visited and mouthed by the male. The eggs incubate in the space of three or four days and the hatched fry drop to the bottom and make themselves scarce. Minute livefood such as micro worms should be dropped in the vicinity of the stones or peaty debris for the fry to eat. There is not any great danger of the parent fish robbing too many, if any, of the fry of their lives. All the same, as soon as spawning is over, it is a good plan to remove the parent fish to fresh quarters, for then the fry can move about and feed without disturbance.

Please give me some information on the temperature requirements, food, behaviour and maximum length of the Chinese snakehead.

Channa asiatica, probably known as the Chinese snakehead, is quite comfortable at a range of temperature from about 65°F (18°C) to 75°F (24°C). Food such as earthworms, lean meat, swallowable portions of uncooked white fish, and so on, is recommended. If by behaviour you mean is *C. asiatica* harmless in a community tank, the short answer is no. The fish is so pugnacious that it must be kept in an aquarium by itself. The aquarium must also be kept permanently covered, for *C. asiatica* is a clever climber and is fond of leaving the water if the opportunity presents itself. In the wild state, the Chinese snakehead reaches a length of over a foot, but in the aquarium little more than half this size is attained.

I have just bought rather a long-bodied and silvery fish called an insignis. So far, I have been unable to trace this species in any aquarium book in our main lending or reference library. Can you help?

I think the fish you have bought is *Prochilodus insignis*. This fish is characterised by thick lips, dorsal, anal and caudal fins adorned with dark bars and reddish ventral fins. The fish grows to about 10 in. and is a bottom or lower level frequenter. It is peaceful but an avid eater of plant life. It is widespread over most of South America.



Prochilodus insignis

My newly acquired *Pimelodella pictus* spends most of its time in a corner packed with plants. How can I coax this prettily marked catfish into view?

P. pictus is rather light-shy and retiring and is, as a rule, most active at night or after dark when it searches the bottom and the lower and middle levels of the water for food. Whiteworms dropped near to its hiding place will invariably bring it out of its hiding place. But only for a minute or two. As time goes by, this species will venture forth when the other fishes are fed, for it can pick up the vibrations of their increased activity in the water. Normally, however, it does spend a lot of its time hidden from view.

Early yesterday, I bought four black widow fish. They looked in perfect condition, with large areas of velvety black on a silver ground. After placing them in my aquarium three of them lost their lovely black colour, and they still look washed-out and grey. Does this colour change indicate that the water is not right for them or that they are suffering from some disease?

The dark markings on the sides, and in the fins, will almost certainly return after the fish have been given a few days to settle down in their new environment. Black widow fish look their best in a well-lighted and thickly planted tank maintained at a temperature in the middle to upper seventies (°F).

Please give me some information about *Leporinus multifasciatus*.

This fish is found in the upper reaches of the Amazon. In the wild state, it is said to grow to about a foot. It certainly attains quite a size in captivity,



Leporinus multifasciatus

that is if it is given plenty of living space in clean and well-aerated water. A temperature of 75°F (24°C) or slightly higher is recommended. The species will eat almost anything alive or dried. It is, however, partial to green food such as cooked spinach or blobs of scalded lettuce. The fish is often mistaken for *L. fasciatus*. *L. multifasciatus*, however, has more vertical bars than *L. fasciatus* (single bars split into two as the fish grows larger and older) and its fins are colourless, in a manner of speaking, whereas those of *L. fasciatus* are marked with black.

Are the fumes given off by a paraffin heater dangerous to tropical fish?

Not if the dirty white scum that forms on the water is removed every day or when seen to be necessary. All you need to do is to draw some torn sheets of newspaper across the surface. More than 40 years ago, I used to keep and breed many species of tropicals in tanks base-heated by paraffin burners. Some of the fishes I kept and bred then were far better in health and colour than many of the identical species I see around today.

EXPERIENCES OF AN AQUARIST IN ZAMBIA continued from page 134

weather conditions from May to August, with ground frost often occurring in July. So it is important that most tropicals bred out of doors during the other warmer months of the year are brought indoors. These are mainly livebearers which were found to be susceptible to temperatures of 50°F. During this period thermostatically controlled heaters are used in all tanks. His main problems with fish keeping are the numerous diseases encountered, some of which are difficult to control even when using the latest recommended and currently available remedies on the market. As a prophylactic measure he treats his aged tap water with Chloramin, since the water is not chlorine treated before use. One disease he rarely gets is "Ich," but bacterial and secondary fungal infections are common where anti-biotics are used for control. Over the past few years he has built up the

number of tanks, of variable sizes, to 61, and divided these into breeding and retail sections in addition to four large community tanks in his living room. This also excludes ponds and fibre glass vats which are kept out of doors.

The cost of bringing fish into Zambia by importers is exorbitant owing to high air-freight charges, but probably the worst aspect are the losses sustained because of the long journey involved. These are the main reasons why tropicals command a high price in Zambia.

His future plans are to continue with his breeding programme and photographing Zambian fishes suitable for aquaria.

In the event of any aquarist wishing to make contact with Glen Melhuish, his address is: P.O. Box 723, Mufulira, Zambia.

GOLDWATER QUERIES

by Arthur Boarder

I had a number of frogs and toads in my pond and there is now a lot of spawn. How do I tell the difference between the two? Will the goldfish eat the spawn?

The spawn of frogs and toads is quite different. Toads lay their eggs in a double string, like a necklace of beads and usually under water round the stems of water plants. Frogs lay their eggs in a lump, about the size of a hen's egg which soon swells to at least three times the size and as a rule floats on the surface. The fish will not eat the spawn and even a duck finds it almost impossible to eat as it slides from its beak. However, the fish will eat the young tadpoles when they hatch. As soon as they are free swimming and leave the mass of jelly, the fish will catch them. It appears that toad tadpoles may be eaten when small but once they reach about half grown they get a covering which makes them distasteful to fishes, and they can then escape being eaten.

Once the frog tadpoles grow almost fully grown, which is when the hind legs appear, they can swim too fast for any but the nippiest fish to catch. Then when the front legs appear and the tail starts to shrink, they are then unable to swim very quickly.

I have noticed one or two black marks on some of my goldfish in the garden pond. Is this a disease?

The black marks are not usually a sign of present disease but may well be the signs of past injury or disease. After a wound has healed up on a goldfish, fresh growth will be made. It is this new growth which becomes black for a time. It usually clears away after a few weeks. The black markings may be seen on a young fish which is just changing from the early bronze colour to gold. The fins and upper part of the back will become quite black during this change but the black will clear away in a short space of time.

I am hoping to breed some fancy goldfish this year. How can I tell if the eggs have been fertilised properly?

You will have no doubts about this point as any eggs which have not been fertilised will become white and covered with a white fungus within two or three days after being laid. If you have a bunch of weed with eggs in a hatching tank, you may become very disappointed when you see nothing but fungused eggs. However, there may be no need to despair. With the aid of a magnifying glass examine the bunch of weed carefully and you will probably see fertile eggs.

These are quite transparent with a tiny dark embryo inside. If in a water temperature of just over 70°F., you may see the alevins inside the eggs turn over. This usually happens within about a day of hatching. The newly hatched alevins are very tiny and if there is a slight movement of the weed, they will dash forth across the tank to take a fresh hold on the side or weed. It is then that one may be greatly surprised at the number of fry which have hatched after scarcely a good egg had been seen previously.

Do you recommend feeding goldfish fry on home-made infusoria?

I consider that it is much better and certainly safer to use a liquid fry food instead of infusoria which has been made from decaying matter of any kind. The liquid fry food can be added to the fry hatching tank after two days of the eggs being laid. At a fair temperature this will encourage the formation of a little infusoria and if not the fry can feed on the liquid fry food. The advantage of this method is that you are not introducing any foul or polluted water with the food as you most certainly would with any which you have cultivated yourself. There is one method I have used successfully and that is to take some water from an established pond to add a little two or three times a day to the fry tank. This water should be examined to make sure that there are no pests in it and also under a medium strength microscope to make sure that there are plenty of free floating Algae and other tiny forms of life.

Some breeders have a tank above the fry tank so that such water can be allowed to drip into the lower tank. In such a case an overflow must be supplied or some fry might be washed over.

I have heard of hand spawning goldfish. Is this possible and could it harm the fish?

It is certainly possible and yes, it could harm the fish. I have spawned fancy goldfish successfully but only at certain times. The only times I have done this experiment is when the fish are actually spawning in the pond. At such times only a little pressure is necessary to eject the eggs and milt. To try to force eggs or milt from a fish which was not actually ready to spawn could harm a fish and then it may not be able to spawn naturally again. My method is to wait until the actual spawning and then get a clean bowl ready with a little clear water, not taken from the pond where there may be the sperms of male fishes which you do not want. Then take the female fish in one hand,

belly uppermost. Stroke with slight pressure with finger and thumb from the head end towards the vent. The eggs should stream out readily if the fish is ready. The same procedure is then performed with the male fish. Then swirl the tail of the fish round in the water to help to spread the sperms. Some clean water weed can be in the bowl to hold the eggs or they will stick to the sides of an empty one.

How much will I have to pay for a pair of fantail goldfish for breeding purposes?

I find this very difficult to answer. It is as if you asked me 'how long is a piece of string'? You will have to pay a price according to the age and quality of the fish. This can be as low as a pound to ten pounds. I must admit that I am quite bewildered by most present prices. I have just seen coldwater fish advertised in *The Aquarist* for, from £100.00 each. And I used to sell young fantails at 2/6 (12½p) each and 5/- (25p) for top quality ones, after the last war, and even very small ones at 10/- a dozen. How times have changed in the last thirty years. You may be able to get a pair of fairly good fish which could breed you some much better ones, if they came from a well established strain. This may not be the case with common goldfish, but no breeder of fancy goldfish would take the trouble of breeding a fair number of fish from poor parents if he intended selling his spares.

I have a community tank of coldwater fishes and every morning I notice a number of bubbles on the top of the water. The fishes appear healthy enough during the day time. What causes the bubbles?

I suspect that the bubbles are caused by the fishes mouthing at the surface for air during the night. As they try to take in oxygen so they make the bubbles. You may have too many water plants in the tank which only give off oxygen during the hours of daylight and give off foul gases during night time. You may have an aerator going during the day time but this is switched

off at night, actually the time when it is needed most. Check up to see that you have not got too many fishes for the size of the tank. This is a common fault.

I have a fibre glass pool which holds 75 gallons of water. I have a lot of plants in it and they are set in containers of soil. The water keeps green and I would like to know the reason?

The pool is small and it is always more difficult to keep this size pool in good order than it would be for a larger one. One needs to get a good balance. You appear to have too many fish and a lot of your trouble can be from the soil you have in the containers. Plenty of soil in a small amount of water can set up the conditions which encourage the formation of green algae. I suggest that you empty the pool and remove all the soil from the baskets except from the water lily. Then set the underwater plants in the baskets securing them in. Then place a few large stones to keep all at the bottom and you should find an improvement. Once the water plants grow well they will send out roots outside the baskets and much of the waste matter from the fish will be drawn towards the plants and used up.

You often recommend one to get some young fancy goldfish from an established strain. My friends and I have tried in vain for such fish. Can you help please?

It certainly seems that few breeders are concentrating on fantail goldfish these days. You might try visiting a few shows and there you may find a breeder with some young ones to spare. I am enclosing an address from where you should be able to get the fish you need. I have sometimes recommended breeding scaled fantails in preference to calico ones. My main reason is that I have in mind the breeder who has a garden pond for his stock. I consider that the scaled type of fish is hardier for a pond where the fish have to go through the winter out of doors. The hard scales prove a better protection against peats than if these are absent.

PRODUCT REVIEW

Aquarian Pacific Shrimps. Distributed by Thomas's, Pellon Lane, Halifax, Yorkshire HX1 5QP.

This latest addition to the specially formulated and specialized range of quality fish foods marketed under the brand name Aquarian is a small freeze-dried marine shrimp (*Euphausia pacifica*) particularly rich in protein (at least 69% under laboratory analysis).

Because a diet well-laced with protein is conducive to the proper functioning of the digestive processes and the renewal and repair of wasting, and wasted, tissue and, among other things, acts as a protective

against disease, it follows that *E. pacifica* can be unreservedly recommended to all coldwater or tropical aquarium keepers as a supplement health food or treat food.

The shrimps may be given whole as they come from the can (or pre-soaked in tepid water) to any of the large community or non-community fishes that do not feed exclusively on living creatures. On the other hand, a few of the shrimps may be pounded to a dust and then given to any species about the size of a harlequin fish or neon tetra. JACK HEMS.



MARINE QUERIES

by Graham F. Cox

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

After reading many of your Marine Queries I am trying to set up a tank 48 in. \times 12 in. \times 20 in. Is this too small? I have been very nervous about starting because I don't want to do anything wrong. Do you think you could possibly give me a name of the book that I can follow word for word.

The aquarium tank which you describe is certainly not too small for sea aquarium usage. It has an approximate gross gallonage of 40 Imperial gallons. However, allowing for the water displaced by the filter-bed, rockwork and corals etc., you will probably have between 30 and 32 gallons of actual seawater once the tank is correctly established. This means that for the first 6 months you should not exceed 8 in. total of fishes (i.e. 1 in. of fish to each 4 gallons)—but thereafter you could safely increase this to 16 in. of fish (i.e. 1 in. fish to each 2 gallons).

You should try and buy a colour copy of a book called "Tropical Marine Aquaria" by Cox (Hamlyn's—60p) and read this thoroughly two or three times before buying any livestock. In the meantime I have enclosed a leaflet called "Starting A Sea Aquarium" which should help you start the tank.

I have an aquarium 48 in. \times 15 in. \times 12 in. which I wish to convert to marine conditions, keeping invertebrates, using the light requirements as stated in the April issue of *The Aquarist & Pondkeeper*. What I want to know is which, in your opinion, is the best form of filtration for success? Will a power filter keep the water in pristine condition? Your help in this matter will be much appreciated.

Without a doubt, the finest form of filtration for any aquarium—and particularly the marine aquarium where total control of nitrogenous excretory metabolites

is so very critical—is the undergravel filter (offering as it does a massive and voluminous bed of bacterially-active calcareous matter) which is operated in REVERSE-FLOW mode (see diagram below) by an external power-filter.

I first suggested this as the ideal means of filtering marine aquaria in my monograph entitled "The New Seaquarium System" which was first published in 1968 and is now, unfortunately, out of print. It is only in the last year or two that the world's major manufacturer of power-filters (—a German company!) has taken this ten-year-old idea up and now markets the necessary equipment to construct such a reverse-flow undergravel-filter.

However, if I might be permitted to do so, I would like to suggest to you that many tens of thousands of marine aquarists all over the globe maintain very sensitive tropical marine creatures and plants with nothing more sophisticated than a deep-bed, air-lift operated undergravel filter and a small, internal, triangular box-filter full of high-grade marine charcoal—as first suggested at the beginning of my monograph referred to above. Additionally I would stress that the total cost of a U/G filter and internal (75 pence) box-filter is a mere fraction of that of the system in the diagram above. In terms of relative values, one might be forgiven here for making an analogy between a Rolls-Royce Silver Shadow Mk II and an Austin Allegro. Does the owner of the former vehicle really believe in a rational way that it is worth paying £20,000 more (after tax!) for the doubtful pleasure of proceeding from traffic jam A to traffic jam B? Clearly the answer to this question is a resounding affirmative otherwise we would not see so many of these superb vehicles on the road.

When it comes down to brass-tacks, in the power-

Continued on page 142

From a Naturalist's Notebook

by Eric Hardy

THE SALMON-TANKS at Pitlochry give one the experience of standing close to wild fish. San Francisco's Steinhart Aquarium, part of the Academy of Science complex at the Golden Gate Park, permits visitors to climb a spiral stairway surrounded by 100,000 gallons of rushing sea-water populated by more than 50 sharks and other fish. The fish swim through a 200 ft. circular glass channel of water. The design, originating in Tokyo, enables fast swimming pelagic fish to be confined in an aquarium without banging themselves to injury as on the sides of conventional tanks. Tuna fish are to be introduced.

At the other extreme, and still in that land of ideas not always without the hope of making a buck or two, is a new garden fish-pond, 1.6 m. deep and 5.5 m. diameter, solar-heated by a geodetic dome to support a thick bloom of green algae in which the owner grows his own back garden fish-food—catfish and rainbow trout, or cheaper to feed and keep tilapia, mirror and grass carps, bluegills and bullheads. The idea comes from the New Alchemy Institute at the famous Wood Holes: Massachusetts centre of fish studies. The water is pumped through filters filled with clamshells to clear sediment and wastes. It seems more like an idea for smallholders than back-gardeners here.

Misnomer

The death earlier this year of a pre-war journalistic colleague on the Liverpool press, H. S. Wright, removes a very keen aquarist and microscopist. Since his retirement to Norfolk over 20 years ago, Harold Wright developed his hobby of studying rotifers, the minute wheel-animalcule one scrapes off the underside of pond woodwork. He had at least one new species named after him. Alas, his obituary announced in modern press confusion that he was "an expert entymologist and studied insects all his life." Apart from rotifers not being insects, there's no such word as entymologist. An etymologist studies words, an entomologist studies insects, but who studies rotifers?—not a rotarian!

Albino Tadpoles

Rarer than white elephants, some pure albino toad-tadpoles intrigued me where they had just hatched in the natterjack/common toad reserve at the Red Rocks marsh on the Dee estuary shore, between West Kirby

and Hoylake in mid-April. I have records of albino and semi-albino common frogs and tadpoles from Wiltshire 1891 and 1933, Warrington, Lancashire 1921, Somerset 1931, Oxfordshire 1933 and Berkshire 1938; also a common newt from Merseyside 1971; and a creamy white natterjack tadpole at 4-leg stage at Ainsdale. With a friend in the Herpetological Society, I am trying to fatten up these with fish food-pellets.

I found natterjacks spawning in the newest pools recently excavated on Freshfield dunes to overcome Ainsdale reserve's water shortage, which was one of the complaints in Dr. Trevor Beebee's trenchant criticism of the past efforts at conservation of natterjacks and sand-lizards by the Nature Conservancy at Ainsdale, which he published in *Wildlife* in April. When the draft of his criticism was shown to the NCC, a series of meetings of those concerned was quickly called over 3 days to organise, at last some unity and co-ordination where for so long experienced aquarists and herpetologists had been excluded from a local "closed shop," and the privileges it received. Beebee set the cat among the pigeons by taking a bulldozer on to the drying dunes and excavating water-holes for the natterjacks to breed in! A couple of wet springs recently saved the situation by raising the subterranean water-tables. I recently turned up a pre-war letter from a local naturalist describing a drake wigeon on the old slack pool "amusing himself by catching and disembowelling natterjacks . . . he had five of them laid out in a row, side by side. It was rather late in the season to see these birds about, but the next day they had gone." The Editor recently showed me a photo of a frog similarly disembowelled at his garden pool. This may happen from several predators: fox, stoat, weasel, dog, etc., which find them distasteful.

The NCC of course had paid as well as voluntary wardens at its Ainsdale reserve. The Cheshire Conservation Trust has only a nominal usually absent warden at its Red Rocks reserve on Hoylake shore. They tell me they cannot raise a rota of even week-end wardens, though I met a throng of them visiting Hilbre only a stone's throw across the sands, for a guided bird-watch. One wonders how many members are really naturalists, or just nature sight-seers in such societies with huge memberships.

Remora

The recent annual report of the Zoological Society mentions its successful display of its first remora or sucking fish, kept in a large tank with a green turtle, to which it occasionally attached itself. It also had the large South American *Arapaima* of Brazil and Guyana, the world's largest freshwater bony fish, though not at its frequent 16 ft. length. This attains 400 lb weight. The zoo also exhibited the related arawana. New York Zoo has also exhibited these fish.

The Nature Conservancy's excellent new 80-page publication *The Birds of Rostherne Mere* doesn't leave the impression, like so many bird-guides, that this national nature reserve near Altrincham in Cheshire is only a bird haunt. Attention is drawn to its waterlife, which makes it unique in Britain. Britain's only freshwater haunt of spurling or smelt, with a small-sized race landlocked since the Ice Ages, is stated to have apparently gone. I think this is too hasty a decision after the fish's long history here. True, a Manchester University trap set by its tumbling brook after the war failed to catch any, but they are notoriously difficult to catch and have usually been taken accidentally in the spawning season when a few reach shallower waters than its 30 metres depth. No alien fish seem to have been introduced to its pike, perch, tench and bream, and eels are thought to no longer reach it. Horned pondweed and starwort are the chief pondweeds, while the shores are fringed with mostly Phragmites reeds, with sweet flag off Harper's Bank. White and yellow waterlilies have gone from its margins, but no mention is made of the purple smallreed, *Calamagrostis canescens*. Its sweet gale and royal fern have also been lost. Nor is mention made of its fen-sedge, *Cladium mariscus*, tufted sedge (*elata*) and commoner waterside marsh-cinquefoil, skullcap and yellow loosestrife.

A. E. Ellis's new 110-page revised edition of *Synopsis of British Freshwater Bivalve Mollusca* (Academic Press, £2.80) is the only work exclusively dealing with these "pond mussels", going back to

Pleistocene remains. So its keys to identification are useful for archaeologists as well as aquarists, and for learning more about the ancient environment of their digs. It is in the series on British fauna sponsored by the Linnean Society.

Snakes

Many readers keep native snakes, but I wonder how long adders have survived and bred in captivity here? Liverpool School of Tropical Medicine, famous for its snake-venomen research, apparently finds that native adders will not generally feed under laboratory conditions and thus cannot be kept so much as foreign relatives. This explains the difficulty in finding the age to which adders can live. It is estimated that about 40,000 people suffer snake-bite each year, mostly in rural tropical areas and relatively few in Britain. Books still include the adder among pets for school (e.g. Spoczynska's 1968 "*A Zoo on Your Window-Ledge*") without any advice on this problem.

The School, in Liverpool's Pembroke Place, is part of the university complex and probably has the most varied collection of snakes outside any zoo in this country: African puff-adder, 10 carpet-vipers, American rattle-snakes, pit-viper, etc., to mention a few. Carl Gans' momentous *Biology of the Reptilia*, now in its 7th volume, is the most comprehensive and largely American review of this class of animals. The latest, on their ecology and behaviour (at £31) has 720 pages on the diversity of species, their competition and selection of habitats, social behaviour, population-dynamics and most interesting of all, their learning processes. The sensory response of an individual reptile to social cues and how it interacts with its own and other species is something older herpetologists never thought of as they collected all they could lay hands upon. In September 1975 the Linnean Society held a symposium on this subject in London where biologists from London's St Mary's medical school and King's College had their say with the Americans.

MARINE QUERIES continued from page 140

filter-operated, reverse-flow undergravel-filter system (henceforth referred to as the REVERSE FLOW SYSTEM) shown in the diagram, you are really paying an awful lot of money for convenience. In other words, this system is no more effective or efficient biochemically than the cheap-and-cheerful air-lift operated U/G filter + internal box-filter. However, the great weakness of the latter is that non-biodegradable "sea-humus" slowly accumulates in the oolitic coral-sand layer of the filter-bed from where it can only be conveniently removed as each partial water-change time comes around by stirring up the sand to loosen the sea-humus, and then syphoning off

both the sea-humus and the 25%-33% tired old seawater. With the REVERSE FLOW SYSTEM on the other hand, all the solid, non-soluble, non-biodegradable materials are continuously "blown out" of the coral sand filter-bed and into the power-filter from where they are removed from time to time in a more convenient manner.

N.B.—The significance of good tank hygiene, with special emphasis on not allowing sea-humus to build-up in the filtrant media, is that it is in this material that trematodes (=flukes), nematodes (=threadworms) and cestodes (roundworms) feed and breed.

AQUATIC CHEMISTRY (3)

THE DEFINITION, MEASUREMENT AND MANAGEMENT OF WATER HARDNESS

by Dr. P. A. Lewis

AT THE CONCLUSION of my last article I mentioned that I would next attempt to discuss the topic of Water Hardness from the concepts previously outlined in the topic of pH. Accordingly I will first outline what causes water to become "hard" or "soft" and then I will deal with the measurement and alteration of the "hardness factor."

To begin with all water falls from the clouds as rain. Since this water has formed a cloud as a result of evaporation from rivers, lakes or oceans it will contain no dissolved salts and will be virtually equivalent to distilled water at the very moment that it leaves the cloud. This situation, however, does not continue long since as the water begins its downward journey through the earth's atmosphere, it dissolves carbon dioxide to form the very weak acid known as carbonic acid (soda water). This weak acid may then fall on minerals in the earth's crust such as Limestone (calcium carbonate) and Dolomite (magnesium carbonate) which will dissolve in the carbonic acid rain to form solutions of calcium and magnesium bicarbonates. Such aqueous solutions collect as spring or well water and are described as being "hard" due to the presence of dissolved calcium and magnesium bicarbonates. Any person washing his or her hands in hard water will immediately notice the flocculant "scum" that is formed as a result of the chemical precipitation of the calcium and magnesium by the soap used to wash with. Many of the earth's subterranean wonders are the result of the erosion of surface minerals by rainfall and rivers which cut deep and grandiose caverns in the earth's upper crust. Such examples are manifest in the Peak District around Ingleton, England and in the famous Skyline Caverns of the Blue Ridge Mountains of Virginia, U.S.A. Water flowing from the caverns in these areas is extremely rich in minerals and very hard.

Alternatively, rainwater which falls on insoluble

rock deposits such as granite, Welsh slate and volcanic rocks usually does not pick up any additional minerals and streams flowing from these areas are invariably "soft."

Having exemplified how water becomes hard I would now like to further explore the topic by differentiating between two types of hardness, namely "Temporary" and "Permanent" hardness. Temporary or bicarbonate hardness is defined as hardness which can be removed by boiling the water. This type of hardness is caused by the presence of calcium and magnesium BICARBONATES and the hardness is removed as a result of the bicarbonates decomposing when the water is boiled to form insoluble carbonates which precipitate in the form of a white "fur." Such "fur" is a familiar sight to the housewife who boils water in a district in which the water is temporarily hard due to the presence of bicarbonates; it will also be noticed as a covering on the aquarium heaters of aquariums located in these areas. Permanent or mineral acid hardness is that type which cannot be removed by boiling the water. This type of hardness is due to the rain dissolving more stable salts of calcium and magnesium which are not decomposed by boiling the water. Most permanent hardness results from rain falling on deposits of calcium sulphate (Gypsum) and, to a lesser extent, on magnesium sulphate (Epsom Salts). Additionally calcium and magnesium chlorides and calcium and magnesium nitrates will also cause permanent hardness but are not as common as composites of the surface strata. Total hardness is merely the sum of the permanent and temporary hardness.

The modern aquarist should be fluent with two systems of expressing the extent of water hardness. The British and American system is to express hardness as parts per million calcium carbonate (CaCO_3); this gives a value for the number of parts of

calcium carbonate hardness present in a million parts of the water under test. The German system uses the symbol DH and expresses hardness as parts per million calcium oxide (CaO). The fact that one system uses calcium oxide as a yardstick whereas the other uses calcium carbonate as the yardstick means that the two systems are not directly comparable. In fact, 1 German Degree (1°DH) is equal to 17.9ppm CaO whereas 1 British or U.S. Degree is equal to 14.3ppm CaCO₃. The use of the British or U.S. Degree is gradually being dropped in favour of the German Degree or merely the expression of hardness in terms of ppm calcium oxide. All that the aquarist needs to remember is that for all practical purposes 1°DH approximates 18ppm CaO. Thus very soft water will have a hardness from 0.4°DH or 0.62ppm; very hard water will have a hardness from 30°DH and above or 540ppm and above.

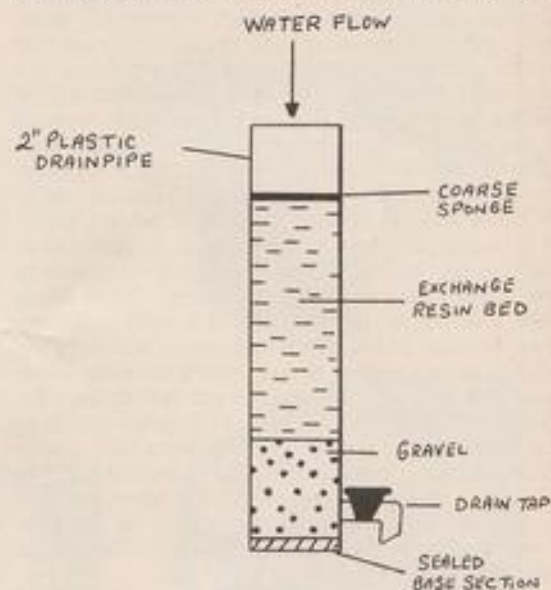
Determination of the hardness of a sample of aquarium water has been made extremely simple and rapid with the introduction in recent years of hardness test kits designed for use by the aquarist. The principle behind many of these tests is the fact that a chelating chemical known as ethylene diamine tetraacetic acid (E.D.T.A.) will complex with calcium and magnesium on a 1:1 ratio at a pH of 10-11. Thus all the aquarist needs to do is look for a colour change when all the hardness-forming salts have been complexed by the E.D.T.A. and apply a simple calculation based on the number of drops of reactant required to bring about the colour change.

A second test, known as the Wanklyn Soap Solution Test, involves the use of a standard soap solution to determine the water hardness as evidenced by the formation of a stable foam when all the hardness-forming salts have been "neutralised" by the added soap. This test requires considerable practice before one becomes skilled in recognising the end point of the test and consequently has been superseded by the more accurate and reliable E.D.T.A. test.

Having determined that the local water is hard, the aquarist who wants to specialise in fish which thrive in hard water, as do the popular Rift Valley Cichlids, needs do nothing save carry out partial water changes as necessary. However, the aquarist who wishes to specialise and breed such magnificent fish as the cardinal tetra or Discus, will be faced with the need to provide a supply of soft water in an attempt to pander to the requirements of these fishes.

In providing a supply of soft water the aquarist is faced with a series of choices, each with its own respective merits. Possibly the most simple and obvious method is to collect rain water. Ideally this should be done by collecting rain continuously from an overflowing rain barrel placed at the bottom of a drain pipe draining from a house or shed roof. It is not advisable to merely place a two-gallon bucket outside at the start of rainfall and collect whatever rain falls

during the shower; this is particularly true for those aquarists who live close to industrial manufacturing complexes and power plants. The reasons for not collecting water by the bucketful are primarily as a result of the fact that the initial water falling during a shower will dissolve a large quantity of atmospheric pollutants which will have a dramatic effect on your fishes' health if added untreated to their tank. Water I once collected this way when I lived in Huddersfield, Yorkshire, had a pH of 3.8 and a decidedly sooty appearance. The use of a continually overflowing rain barrel tends to overcome contamination problems by dilution and through some degree of ageing which allows volatile gases to escape on standing. As a further guard against contamination the downspout feeding the water barrel should be fitted with a coarse plastic mesh cone which will prevent dead leaves from falling into the barrel and decomposing. Further, the barrel should be fitted with a cover with a hole cut



SYSTEM FOR ION EXCHANGE RESIN USE

to allow for the drainpipe, some aquarists prefer to leave this cover off during the Summer months and allow Mosquitoes to fertilise the water which eventually leads to a supply of live food for the fish in the form of Mosquito larvae.

A second method for obtaining soft water is to soften the hard domestic supply by the use of what is termed an "ion exchange resin." This method is gradually increasing in popularity as manufacturers are beginning to cater more and more for this aspect of the hobby. Basically ion exchange may be defined as the reversible interchange of ions in solution and a solid in which there is no permanent change in the structure of the

solid, the solid being the ion exchange material. The reversibility of the exchange resin is a key factor in the economical use of such techniques by the aquarist. Ion exchange resins have been used industrially since 1910 when water was softened using natural zeolites. More efficient and stable synthetic resins were introduced in 1935.

The mechanism behind water softening using an ion exchange resin is basically brought about by the interchange of ions causing hardness, i.e. calcium and magnesium ions, for another "soft" ion, usually sodium or hydrogen ions. The "hard" ions remain trapped in the exchange resin and the "soft" ions are given up to the water where they remain in solution. If the "hard" ions are exchanged for sodium ions the hardness will fall but the total mineral content of the water will be unchanged. Calcium and magnesium "hard" ions will have been replaced by sodium ions in equivalent proportion to form sodium carbonates, sulphates and bicarbonates which will in turn result in the pH of the softened water being higher than that of the untreated water. If the "hard" ions are exchanged for hydrogen ions the overall effect will be a reduction in the total mineral content and an increase in the pH of the now softened water due to the formation of carbon dioxide and mineral acids. A system for softening water using an exchange resin may easily be constructed as detailed in figure 1, using a length of 2 in. polypropylene drainpipe, a small plastic tap of the type sold by home brewing shops, a coarse sponge and a small amount of silicone sealant. When filling such a set-up for the first time it is most important that the resin bed is distributed evenly and does not contain any air pockets through which the water under treatment will rapidly channel and not contact the resin. I find the best method of filling the tube is to stir the resin with a quantity of tap water then rapidly pour this slurry into the tube before the resin has time to settle. It is good practice to never allow the resin to dry out and always leave the resin in the tube covered with about half an inch of water. Ideally the tube should be capped when not in use.

Water to be softened is first tested using a hardness test kit and then slowly trickled through the resin bed at a rate of about two to four gallons an hour dependant upon the state of the resin and the hardness of the water. The treated water is then re-tested to determine the hardness and to confirm that the resin has been effective. Normally the water softened by ion exchange resin cannot be used immediately. The pH must first be checked and adjusted to coincide with the pH of the tank in which the water is to be used. The amount of water obtained by exchange treatment may be increased by diluting the water which has been softened with a quantity of untreated domestic water until an acceptable level of hardness is achieved.

When quality checks of the treated water show that the resin is losing its effectivity, it is time to regenerate

the resin bed. If, as in the majority of cases, the exchange resin was in the sodium form prior to use regeneration is accomplished by replacing the water in the resin tube with a 10% solution of cooking salt and leaving overnight. The following day the salt water solution is replaced by fresh domestic water and the resin is once again in the correct state for water softening by sodium exchange. Resin which softens by means of hydrogen ion exchange must be regenerated using a 5% solution of hydrochloric acid, not as simple a matter as in the case of the sodium resin. A 10% solution of salt may easily be made up by dissolving one pound (450g) of cooking salt in one gallon of water.

Points to bear in mind when using ion exchange resin are: always check the pH prior to using the treated water, dilution with unsoftened water will greatly increase the life of the resin, never purchase a "mixed bed" exchange resin—these produce ultra pure water and cannot be regenerated at home. The volume of water which can be softened per pound of resin varies with the area in which the aquarist lives and the degree of hardness required as the end product. Cost of treatment is very difficult to assess since the resin can be used many times over and it is normally only as a result of physical loss that the resin has to be replaced totally.

A third method of softening water is by the use of Sphagnum Peat Moss in an outside filter servicing the aquarium. Peat does contain complex molecules which will act in a similar manner to the resin discussed previously. Its softening action is, however, slow and not reversible. Care must be exercised if this method is chosen for water softening since the water chemistry can be drastically changed in a relatively short time period as a result of the action of the peat.

Finally, soft water may be purchased commercially if the aquarist can justify the expense. This water is normally de-ionised or distilled and must never be used without first being mixed with a quantity of domestic water which is liable to contain trace elements necessary for the well being of the fish and plants.

Prior to concluding this article I would like to say a word about the tank set up for keeping "soft water" fish. Obviously it is pointless going to any trouble to prepare or obtain soft water if the tank contains gravel which has not been treated to remove carbonates and bicarbonates of calcium and magnesium. If any gravel for use in a "soft water" tank is first washed with a 5% solution of Nitric acid and then washed acid free by flushing with tap water, then all calcium and magnesium hardness-forming salts will be converted to soluble nitrates and washed away. Additionally the ideal tank will have an internal seal of silicone such that the water will not contact any putty type of aquarium sealant which will gradually release calcium into the water.

WHAT IS YOUR OPINION?

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

Photographs by the Author



"I HAVE a good supply of bloodworms that cultivate themselves in an old container in the garden," writes Mrs. M. T. Taylor, from her home at 18 Cookson Road, Thornton-Cleveleys, Lancs. "My problem is separating the worms from the mud because unless I have a couple of hours to spare it just isn't worth bothering with them. However, I have recently discovered that if I scoop up worms and mud together then stand them in a polythene container on top of the fire-guard, as the water warms up the worms start swimming to the surface and can be scooped out with a small sieve. Of course, I have to be careful not to overdo things and end up with cooked worms. Perhaps other readers may have better methods of cleaning bloodworms. I have also been wondering what is a reasonable life span for a tank-kept fish. Most books don't give any information about life expectancy and every time a death occurs I wonder if it really is from old age or because I have not been properly caring for the fish.

"My own oldest residents are three serpaes which I bought as young fish over four years ago when I set up my first fish tank. I have several other species that I've had for over three years—so I don't think I'm doing too badly. It would be interesting to know for how long aquarists have managed to keep specific fish. Maybe through your column you could find a record breaker."

"Even at the threat of having an increase in cost, let's have some more colour photographs—especially of plants; even in *W. Y. O.!*", writes Mr. Rob Marshall, of The Cottage, Belle Eau Park, Bilsthorpe, Newark, Notts. "With reference to a contribution that appeared in April's saga about pseudo-aquatic Ivy-Leaved Cryptocorynes, I too am of the opinion that these plants don't quite flourish when submerged in water—as one is led to believe when one buys them from our dealer 'friends.' I cherish my plants even more than my fish and am often to be seen peering into the evil, dark corners of dealers' tanks in an attempt to satisfy my unnatural lust. However, the number of times that one is left with a filthy, degenerating remnant almost turns me to keeping fish and not plants. I think I'll stick to 'these we have loved' and leave the 'Ivy-Leaved, Malayan, striped, pygmy, floating palms' to rot in dealers' tanks!"

Mr. Kevin McGrath is 20 years old and resides at 30 Beddington Road, St. Paul's Cray, Orpington, Kent. "You may like to hear about my pond because you do not seem to get many letters about ponds. As I always planned to go on to college after 'A' levels, I knew I couldn't keep tropicals, so I had various coldwater fish in two aquariums; and I also built a pond knowing that when I left I could put all my fish in the pond and not have to worry about them. Neither my family nor I realised what an interesting and valuable addition to the garden the pond would make.

"The pond has a p.v.c. liner and is 8 ft. x 5 ft. It started out only 6 ft. x 4 ft. in 1971; but I dig the excavation a little bigger each time I clean it out under the pretext of 'improving the design.' I planned to make it as self-sufficient as possible and I was very pleased with the result.

"I planted it with a wealth of oxygenators: *Elodea*, *Ranunculus aquatilis*, *Callitriche*, *Myriophyllum*, *Fontinalis* and *Potamogeton*. These grow very rampantly and would choke the pond if the fish did not eat them. All the marginals are container-planted—but their roots still spread. I let them because they provide homes for numerous, small life. This was what surprised me—the amount of small life that developed despite 17 hungry fish. *Daphnia*, cyclops and Ostracods breed in abundance—although the *Daphnia* are scarcer, probably because they are easier to catch. *Gammarus* shrimps and *Asellus* (water hog louse) are extremely common and are helpful scavengers. I even have a golden strain of water hog louse amongst the normal brown ones, and it is very attractive. Has anyone else heard of this variety?

"Various fly and gnat larvae are very common, especially mayfly nymphs, and bloodworms, the latter unbelievably common in the bottom silt, much to the delight of my tench (my favourite fish). There is also a tiny, brown beetle; but I think it is eating the water-lily leaves so I'm not encouraging it any more! Ramshorn snails and *Sphaerium* mussels also appeared from nowhere. I have enough small life in my pond to harvest regularly and give to my friends to feed the fish in their aquaria.

"My pond also provides a home for many smooth newts and a few frogs. I release their spawn in a

lcal pond which has few fish, to give the tadpoles a chance, and I raise a few to maturity myself in an old sink, because frogs seem to be getting scarce. I would recommend a pond to anyone who has a garden, no matter how small, as long as nothing and nobody can fall into it. Finally, does anyone know where I can get some frogbit, or water violet (*Hottomia*)? I would gladly swap some of my coldwater plants." (Anyone wishing to effect a swap should write directly to Kevin.)

No. 103 Alexander Avenue, Largs, Ayrshire, Scotland, is the home of sixteen years old Master Norman Wild. Some time ago he purchased a female swordtail; her first brood consisted of one pair of Siamese twins, one of which was dead. Norman tried to separate the pair but the other fish died. The swordtail's second brood consisted of a baby fish with two tails and three eyes—one in the middle. The fish's stomach was not properly developed but close examination showed its tiny heart to be beating. As the fish could not swim properly Norman destroyed it humanely. He hopes that the swordtail's next brood will be perfectly normal. Have any other readers' fishes produced deformed babies?

Lime-free Peat

Master David A. Higgins is fourteen years old and he wrote to me from Cherry Trees, Cokes Lane, Chalfont St. Giles, Bucks. David had kept tropical fish for two years; but although he was very successful with the fish he was unsuccessful with aquatic plants. He says: "My first mistake was that my local dealer sold me a 2 ft. x 20 watt fluorescent tube for my 3 ft. tank; not having any knowledge of the hobby I thought nothing of it. I had a U/G filter and about 3 in. of gravel. About three months ago I put 2 x 40 watt bulbs in the hood as well as the fluorescent tube. I also went to the local garden centre and bought some lime-free peat for my tank. I made quite a mess of my bedroom but it was worth it. My plants grew like mad; my Amazon sword sent out a runner, the *Cabomba* grew about 3 in. a week, my *Vallisneria* sent out runners and my dwarf lily sent up floating leaves, one of which was 4 in. long. Previously the largest leaf was 1½ in.-2 in. long."

Rainbow Fish

Mr. P. W. Neville lives at 1A Allandale Crescent, Potters Bar, Hertfordshire (Tel: Potters Bar 58593). "Wanted: *Melanotaenia maccullochi*—dwarf Australian rainbowfish, yellow with brown dashes; not to be confused with bluish, iridescent species of *Melanotaenia*." (Anyone who can supply Mr. Neville with the required fish should contact him by telephone).

Mr. G. D. Forkes is a director of Akwa Limited, Victoria Road, Mortimer, Berkshire (Tel: Mortimer—STD 0734-333144), specialists in equipment and filtration for pools, ponds and aquaria. He writes:

"I read your column monthly with great interest. I see quite frequently problems people have with filters (and) filtration for ponds and aquaria. Enclosed is our brochure on the range of Akwa equipment. I should be pleased to answer any reader's problems on any aspect of filtration, large or small." (I have not seen the Akwa range of equipment; anyone interested should contact Mr. Forkes).

Plants Wanted

Master Alan Lee is a pupil at Ballyclare Secondary School and is at present studying for his 'A' levels. His address is 10 Loral Park, Newtownabbey, Co. Antrim, N. Ireland. Alan would like to find someone who could supply him with the following plants: *Nymphoides aquatica* (banana plant) and *Didiplis diandra* (water hedge). He wonders if any reader could supply the plants on a cash or swap basis. Please contact him, by telephone, at Whiteabbey—STD 0231-65062. (I must admit I haven't seen either plant for some years but they used to be quite common in Northern Ireland. To be honest, I haven't been in any of the Belfast dealers' shops for a couple of years therefore I'm out of touch with the current state of the hobby in Ulster.)

The fish sent to me by my friend Jeff Hutchings, chairman of the North West Lancs. Section of the Fancy Guppy Association, continue to thrive. Perhaps the three females—with the help of the two males—will soon present me with some baby guppies.

Master Andrew Young is thirteen years of age and his address is 43 Lawn Drive, Swinton, Lancs. He says: "I'm sure many people have heard of internal backgrounds for fish tanks; and some may be thinking of buying one. They come in two different colours: dark and light blue, and in one length—which is 36 in.; so if you have a small tank you have to cut them to size—which isn't easy. Before putting an internal background in your tank, take out all your fish or you will find half of them trapped behind the background and you will have to try to net the fish, which is almost impossible.

"Using internal backgrounds means you can hide all pieces of equipment behind them—apart from extensions on the air lifts from the U/G filter; and as a bonus there is still a good spread of heat, from the heater, all over the tank. Over all, I think such backgrounds are well worth £1.50 each."

Angels

Mr. R. E. Fuller's home is at 91 Eastgate Street, Bury St. Edmunds, Suffolk. He has the following to say about his angel trio. "Most books claim that angels should be allowed to find their own mates; and once they have, be allowed to stay as a mated pair for life. My 39 in. x 15 in. x 12 in. aquarium contains five angels comprising 2 gold, 2 blushing and one

Continued on page 161

THE ORANGE-TAILED GOODEA

SOME PROBLEMS ENCOUNTERED IN BREEDING *Xenotaca eiseni*

by Barry Durham

SEVERAL species have had a hand in the revival of interest in rarer livebearers in recent years but the one which really sparked the whole thing off was a pretty little member of the Goodeidae family—*Xenotaca eiseni*—the Orange-Tailed Goodea.

In the late summer of 1975 three pairs arrived in this country from the United States and these provided a basis for Britain's aquarium population. Other importations may have been made but in view of the mystery surrounding the original method of obtaining these fish for aquarium use (which I understand was smuggling them out of Mexico) it is highly likely that the recipients of any more of these little beauties were sworn to secrecy.

The mystery has disappeared now though and the Orange-Tailed Goodea has even found its way into some aquarium shops selling for around £1.00 a pair.

They have been known to science since 1894 when they were first collected in a branch of the Rio Grande de Santiago near Tepic, Mexico, by Dr. Gustav Eisen and then described by Rutter two years later in his "Notes on the Freshwater Fishes of the Pacific Slope of North America" (California Academy of Sciences, Series 2, Volume VI, pages 266 and 267). Rutter named them *Charcodon eiseni* and his original description was based on four specimens (one male and three female) which were preserved in alcohol. Consequently he could not record the lovely life colours of the male and described it simply as having a "broad indefinite lateral band" with no mention of the orange caudal peduncle and tail and blue body.

In the 1960s they were moved to the *Xenotaca* genus and were thought to be synonymous with *X. variata*. But this seems to have been suppressed following the paper by John Michael Fitzsimmons on "The Revision of Two Genera of Goodeid Fishes from the Mexican Plateau" (Copeia 1972, No. 4).

Being essentially river fishes found in the Rios Tamazula and Tuxpan as well as Grande de Santiago, they inhabit shallowish water with plenty of plants.

The body shape is laterally compressed with the males having a slightly higher back than the females, and a deep belly. The caudal peduncle is long, and bright orange in the male with the colour spreading into the triangular tail. Some females also show some orange colour in this area.

The male has an olive-grey body which is bright to deep blue on its latter half and there is a dark blue lateral line stripe running from just behind the gills. Dark blue streaks are evident on the dorsal fin (which is longer than the females) and the other fins are just faintly orange.

The females are much drabber, being basically olive-brown to gold in colour, although some show an area of faintly metallic scales just below the lateral line. Fins are colourless apart from some orange colouration in the caudal.

Sexes are easily distinguished as the male has a modified anal fin where the first six or seven rays are crowded together to form a small tube which is separated from the rest of the fin by a notch. Although they sex out at about six weeks, which is comparatively early for livebearers, they will continue growing until about a year old by which time the males should have attained a length of 1½ in. to 2 in. and the females perhaps 3 in.

I obtained my first half dozen specimens about a year after their importation from a fellow aquarist, and they were then about a week old. There being no available literature on this particular species I had to rely on observation and experimentation after having gleaned every scrap of information I could from my friend.

The youngsters looked rather like largish misshapen guppies (being over half an inch long) and they grew reasonably well in a 24 in. × 12 in. × 12 in. tank along with a family of Mosquito Fish (*Heterandria formosa*) and about a dozen week old Cuban Limias (*Poecilia vitatta*). At six weeks, on a diet of sifted *daphnia*, mashed and cleaned *tubifex* worms and

fine dried food, they had reached almost an inch long and had sexed out. I had one male and five females. Over the next couple of weeks or so the male began to colour up with the orange patch on the caudal peduncle showing first of all and then the rear half of his body slowly darkening until it became a deep blue, paling and then petering out just behind the operculum. The females retained their olive-brownish colouring mottled with darker spots until they were about two and a half months old when the mottling disappeared altogether leaving just a faintly darker lateral line stripe and a faint reticulated pattern, especially on the upper half of the body.

It was about this time that I noticed that one female was progressing better than the rest; she was growing faster and had better colour than the other females, bearing some orange in the tail and patches of faintly metallic scales just below the lateral line. She seems to be a bit more streamlined round the head than the others as well. Then followed a close examination of all the fish and I discovered that this female was the only perfect one amongst all six. Her brother and sisters looked as though they had swum full tilt into the end of the tank. They had squashed in noses which meant that they could not open their mouths properly to take in the larger food I was giving them. And this "squashing in" process had also affected their gills so that the covers protruded and kinked

leaving the lower half of the inside exposed. Being unable to eat properly had obviously retarded their progress while their big sister gobbled up everything that came her way.

With having no experience of the species previously I had had no idea what they should look like and consequently had missed spotting the deformity until it became very obvious.

A quick telephone call to my friend showed that most of the rest of the brood from which my fish had come had turned out the same way. His parent fish were almost normal, he said, apart from a slight flaring of the gill covers, and after much discussion we decided that the condition was due to too much inbreeding—especially after he remarked that his parent fish were brother and sister.

It would seem that in an effort to spread the fish around to as many people as possible, too many aquarists had allowed too many sibling matings to be carried out with the resultant deterioration of the stocks.

At the risk of not being able to obtain any more fish I disposed of my four deformed females and one male before they could mate and perpetuate the distortion (they all became quick snacks for our Oscar), and hung on to the one good fish.

Then followed a rather anxious couple of months while I wrote letters and made telephone calls in an

X. eiseni pair, male fish above



effort to obtain a mate for my female which was growing all the time. After a fruitless, and somewhat disheartening, few weeks everything happened at once and I ended up being offered two mature males and two batches of six fry all on the same day! Perhaps I was greedy, but I gratefully accepted the lot, and after working out several exchange deals for some of my other fish, finally got all my new Orange-Tailed Goodeas settled in their new quarters. With so many fish to choose from now I hoped that the ones I had had drifted far enough down their respective lines from the original parents that crossing them back into another line would only do good.

The two males were lovely fish with good colour and what I now knew to be the correct deep body shape of rather pointed noses, slightly dished foreheads and upturned mouths. Their gills were perfect and showed no sign of any deformity. Out of the other dozen fry three showed up distorted gills as they got older and these went the same way as my original five. In the end I kept three pairs (the three older fish and two females and a male out of the youngsters) passing the remainder on to a friend to see how he made out with them. All six fish settled down together in the same tank, and while several mock battles ensued between the males no damage was done to any of them.

All this had taken about nine months so my best female was around two inches long by this time and in excellent condition. The males were close on an inch and a half and the other three younger fish about an inch and a quarter.

The next stage was to breed them and this proved a rewarding experience as the antics of the males were fascinating to watch. The smaller fish kept out of things and indeed I kept the two small females partitioned off for a while, until they had grown a little. A male would swim in front of the large female and perform all kinds of acrobatics in front of her while she remained stationary, or nearly so, seemingly rather bored with the whole procedure. He would swim in figure eights; stand on his head quivering all over; flip over to stand on his tail then move from one side of her to the other. After several minutes she would assume a slightly head down position and he would move in beside her, still quivering. If she wanted to mate she would allow him still closer and the small tube formed by the crowded rays at the front of his anal fin would swing forward and, as their sides met, appear to touch her genital opening. They would remain in this position for perhaps two seconds before she shook herself and swam off.

After that first mating in my tanks the female started to swell up and began to take on a squarish shape to her lower abdomen. Not knowing exactly how long the gestation period was I kept a close watch on her, but she fooled me and dropped her first brood in the tank with the other fish. However, there was plenty

of cover and I managed to save eight youngsters which were skitting about in the Riccia which covered about half the surface of the water. I think there must have been more fry originally as when one of them ventured out into open water it was made short work of by one of the males.

I promptly netted the remaining fry, placing them in a tank I had originally intended the female to give birth in, and then turned my attention to the mother herself. She looked terrible! After the plumpness of the preceding few weeks she was now emaciated with the two sides of her belly almost pressing together. I put some *tubifex* worms in the tank, but while the other fish promptly snapped them up, she paid scant regard to them and retreated into the plants.

She stayed deep in the vegetation for four or five days and in all that time I never saw her eat once and I thought I was going to lose her. But after her rest period she took an interest in food again and at last began to put on a little weight. After a further ten days or so she seemed fully recovered and was a willing partner with her previous mate once again. During her rest she drove off any male that came near her and this pattern has been repeated both with her, and the other females, after each pregnancy.

In the meantime the fry had been progressing quite well. As this species is truly viviparous (as opposed to ovoviviparous like the Poeciliids) the fry tend to be quite large in size but their numbers are relatively small. The eggs hatch inside the mother early in pregnancy and the fry are nourished directly by her through a form of placenta, rather like a human baby. They are born singly, tail first, with the "umbilical cord" attached and this drops off during the first 24 hours. The first couple of days seem to be the critical period and three of the youngsters developed the shimmies during this time and subsequently died. They had not eaten since birth and although it was too small to see clearly, it looked as though they may have had the distorted mouths which had appeared on the brothers and sisters of their mother. I added about a quarter of a teaspoonful of cooking salt to the gallon and didn't lose any more. They were fed sifted *daphnia*, clean mashed *tubifex* worms and powder size dried food and they grew well. One did show a slightly distorted mouth and gills as it became bigger and this was duly disposed of when the deformity became evident. At six weeks old I found I had two females and one male and duly separated them to prevent any further risk of brother to sister breeding.

All the pairs have bred three times each now and out of all these later broods only one or two have been born with deformed mouths or gills. By weeding these out and preventing sibling crosses the problem seems to have disappeared. Apart from my first three pairs I now breed only from cousins or even more distant relations.

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TROUBLE SHOOTING FOR PONDKEEPERS

by Christopher Andrews, Technical Consultant, TetraMin (UK) Ltd.

THE SEASONAL surge of interest in pondkeeping is with us again, and the spring-early summer months are an ideal time for restocking or planting operations. In addition, many pondkeepers are now reflecting on last year's problems, and wondering how they may be best avoided.

First of all—algae. Many ponds develop algal blooms during the spring and summer period. Water garden specialists offer a range of products to control this problem. However, it is wise to first consider the cause of excessive algal growth. This is usually a combination of too much sunlight, along with too little other plant life in the pond. Ponds are best situated where they receive some shade from the mid-afternoon summer sunshine. In addition, other plant life in the pond will compete with and control algae, by absorbing the available nutrients and sunlight. Newly filled ponds often develop marked algal blooms after a couple of weeks. This should subside after a month or so, as other plant life in the pond becomes established and starts to grow. Never empty a pond with an algal problem—as this will simply start the process over again.

Your local water garden specialist will be able to advise you on the plant requirements of your pond. As a rough guide, a pond with a surface area of 15-20 square feet and a minimum depth of 18 inches, will require at least 6-10 bunches of pond weed such as Elodea (*Elodea Canadensis*), Starwort (*Callitriche* spp.) Hornwort (*Ceratophyllum demersum*) or the like. To this 5 or 6 marginal plants such as Arrowhead (*Sagittaria sagittifolia*), Sweet flag (*Acorus calamus*) and Flowering rush (*Butomus umbellatus*) may be added, and planted in shallow water around the edge of the pool. Duckweed (*Lemna* spp.) and the Water soldier (*Stratiotes aloides*) are both floating pond plants, and of course no pond is really complete without a lily. Because of the variety of water lilies that are now available for garden ponds, special attention must be paid to the depth at which they should be planted. Some prefer relatively shallow water, others prefer deeper water. Floating plants and lilies provide shelter for the fish, though some pondkeepers have found duckweed a problem as a result of its remarkable growth. Nonetheless, this latter plant is a favoured addition to the diet of many pond fish.

Beating in mind the cost of pond plants, it is tempt-

ing to spend a Sunday afternoon dredging a local stream or canal. Whilst this is an alternative, it must be remembered that certain pond pests and disease organisms may be introduced with wild plants. Snails may be introduced in this way, though many pondkeepers add them of their own accord. Snails are in no way essential to a garden pond, and may themselves introduce disease organisms. In addition, although snails do scavenge and ingest small amounts of algae, they can multiply to such an extent to become a nuisance. The ramshorn snail (*Planorbis*) and the common pond snail (*Lymnaea*) are both easily available, though the former is the more attractive, and less troublesome of the two.

Overstocking is a trait common to all new-comers to the aquatic hobby. Too many fish added to a pond during the spring may lead to trouble later in the summer when temperatures rise, or as fish grow and require more space and oxygen. Obviously it is best to avoid overstocking from the beginning. The rule of six inches of fish (excluding tail-fins) to every square foot of water surface should be regarded as a maximum. If this maximum is reached trouble will occur in most ponds, particularly in warm, humid weather. Therefore it is best to begin with a stocking density of approximately 3-4 inches of fish per square foot, though your local water garden specialist will be able to advise you further. The fountain produced by a submersible pump can provide useful aeration during warm summer spells.

Many pondkeepers (and aquarists in general) leave their fish in the care of co-operative neighbours while they enjoy their summer holidays. It is not uncommon to return and find the fish dead or dying. When this is pointed out, your (one time!) friend and neighbour will undoubtedly state "but they looked hungry"! The problem is best avoided by not feeding your fish whilst away on holiday. Healthy fish will come to no harm if not fed for 2-3 weeks. Alternatively, measured amounts of food may be left for your fish-minder to administer—but remember to hide the tin!

Moving on to later in the year, the appetite of the fish will wane as the temperature of the pond falls. Care should be taken to ensure that excess, uneaten food is not allowed to pollute the pond at this time causing a problem later. Similarly, if there are

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Brachyrhaphis rhabdophera

IN THE article on *Brachyrhaphis rhabdophera* by Mr. B. Purdy in the March *Aquarist*, he stated that doubts had been raised in the last 6 months about the correct identification of this species, and he was shocked to learn that this species had been identified as *Neoheterandria umbratilis* on no more than a mere superficial glance into a show tank.

The confusion comes from Kurt Jacobs' *Livebearing Fishes* published by Studio Vista, when he states the only difference between the two species mentioned is the size of the eye, smaller in *rhabdophera*.

Based on this information, most informative judges would be a bit sceptical if they did not have both specimens in front of them to compare with, and they would not be in a position to be adamant as Mr. Purdy obviously is.

Who are the so called experts who examined these fishes, and where are their results published to put all of us out of our misery? As Mr. Purdy states, these fish have been shown up and down the country since 1976, two full show years, and still no clarification has been provided by the show exhibitor or the experts Mr. Purdy mentions.

However, I have a great interest in Livebearing fishes and in company with a member of my society we travelled to the Natural History Museum in London in January with *live* specimens of fishes for identification by their specialist, Mr. J. Chambers. He anaesthetised the specimen of a male *rhabdophera* we had brought with us and, after microscopic examination, confirmed that the gonopodium was identical to that drawn by Rosen and Bailey in the *Poeciliid Fishes Bulletin* of the American Museum of Natural History Vol. 126, New York 1963, of a *rhabdophera* male. At last he confirmed what most people had hoped for, the specimen was indeed *B. rhabdophera*. My society in its magazine, *The Basingstoke Fish Forum*, published a report of our visit in their March Issue No. 38.

I object strongly to the suggestion that judges give no more than superficial glances at exhibits and add to the confusion which, I may say, already exists. Most of my colleagues give up spare time and put a lot of effort into their hobby, and many species have been classified and re-named largely due to their

efforts in finding out in the correct manner and not just accepting a name given to it by the general aquatic trade.

To conclude, at a recent Open Show a *B. rhabdophera* not only won its class but also the best fish in show, all as a result of one judge's efforts to remove the confusion from this section of the hobby.

Yours faithfully,
ADRIAN BLAKE,
Basingstoke Chairman
of the F.B.A.S.,
Judges and Standards
Committee.

Brachyrhaphis rhabdophera

IT IS good to see that, at the second attempt, Mr. Blake has managed to secure an identification for this species that satisfies him. Strangely enough, this identification vindicates all that I stated in my article. As Mr. Blake should know, my articles are well researched before being submitted for publication and if any doubts exist I voice them at the time.

By trying to lay the blame for the confusion on Kurt Jacobs' excellent book, "*Livebearing Aquarium Fishes*," Mr. Blake is only clouding the issue even further. An analogous situation would be that of a murderer blaming the gun for committing the crime or the police arresting a car for hit-and-run driving. The information given by Jacobs is correct as far as it goes; how it is used by his readers can be no fault of the author.

Jacobs states that the size of the male of this species is "up to 30mm" and the F.B.A.S. has used the upper limit as a show size for the purpose of judging. As Jacobs quotes only Holotypic sizes, any measurement given by him would be quite unsuitable for this use and, when faced with males up to 1½ in. long, certain judges, in their ignorance, doubted the identification of the exhibit rather than doubting the size given by the F.B.A.S. standards.

Mr. Blake also objects to my suggestion that judges give only a superficial glance at an exhibit. As usual he has quoted me out of context and I maintain that, on a matter of identity, no judge is in a position to be definitive on the kind of examination that he can give at an open show. Most judges point an average of sixty exhibits in approximately three hours, an average of three minutes a fish. I'll bet that Mr. Chambers spent a lot longer than this when re-identifying *Brachyrhaphis rhabdophera*.

The suggestion that judges should not be criticised because they give up spare time and put a lot of effort into performing their function is, to say the least, ludicrous. I've been a judge for the past three years and have travelled an average of 300 miles a month in order to function as such. As a judge I am always prepared to accept constructive criticism and am very

aware that I'm in a position to help the hobby to progress or to retard its appeal depending upon my attitude towards the exhibitor. Mr. Blake seems to think that there would be no shows without judges and seems to forget that there would be no point in holding shows if no exhibitors turned up.

Finally, to be more specific, there was no real confusion surrounding the identification of this species until a certain judge deliberately altered the name of an exhibit on the show bench and substituted the name, *Neoheterandria umbratilis*. If that judge had studied page 86 of Jacobs' book, he would have seen that *B rhabdophora* is so similar to two other species that they cannot be told apart except by very careful, detailed examination. This kind of examination cannot be made in a show tank, on a living specimen, at an open show. Nevertheless, the judge was adamant that the exhibit was *N. umbratilis* and a competitor was robbed of any possible reward that his exhibit deserved.

It's nice to see Mr. Blake giving himself a pat on the back and I'm very glad that he took steps to resolve the confusion surrounding the identity of this species. After all, if it wasn't for the judge who wrongly identified this species as *N. umbratilis* there would have been no confusion in the first place. For those who are interested, the show was North Wilts A.S. first open show, held in Swindon on 16th October 1977 and the judge who caused all the confusion was Mr. Adrian Blake.

BOB PURDY,
Ebbw Vale.

Ireland's Largest Show

WITH all the adverse news, which never escapes the news media, about the people of Northern Ireland,

Aquarists across the Channel must wonder if the hobby exists over here.

The keeping of tropical and coldwater fish here in Northern Ireland is increasing daily, the hobbyist can join any one of 4 Clubs here in the North. These Clubs belong, along with 5 Clubs from the South, to the Irish Federation of Aquarist Societies.

The I.F.A.S. is a thriving body of enthusiastic Clubs and this year we are staging what we hope will be the largest ever Show in Ireland. The Show, AQUA 78, will be held on 2nd August-5th August in the Maysfield Leisure Centre, a recently completed complex on the outskirts of Belfast's City Centre.

AQUA 78 marks the return of the AQUA series of Fish Shows to Belfast. The AQUA Shows commenced in 1969 with AQUA 69 in the Wellington Hall in Belfast's City Centre. The Show proved very successful, AQUA 70 and 71 also proved to be as successful as the first Show. The proceeds of these Shows purchased equipment to be used at the Show. Unfortunately, disaster struck in 1972, all our equipment, valued around £2,000 was destroyed by a terrorist bomb. A lapse of 2 years occurred and in 1974 the Show was revived on a smaller scale in the seaside resort of Bangor. Here the Show remained for a few years. AQUA 77 was so successful that ideas for a return to Belfast were talked about by many of the Club members.

The ideas have turned into reality, a reality which can only be made successful by you, the readers, in your support for the Show. Show schedules will be available shortly from Mr. S. McKinney, 19 Connsbrook Park, Belfast BT4 1NF.

Information about the Clubs in Ireland may be obtained from Mrs. M. McFarlane, 79 Ards Drive, Monkstown, Newtownabbey, Co. Antrim, Northern Ireland.

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One advantage of breeding these lovely little livebearers is that one fertilisation produces only one brood instead of several as with other families and this has meant it has been easier to eliminate the inbred deformities and it opens up possibilities for producing very colourful fish by putting the best two together each time. Occasionally, however, pairs will stick together and won't tolerate another mate, and there have been reports of one partner dying and the other refusing to eat until it simply wasted away.

Orange-Tailed Goodeas are fairly tolerant of quite a wide range of water conditions but mine seem to do well in softish water which is just slightly alkaline (pH 7.2). A teaspoonful of cooking salt to the gallon

seems to be beneficial as a disease preventative, and a temperature in the mid seventies suits them best. They eat just about anything but have a preference for live food and some green stuff. Broods range from six to fifty in number depending on the age, size and condition of the female, and gestation takes from six to eight weeks depending on water and feeding conditions.

They can make interesting additions to a community tank, but they have a tendency to nip flowing fins such as those on veiltail guppies or Siamese Fighting Fish, and when a female is close to giving birth she can be rather aggressive towards the other inhabitants of the tank who are not respectful of her condition.

LONGEVITY IN FISH

by Cleeland Bean

If the inmates of our aquariums and outdoor pools exist in balanced ecological systems and are adequately fed in non-polluted surroundings we can expect them to live lengthy lives according to their size and species. Under protected or semi-domesticated conditions most fish are likely to live beyond their life span in the wild. Typical of such is the goldfish which may be old at 6 or 7 years, yet some specimens have reached 12 years, with others going well beyond this threshold. Much of course still remains unknown about the age limits for both freshwater and marine fish species, but perhaps careful observations by aquarists and pond-keepers could help to bridge some of the gaps in our knowledge.

From earliest times fish observers in gardens and estates have been telling stories about particular specimens which have lived to great ages. Even in relatively small garden pools note has been taken of old and wily carp which were able to evade all attempts at capture. No less a person than Walton described the carp as being a good and very subtle fish. The carp has a natural tendency to live long, for observations have shown that the fish can reach an age of 15 or 20 years, but other specimens will be much older.

Possibly we may wave aside those stories about carp living to be a hundred years of age, yet we can't be too sceptical of such longevity. Take for example, records at the Zoological Society's aquarium in Regent's Park which reveal that a carp kept there had lived for 58 years. More curious still was the fact that before entering the zoo the fish had existed for 37 years of this period in a washing tub.

Aquarium experiments show that carp and other fish will quickly learn to associate objects with danger, but the carp in particular is extra watchful. Biologists have remarked on the comparatively large brain of the carp in proportion to its size, and perhaps this also explains its greater sensitivity to dangerous conditions and long life span in the wild. Evident from observations are the carp's great powers of endurance which reveal that the fish has survived after being found frozen solid in ice.

As previously noted endurance likewise belongs to the goldfish, and a surprising instance of such en-

durance must be the specimen which was bought from a Glasgow pet shop in 1954, and was alive twenty years later in 1974. The fish had belonged to the son of Mrs. Agnes McFadyen of Gartlock Road, Garthamlock, Glasgow, and it was kept in a large bowl on the sideboard. Flick as the goldfish was aptly called had survived various accidents, and on two notable occasions he was given up for dead, yet came alive in fine style under the influence of an unusual stimulant.

The first incident involved the dropping of Flick's bowl by removal men, but prompt action by Mrs. McFadyen's son ensured that the goldfish found a temporary refuge in a water-filled sink. At this period the fish appeared to be lifeless, but when a few drops of whisky were added to the water Flick revived within minutes, and swam around as if nothing had happened. On the second occasion Flick was found floating as if dead at the surface of the water, but here again a few drops of whisky made the fish active within seconds.

Aquarists who keep larger aquariums stocked with trout will find that these fish can likewise live for lengthy periods. Most memorable was the 1966 report of a trout which died at the age of 34 thus holding the record for being the world's oldest specimen. This fish had lived for 30 years in a farmer's 5 ft. well at Finsnes in North Norway where it existed on natural food in the water. No one ever fed the trout which had been put into the well when it was four years old. But despite its captivity the fish did not succumb to winter conditions amid ice and snow.

Long life in fish obviously depends to a great extent on genetic factors within a species. This means that the life span of certain larger varieties will not vary much under aquarium conditions compared with the situation in outside waters. Examples include the salmon and pike with the former living a relatively short life of 10 to 15 years, and the latter reaching 12 or 13 years. Nevertheless pike aged between 15 and 16 years have been caught in countryside ponds.

As with other creatures long life and experience can

help particular fish specimens to cope extremely well with their environments. They have a capacity for learning things as was shown by an animal psychologist at the University of Pennsylvania. The scientist was able to train his goldfish stocks to obtain food from a container by inducing them to push against a lever three times. When the fish pressed the lever they soon learnt that a single white worm would be released from the food container once every minute.

Crafty enough too is the stickleback, which according to work done by French scientists can apparently find ways of solving specific problems. Most of us will know that during the breeding season the male stickleback builds a nest which it defends against intruders, and such nest-building activity is quite rare in the fish world. However, when a pile of small, flat stones was placed at the entrance to a stickleback's nest experiments showed that the fish dismantled the obstacle in an intelligent manner. It did this by beginning at the top portion, and carried stones away one by one until none remained.

From such an experiment scientists deduced that the fish had avoided the mistake of undermining the structure and perhaps injuring itself. But on another occasion the stickleback rightly applied undermining techniques to a different obstacle. This took place when a fence of closely fitting pegs was placed around its nest; then the fish nuzzled in turn at the foundation of each peg, and these soon became loosened and were carried off singly. So it would seem that instinctive intelligence combined with age and experience could indeed produce fish with nine lives.

Reverting again to records of fish which have reached great ages we find that an eel under domesticated conditions had lived to the advanced age of 60 years. This appears to beat the carp's record, but carp are reputed to have existed for 80 years in captivity. Much younger was an electric eel at London Zoo which lived for twelve years, seven months and ten days. A species of quite a different sort was the starlet which died at Brighton Aquarium

aged 38. Other records include a mirror carp of 24 and a golden orfe which reached the very old age of 29 years. But compare these with the short life span of the white goby which merely lives for one year, and dies after the breeding season.

During recent years a greater interest in marine aquariums and the tagging of marine fish species has thrown more light on the life durations of species such as the cod and plaice. If these manage to escape predators during their earlier growth periods both species can easily reach advanced ages. On record is the largest cod ever caught, and weighing in at a hundred and sixty pounds at an estimated age of 50 years; this specimen was obtained off the coast of North America. Not far behind in years is the 1968 record for a female Iceland plaice of 40 summers which was landed at Grimsby.

Reports from the Fisheries Laboratory, Lowestoft show that this plaice is the oldest known in the history of plaice investigations. More usual however, are younger specimens ranging between four and eight years of age, with considerable numbers of older fish up to 20 and 25 years. Tags on a plaice caught in August 1971 showed that the fish taken from the area around the southern end of the Dogger Bank had been marked and released 17 years earlier.

The increasing number of marine aquarists is doing much to focus attention on the growth rates and life histories of the numerous interesting fish species around our local coastlines. Apart from the purely aesthetic appeal of keeping fish scientific aquarists are taking note of species including the gobies, pipefishes, blennies, rocklings, sand-eels, wrasses, rock suckers and the marine fifteen-spined stickleback. The last mentioned species is of course a relative of our two fresh-water sticklebacks—namely the three-spined and ten-spined, all of which build nests during the breeding season. Different however, is the blue underside colour of the male marine stickleback during the breeding period, where his freshwater cousins develop red colours.

TROUBLE SHOOTING FOR PONDKEEPERS continued from page 153

trees nearby it is best to prevent too many of the autumn leaves from entering the pond. This may be achieved by placing a nylon mesh net over the pond, taking care to observe that no animals or children become entangled at anytime. Once the temperature falls below 11 or 12°C, it is wise to cease feeding. If the fish have been well cared for during the spring and summer, they will happily survive the winter in a dormant state at the bottom of the pond. For successful overwintering it is important to have a portion of the pond at least 18 inches deep, which will provide the fish with adequate protection during the coldest months. During the winter a sheet of

ice may form over the pond. This should be pierced in order to allow the necessary exchange of gases. A kettle (full of boiling water) held onto the ice will make a suitable hole, though this may freeze over again. The best plan is to obtain a low wattage pool heater. These are cheap to run and do not warm up the water sufficiently to disturb the fish. Ice on a pond should never be physically smashed, since shock waves will upset the fish.

Turning full circle, as temperatures rise and days lengthen in the spring, the fish will begin to feed again. Food should be offered (sparingly at first), and live food may be especially appreciated at this time.

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black marble. A few months ago a gold male and blushing female paired off and spawned—on the air lift tube—regularly. So far I have had only limited success in raising fry. However, the other morning, much to my surprise, the two gold angels were fanning a large spawn—again on the air lift. After convincing myself that I had not been struck colour blind overnight, I removed the eggs to the breeding tank. Due to the fact that I used a different brand of fungus cure/methylene blue, the eggs fungused. As I am writing, I have a breeding tank full of ten-day-old fry, only this time from the original parents. I have certainly never heard of this ever happening before and should be interested to hear, through W.Y.O., whether or not this is common.

Sucking Loaches

"While I'm about it, I'll refer to the article in February's W.Y.O., page 502, concerning sucking loaches. My sucking loach has also acquired the same nasty habit of sucking the sides of other fishes. It does not bother the angels much; in any case they are fairly cautious and stay clear. However, the horse-faced loach tends to be the victim, although it has got the advantage of being able to escape under the gravel."

In a subsequent letter Mr. Fuller had the following information to impart: "My five angels consist of 1 gold male, 1 gold female, 1 blushing female, 1 unidentified blushing angel, and 1 black marble male. Spawns took place between: a female blushing and a male gold, and then a female gold and a male gold; now, on 16 April, the female gold and the black marble male have spawned. The latter pair spawned on the air lift tube at about 5.00 p.m. and cared for their eggs until I switched out the light. Then, with the aid of a 15 watt bulb night light, I observed the two golds fanning the eggs! The original male, the black marble, appeared to lose interest. However, in the morning he took over. Strange!

"The angel fry I referred to in my earlier letter are doing well although numbers diminish daily. They are now about ½ in. long. You will recall that they are the offspring of the blushing female and the gold male."

Photograph 1 shows a pair of my breeding angels.

Mr. A. J. Hewitt lives at 174 Salisbury Road, Liverpool, and he writes about a dangerous fish. "I recently acquired a 4 in. red piranha. The fish is quite beautifully coloured with greenish tints and silvery, reflective scales; his belly is scarlet red. He is kept in an 18 in. x 10 in. tank along with a ½ in. platy. The tank contains a number of *Cryptocoryne*, *Vallisneria*, etc.

"When hungry he lets me know by circling about the centre of the tank, glaring angrily out of his black eyes. He is used to me and when well-fed will allow me to tickle his sides with my fingers. His basic diet is frozen beef, small liberty mollies and frozen chunks

of fish fingers which he loves." (Were I you I should be very wary of the piranha because a day could come when he will not allow you to tickle his sides—and he won't inform you previously. A friend of mine got a nasty gash from a piranha and the hospital staff who stitched the wound took some convincing to believe that it had been caused by an aquarium fish).

Omnivorous?

No. 18 Terminus Road, Millhouse, Sheffield, heads a letter I received from Mr. John A. Richmond. He writes: "... *G. aymonieri* (the sucking loach) is described in the literature as existing solely on a diet of algae and algae substitutes in the aquarium. My own experience with this species does not totally support this information. I have two *G. aymonieri*, both purchased at the same time and at the same size. One of these fish has adapted to feeding on an omnivorous diet of Aquarian tropical flake food, supplemented by cooked peas, spinach and tank algae. After one year it is now about twice the size (approx. 5 in.) of the second fish which was fed only on a normal diet. It is tempting to suggest that the increased growth rate and better colouring of the more omnivorous fish is due to the higher protein content of its diet, particularly with respect to animal protein. All fish are covered with mucus, a protein-rich substance secreted by the epidermal cells. It is possible that Miss Barnes' fish (see February feature) may be attempting to correct a dietary deficiency by sucking at the mucus covering the sides of other fish.

Neons

"Secondly, you have asked for comments on the breeding of neon tetras. I have not attempted to breed these fish as I have no facilities in a small flat for rearing fry; however, the following comments may be of some help. I recently moved my seven neons, all about one year old, into a 17-gallon community tank which I had replanted with *Hygrophila* and *Cubomba* species. The tank water is well-aged Sheffield tap water, extremely soft, pH about 6.8 and temperature 76-78°F. Within two days of the transfer the fish had begun vigorous spawning activity, triggered apparently by switching on the very bright top lighting at about mid-day. Spawning activity was of a typical characoid fashion, with the males courting the females by dancing around and trying to drive the female into a thicket of plants. Once there the two fish swim very closely together before a sudden ricocheting collision and release of eggs and sperm. The males appear to be highly promiscuous, rapidly switching their attention to another female if the one which they have spawned with does not recover quickly enough from the release of the eggs. All seven fish, three male and four female, engaged in the spawning activity and a large number of eggs was produced, and eaten by the other residents of the tank.

"My experience with these fish, which are usually described as difficult to spawn, suggests either that I managed to provide conditions which exactly suited neon tetras, or, more likely, that the continuous, regular spawning of these fish in captivity has selected those fish which have a wider tolerance of water conditions different to those in their natural environment. As a consequence the fish now available are showing natural spawning behaviour under conditions in which wild fish would never spawn. Perhaps other aquarists could further this argument?"

"Finally, I must make a comment on the sale of a plant under the name of ivy-leaved *Cryptocoryne*. I purchased two of these plants expecting that as a species of *Cryptocoryne* they would survive quite



happily under aquarium conditions. My annoyance at their fairly rapid degeneration was not improved when I found out they were in fact a species of *Syngnium* which is not suited to any but very temporary aquaria. These plants are very decorative, with variegated ivy-like leaves carried on long stalks, and aquarists could well find themselves buying some to use as a centrepiece in a decorative aquarium. They will not remain decorative for very long! Despite this I have noticed these plants for sale in a number of aquarist shops."

Shows

Aquarium shows are the subjects about which Mr. David Kerr writes—as follows: "The last one (show),

and indeed only one, I visited was the F.B.A.S. show held in Motherwell last March. As it was the first such show I had been to, I did not quite know what to expect; but when we got there my wife and I found that it seemed to be dominated by trade stands. Many of the actual exhibits were in the form of 'tableaux,' depicting, for the most part, aspects of the World Cup. Whilst appreciating that the tableaux had been painstakingly constructed, they did seem a bit pointless, assuming that the idea is to exhibit fish and not model-making skills.

"The fish exhibited, with one or two exceptions, were not particularly outstanding, and a few of the unfortunate creatures ended their days bottom up on the floor of their cubicle in a tableau. As we have nothing to compare it with we do not know whether or not the above is normal. However, Mr. L. J. Collins' letter in your April issue would seem to indicate that most shows are of this standard, and, if this is so, I don't think we will be visiting many more."

I'm pounding away at my typewriter on Bank Holiday Monday with outside temperatures soaring; a check of my greenhouse about an hour ago showed the temperature to be 115°F. No wonder many of my cacti are in bloom! Mr. Terry Flood, of 18 Booth Close, Thamesmead, London S.E.28, refers to an earlier warm spell in his letter. "Do you remember those two weeks we had in March that were so much warmer than the earlier part of the year? During that period I got up one morning to find one of my goldfish in hot pursuit of another which did the two minute mile around my tank. I knew that they were going to spawn although I had never had or seen a spawning before. Anyway, I had just started a new job so I couldn't really have a day off; so I filled a small, unused tank with water so that it would have warmed up by the time I got home.

"When I returned most of the eggs had been gobbled up; still, there were some left so I took the bushy, egg-holding plants from the aquarium, and whilst holding them to the light I saw that there were about eighty eggs left. The plants were put in the small tank which was lit by a 100 watt table lamp standing next to it. Some algae from the aquarium were also put in the tank. After a couple of days the eggs had hatched; and after a few more the yolk sacs had gone. The algae were then growing quite well so I left the fry to get on with whatever it is fry get on with. They are now 1/2 in. fish which I have just transferred to an empty 3 ft. tank that used to house a common carp that I had to set free because it was growing too big.

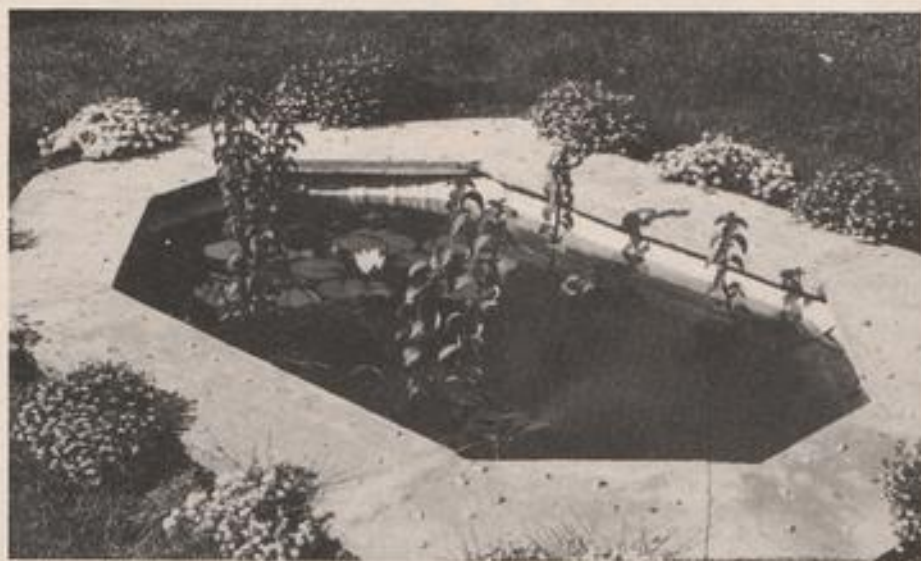
"The point I am trying to make is: you don't need to fuss over your fish in order to get them to breed—unless you want to breed a particular pair. My fish were given no live food—as generally advised; the

lights were left on no longer than usual—as generally advised; no water was changed—as sometimes advised; and the only increase in temperature was due to the weather. So, if you look upon your fishkeeping as a week-end hobby, and don't have time to supply live food etc., there is no reason why your fish shouldn't spawn providing they are in good condition generally. Finally, let me stress the importance of aquarium plants in spawning. I consider it no mere coincidence that my first-ever spawning came in the first year that I had plants in the aquarium—and I've been keeping fish for about eight years!"

Mr. Bruce F. Smith's address is 19 Besant Court, Newington Green Road, London N.1. Obviously fond of the pun, Mr. Smith is very much in favour of

nant fish in the aquarium circled the newcomer in a head down attitude. The entire dorsal fin took on a deep scarlet hue and the two black body lines deepened in contrast. The dominant fish then attacked from below. These fish are very sensitive to water change and any moving should be carried out slowly, with care.

"Something I should find interesting in the magazine would be a survey of fish prices around the country. Prices at my local shop are as follows: neons—22p; glowlights—22p; zebras—20p; large tiger barbs—40p; small 25p; mollies 35p; half-beaks—35p; kribbs—70p; rams—85p; dwarf gouramies—£1.00 per pair; black shark—£1.00; red-finned shark—70p; *Pim pictus*—£2.25; sucking loaches—30p; armoured cats—60p; monos—£1.50 large, £1.10 small; scats—70p



a 'Swop-Shop' and suggests the Editor might like to call it 'Swop-Window.' Bruce's favourite fish is the mono. He writes: "I have been keeping the mono for over a year, with mixed success. It undoubtedly does best in a marine set-up. I once bought a small, ½ in. specimen for 60p and within five months, in a salt water environment, it had grown to a lovely 7 in.—and eventually, on moving, I sold it for £6.00!"

"I keep my other specimens in a brackish-water tank—25% salt water plus 75% fresh water—furnished with coral sand, shells etc., at a temperature of 78°F. The monos are much more active at high temperatures. In the same tank I have a scat and various, assorted gobies. I would suggest to anyone who intends to keep monos to decide on the number he or she would like, and to buy them all together. In my experience they tend towards territorialism and on two occasions I tried to introduce a newcomer—with fatal results. However, it is very interesting to watch these fish fight. On both occasions the domi-

small; £1.50 large; bees—25p; etc." (What are fish prices in your local dealer's shop?)

Mrs. Pauline Hodgkinson, P.R.O. of the Northern Goldfish and Pondkeepers' Society, resides at 281 Plodder Lane, Farnworth, Bolton, Lancs. She has the following to say: "In your April feature I read, with interest, the letter from Mr. L. J. Collins about some of the fish shows he has visited. I myself am not a frequent visitor to fish shows but have been to a few, including Belle Vue, and share his opinion about the standard of the fish, etc."

"I expect Mr. Collins is interested only in tropicals, or I feel sure that he would have made the journey last year to Bolton to the Northern Goldfish and Pondkeepers' Show; it attracted the county's top fancy goldfish breeders. In fact, exhibitors came from as far away as Scotland and Cornwall; so the best fish in the country were there for all to see."

"This year the show will be much larger and will be held in Bolton's Sports Centre, Silverwells Street, in

the town's centre. Sponsored by Aquarian Foods, who will have the only trade stand there, this show promises to be one of the most important functions for fishkeepers in this country. By the way, may I point out that our members are not from the Manchester area only; they are from many parts of Yorkshire and the Wirral; and we have postal members in Scotland, the U.S.A. and Canada."

Master Paul Brown Kenyon, 24 Tynning Road, Saltford, Nr. Bristol, Avon, is 12 years old. He writes: "... If anyone has long-finned blue or red Siamese fighting fish I will be pleased to bargain for them with money or fish. I have a lot of Java moss and if anyone would like some he or she should send a s.a.c., with a plastic bag, to my address. I would be pleased to send him or her some." Paul's telephone number is 3228.

I hope that Mr. Kevin Morley, whose home is at 35 Cockshot Road, Reigate, Surrey, is out of hospital and home by the time this appears in print. He wrote: "... I should like to tell your readers about the back-cloths I make for my tanks. They are made using the batik technique—which I shall endeavour to explain to anyone who may not be familiar with this. You need a piece of cotton sheet, the size of the tank, on to which you apply hot wax with a paint-brush in a simple pattern. The cloth is then dipped in a coldwater fabric dye—yellow, for example. When dry, more wax is applied to the areas that you want to leave yellow. Then the cloth is dipped in red dye. More wax is applied to keep some areas red and then the cloth is dipped in brown dye. When dry, the cloth is placed between layers of newspapers and ironed. This removes the wax from the cloth.

"Beautiful and strange effects can be achieved using this method. Yellow, blue and green is another combination of colours that could be tried. Simple patterns seem to work better and don't spoil the natural effect which I prefer. The red and brown dyes enhance the colours of the wood in my tropical

tank. Lovely effects can be achieved by shining a light from behind the tank, through the back-cloth. I hope my description hasn't been too confusing and that some people will try out the idea because the results are certainly worth it, in my opinion."

Those are all the opinions for which I have space this month. I do not necessarily agree with them but I hope you will find them interesting. For a future *W.V.O.* please send me your opinion on any of the following: (a) looking after garden ponds during very sunny weather; (b) keeping trout in captivity; (c) fish farming in general; (d) fish houses; (e) breeding gouramis; (f) the use of peat in aquaria; (g) aquaria on display in public places, e.g. hotels, theatres, restaurants. Photograph 2 shows an attractive, little pond belonging to an aquarist friend, Mr. Bob Crossan. Have your waterlilies bloomed?

Have an enjoyable summer and, if you get time, please do drop me a few lines.

OBITUARY

It is with deep sorrow that we report the recent untimely death of Ken Fawcett of T.P.H. (Great Britain) Ltd. Ken was a familiar figure at Shows and Pet-Trade Fairs both here and on the Continent, his large stand always being a very welcome sight for all aquarists.

His interest in fish-keeping was well known, having at one time over a dozen ponds in his garden. He was President of Reigate and Redhill Aquarist Society for many years. In 1970 he was largely instrumental in forming The British Koi-Keepers' Society and for the first two years shouldered all the work and expense of providing and issuing the Society's Newsletters. Upon his retirement as Chairman in 1972 he was unanimously elected Honorary President with Life Membership and had since been a regular and generous supporter of all the Society activities.

Ken was a kind, gentle man, highly respected by all, he will be sadly missed. Sincere and deepest sympathy is extended to Mrs. Fawcett and family in their bereavement.

MRS. HILDA ALLEN,

The British Koi-Keepers' Society.

ADVANCE NOTICE

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THE 27th BRITISH AQUARISTS' FESTIVAL

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at

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SATURDAY AND SUNDAY 21st 22nd OCTOBER 1978

THE ATTRACTIVE COMBTAIL

by Chris Brook

TO MY MIND *Belontia signata* is one of the most attractive and impressive of the anabantoids. In the mature adult the colouring is a beautiful brick red, while less mature specimens are less bright and tend to be slightly orangey. The dorsal and anal fins are the same colour as the main body of the fish with a blue border to them. The pectoral fins are transparent as are the ventral fins. The ventral fins are a diagnostic feature of the genus *Belontia* in that they are split into two filaments. The caudal fin of *B. signata* is again mostly the same colour as the body, but running through it are black strands or combs that extend past the rest of the caudal fin; it is these combs that give *B. signata* its common name, "comb tail." Bordering the posterior part of the caudal fin, between the combs, is a sky blue band which contrasts with the red of the rest of the body and the caudal fin, especially during breeding. When *B. signata* becomes frightened or excited dark bands appear on the body; this is possibly an automatic response to sudden stimuli causing the fish to become camouflaged. The species has the following fin ray and scale counts:

Dorsal: XVI—XVII /7-10

Anal: XIV—XIVII /9-12

Scales above the lateral line: 29-32 (1)

According to the F.B.A.S. (2) *B. signata* can be expected to grow to six inches to the caudal peduncle in the aquaria. The mouth, as in most anabantoids, is up-pointing to allow it to eat from the surface and middle of the water.

The generic name *Belontia* is derived from the native Sumatran name for a closely related fish, *Belontia hasselti*, which is called by the natives "Belontya" (3).

Though *B. hasselti* comes from Sumatra and Java, *B. signata* has a more restricted range, coming only from Ceylon, where it is said to come from the mountainous region of Sabaragamuwa in the Andonwa river. The river has a grit and sand bottom and contains few aquatic plants, though its banks are overgrown with the plant *Lagenandra ovata* (3).

Water tests made by Geisler while he was collecting gave the following results:

Total hardness 0.65 dH

pH 6.68

Temperature 83°F (3)

I obtained my fish from my local aquarium shop, as

two pairs, within a week of each other. Before this I had rarely seen a single fish for sale, let alone a pair. One pair were 4 inches to the caudal peduncle and were the rich brick red colour of a mature fish; the other pair were 3 inches to the caudal peduncle and were much lighter in colour. I put all four fish in a 36 in. x 12 in. x 12 in. aquaria with three *Dianema longibarbis* for company and they settled down fairly quickly although they were always fairly shy. After several months I found that the larger pair were beginning to bully the other two fish and I had to remove these because they were suffering fin-damage. The two fish I removed were placed in a community tank containing fairly large fish and they settled down very quickly, not bullying or being bullied. The remaining two fish, which I was now sure were a true pair, began to pay attention to each other. I raised the temperature in the tank to 78°F and changed 1/5th of the water for fresh to try to stimulate breeding. I also began giving the pair generous feedings of maggots, garden worms and sliced ox kidney. I placed two plastic fish food container lids in the tank because I had found that other anabantoids that I had bred had found these useful to blow the nest under.

The pair, though very much alike, showed very slight differences if one searched for them. The male was very slightly thinner than the female and his red colouration was much darker when in breeding mood. Also, the fins are very slightly longer in the male, his combs being up to an 1/4 in. longer than the females'.

The water in the tank was ordinary aged London tap water at:

pH: 7.3

Degrees general hardness: 15° dH

Temperature: 78°F

The fish bred fairly early in the morning. Both fish were brightly coloured, though the male was a much darker red, and the blue band on the posterior of the caudal fin stood out a brilliant sky blue. The pair spent a lot of time under the plastic lid blowing bubbles and generally fussing about before they started to spawn. Several mock matings occurred, the male embracing the female, but no eggs were released. After a while the fish began to actually get down to business.

Continued on page 170

WHAT'S WHAT

AND

WHO'S WHO

by Bob Purdy

THE proper identification of various species of tropical fishes is a thorny old subject that has troubled the more serious aquarist for some time now. Although proper identification is a job for the expert, providing certain formalities are observed, fairly good proof of identification can very often be obtained by the average fish keeper. It is hoped that the following "rules" will be of help to the enquiring aquarist when he or she acquires new fishes that are unknown to them.

The main source of supply for tropical fish in this country is, of course, the local dealer. Unfortunately, the local dealer is also the main source of supply for wrong names and mis-identity. Before proceeding any farther, let it be made clear that in most cases, although the dealer is a source of mis-information, it is far from his fault.

The laws pertaining to the Fair Trading Act are quite strict and aquatic dealers are governed by these laws in exactly the same way as any other high street trader. To cover himself, where this law is concerned, the local dealer usually sticks rigidly to the names on the invoice sent to him from the wholesaler. Again, the wholesaler, who is also governed by the same laws, uses the names on the invoice sent to him by the breeder or collector. Inevitably, the breeder or collector lives abroad and is usually motivated by nothing more than the plain, old profit motive; he is way outside the sphere of influence of the Fair Trading Act and can describe his stock in any way he pleases. One only has to look at the confusing array of names for various strains of Discus (*Symphysodon* species) or see *Pseudotropheus auratus* appear under five different names in five different shops to see how complex this situation can be. One example, regrettably quite true, concerns a dealer who knew better, having to sell "Australian Rainbow Fish" as "Pearl Danios." When questioned, he quoted the

Act and stated that he dare not put the correct label on the stock because he would be unable to prove its correctness in the event of a complaint. A crazy state of affairs but one that is unlikely to be changed in the near future. This leads to the formulation of "Rule Number One." Do not be afraid to doubt the identity given the fish(es) by the local dealer; if it is wrong it isn't usually his fault.

The second problem of identification is the number of common names that abound in our hobby. Certain common names are, of course, quite acceptable and even in scientific tomes guppies are often referred to as guppies and platies can still be platies. Even when common names go against contemporary scientific thinking they are still sometimes easier to use and a lot less confusing than the current scientific tag. The Golden Pheasant, currently known to the scientific world as *Aphyosemion occidentale*, has suffered three name changes in as many years. The species has always been known as Golden Pheasant and this common name must now prove to be the least confusing of all its pseudonyms. The rate at which some piscine nomenclature alters makes it far too confusing for any but the most determined aquarist to follow.

Generally speaking, however, strict identification of a specimen means the use of scientific nomenclature. Fortunately, apart from quite a large number of killifishes and some groups of livebearers, the nomenclature covering most of the species kept as tropical fish has remained fairly static over a period of years.

Common names are very confusing when the same name is applied to more than one species. "Golden Cichlid" could mean *Pseudotropheus auratus*, *Pseudotropheus tropheops*, or *Cichlasoma severum* (in the golden or xanthic form) or *Tilapia mosambique* (again in the golden form). When the name "Sailfin Molly" is used it fails to distinguish between *Poecilia velifera*

and *Poecilia latipinna* and *Poecilia petensis* and at least three different species of albino *Corydoras* are sold simply as Albino Cats. This leads to the formulation of "Rule Number Two." Unless a common name is generally accepted e.g. Neon, Siamese Fighter, Oscar, the fish should be further identified.

The third and final "Rule" is very straightforward and simple. Buy a good book before buying any fish. It is impossible to recommend any individual texts but as a general guide a book should contain the following:—

- (i) Separate descriptions of a large number of different species.
- (ii) Fin and scale formulae for each species.
- (iii) Colour photographs of at least a quarter of the species dealt with.
- (iv) Line drawings of those species not photographed.
- (v) Either specific information about breeding or, if applicable, breeding information about the genus as a whole.
- (vi) Location data for each species giving a concise description of the local conditions.

Do not expect a book of this sort to be cheap; it will be quite expensive but one good book is worth countless second-rate tomes.

So far, this article has dealt with some of the reasons for the mis-identification of aquarium inmates and has said nothing about the various methods that the aquarist has at his disposal for making a correct identification. The expert ichthyologist always works with preserved and therefore dead specimens when attempting to make an identification. Although there is a great deal to be said about the ease of handling preserved specimens, most responsible aquarists would rather remain ignorant of a fish's true identity than deliberately kill it in order to tag a name to its corpse. Because the following methods have been worked out for live specimens, they cannot guarantee absolute proof of identity. There is no known way of counting vertebrae in a live specimen without the use of an X-ray machine, a little extra that most aquarists do not possess. Providing the aquarist can tell a catfish from a barb and a swordtail from a cichlid these methods can be applied without too much difficulty.

Identification is based on the following data:—

- (i) The external appearance of the fish.
- (ii) The habits of the fish.
- (iii) Any other relevant information such as, collection data (should you be so lucky), methods of breeding (again, should you be so lucky) and choices of foods etc.

(i) *The external appearance*

The most important factors used in identifying a fish from its external appearance are the fin ray and scale formulae, hence the insistence that these were reproduced in any book purchased for use in this

context. Fin ray counts and scale counts are usually given in the following way.

D. XV 1/7	Representing the dorsal fin rays.
A. XVI 11/15	Representing the anal fin rays.
P. 10	Representing the pectoral fin rays.
V. 1	Representing the ventral fin rays.
LL 27-28	Means there are 27 to 28 scales in the lateral series.
TR 15-17	Means there are 15 to 17 scales in the transverse series.

A species can occasionally have two dorsal fins and when they are present they are indicated as D1 and D2. The dorsal and anal fin rays can also, on occasions, be divided into hard fin rays and soft fin rays. This kind of division can most readily be seen in many of the larger cichlid species but is sometimes difficult to see in smaller, live specimens. As can be seen above, the convention is to use Roman numerals to represent the hard rays followed by Arabic numerals representing the soft rays. In most cases the caudal ray count, represented by capital 'C', is omitted together with the ventral ray count leaving the dorsal, anal and pectoral as the main fins used in identification.

The final two counts shown above are used to indicate the number of scales found in the lateral series and in the transverse series. The first indicates the total number of scales found in a line that runs from the gill cover to the beginning of the caudal fin. The latter is a count of the scales found in a direct line from the middle of the back to the middle of the ventral surface AT THE DEEPEST PART OF THE FISH, unless otherwise stated. The above formulae also applies to the line drawing in diagram 1 and is the formulae for a typical Dwarf Gourami (*Colisa lalia*).

Fin ray and scale counts can be made on most of the larger fishes without too much difficulty. After a little practice and providing a little patience is used, almost any fish at or above four inches can be counted on sight. Smaller fishes pose some problems and any specimen below an inch and a half will require a special technique. Briefly, a close-up photograph of high quality is needed and this is far from easy to get. Apart from a single lens reflex camera (S.L.R.), flash guns and close up tubes are also essential equipment when taking such a photograph. Unless the aquarist is also a photographer, the only alternatives are either an approach to the local camera club (try telling them it's a challenge) or don't bother with small specimens.

The external appearance of a fish also includes the measurements of various parts. Because fishes have a tendency to vary in size, depending on growth, age etc., these measurements cannot be given in the normal units such as inches or centimetres. All measurements are given as proportions of the main measurement which is the standard length. As an example, if a fish has a standard length of 10cm and a head length of 2cm then the standard length would

be given as either 1 or 100 and the head length would then be either 1/5th or 20%. Note that the standard length is from tip of nose to beginning of caudal fin, this being the same measurement used to judge fish on the show bench. Diagram 2 gives four of the most commonly used measurements. Measurements are not very important for identification within the context of this article; it is very difficult to accurately measure a living, swimming fish (ask any truthful judge). What measurements can do, however, is to give a rough idea of the various proportions of a specimen making any large discrepancy more than obvious.

At this juncture a few words about shape would be appropriate. Laterally compressed is a term, often used to describe fishes, that is sometimes difficult to comprehend. In brief, it describes the resulting shape formed by exerting pressure on either side of a cylindrical object, forcing in the sides, increasing the body depth and decreasing the width. Discus and Angel Fish (*Pterophylon species*) are examples of extreme lateral compression whilst most Barb species are more normally, compressed laterally.

Fin shapes are important and should be noted together with any signs as such things as fin extensions or elongated fin rays. The positioning of various fins can be of great help and comparisons between the relative insertions of anal and dorsal fins are easily seen and used as information for identification purposes.

Still under the heading of external appearances, colour and pattern can now be dealt with. Most aquarists, when starting to keep fish for the first time, soon notice that the aquarium inmates change their colours more often than some women change their minds. Experienced aquarists can often tell a fish's mood and/or its state of health from the colours it carries. Some people see colours differently to others and even colour photographs can be totally unbalanced giving results that are far from correct. Colour variations within a species is more often the rule with fishes and some strains of tropical fishes have been developed to the extent that, in colours, they bear no resemblance to the wild type. Consequently, because of the foregoing, little attention should be paid to colour descriptions as they can often prove to be more misleading than useful.

Patterns can be a little more positive when used for identification purposes but these should also be treated with caution. Some cichlid species can adopt a fairly extensive range of patterns and are said to use them as a form of conversation; certain killifish, known to belong to a pure strain, have developed patterns that their parents lacked.

Finally, the question of counting a fish's quota of teeth can be discussed. Teeth are very difficult to count in live fish and can rarely be seen under normal conditions so, once again, a special technique is

required. The following method should only be used by experienced aquarists in order to minimize the risk to the fish and, sometimes, the risk to the fish-keeper. Once the fish has been netted it must be held firmly in a cloth that has been wetted with water from the aquarium. As soon as it has been removed from the aquarium a fish will usually open its mouth and expose its various sets of teeth. Generally, the teeth will be too small to be easily counted just by looking at them and this situation calls for the use of a large darning needle. The needle is carefully inserted into the mouth of the fish and placed on the first tooth in the row to be counted. With a little downward pressure the needle is pulled along the row and each time the needle "clicks" a tooth is counted. This method is rather like running a stick along a railing but, with a little practice, it can give quite accurate results.

As a fish out of water will very quickly die of asphyxiation, it is essential that this method is only employed by aquarists who are well acquainted with the specimens used and can readily judge when it is time to place the fish back into its aquarium. If in doubt do not use this method as good results can only be gained by correct handling and interpretation.

(ii) *The Habits of the Fish*

The habits of fishes can vary tremendously, even within one species. Obviously, fishes can be trained and thus habituated to do simple little things quite contrary to their general nature such as seeking out human fingers because a hand over the water is now a sign of food and no longer retains its original meaning of danger. What the aquarist must look for are habits that are essentially part of the physiological make up of the fish. Examples of this kind of behaviour are the way an Anabantid is forced to the surface of the water in order to "drink air" or the nocturnal habits of various catfishes who hide away all day then come out in darkness to grub around the base of the aquarium. Other examples of this kind of behaviour are the aggressive territoriality of some species, especially cichlids, and the shoaling habits of certain species such as Danios and Barbs.

Another point that is well worth noting is the depth at which a fish generally swims in the aquarium. Although Barbs sometimes visit the surface of the water or the base of the tank, they will generally be found swimming midway between each. Catfish tend to stay on the base of a tank along with most species of Cichlids; both kinds of fish will be found grubbing around looking for food scraps. Larger Cichlids will often dig up gravel, move quite heavy stones and rip up plants, all forms of behaviour which are, in fact, hard to ignore. This list could go on endlessly so suffice it to say that any little facet of behaviour is worth noting, it could turn out to be the last clue needed for an identity.

(iii) *Any Other Relevant Information*

Number three is really a miscellaneous category. Much information, such as collection data, only applies to specimens actually caught in the wild. Sometimes, in odd cases, this information can be acquired by asking the dealer or supplier where the fish were purchased. The information is most likely to be available from the specialist dealer and is bound to be of a rather general nature such as, South America or Lake Malawi. Nevertheless, this type of information can prove useful by enabling the aquarist to eliminate many possible contenders at a stroke, even if it does not reveal the true identity of the specimen in one go. Certain species have been deliberately introduced to areas that are as much as half the world away from their natural habitat and these will often be the cause of some confusion when they turn up in a shipment. Some instances of this are the various species of *Gambusia*, common to Central America, that sometimes turn up in shipments from Asia and some wild Guppies that once accompanied various species of small Tetras imported from South Africa. In all these instances the livebearers had been originally imported into Africa and Asia to try to combat

malaria by devouring the mosquito larvae and thus reducing the number of adult, malaria-carrying flies.

A requirement of breeding is, in all instances but one, a pair of fish from the same species. Inter-specific hybrids are sometimes possible but in this instance are of little use to the average aquarist. As it is often easier to sex a pair of fish than to try and determine what species they belong to (for example, *Corydoras* catfish or Cichlids), this method of trying to identify specimens is not as ambitious as it may seem. If a pair of unknown fishes spawn, give birth, or breed in any other way, notes should be taken and then compared with the written accounts of various breeding successes.

Finally, if all else has failed, it is possible to preserve the specimen when it dies and get an expert opinion about it, from either the local museum or the Natural History Museum in London. One word of caution however, make sure that the fish in question is indeed an unusual and unrecognised specimen as an ichthyologist confronted with a preserved platy is not likely to be too pleased or very cooperative. In other words, when resorting to qualified help, please do not waste the poor man's time.

THE ATTRACTIVE COMBTAIL

continued from page 165

The male again embraced the female; the female turned upside down and 20-30 eggs were released. Both male and female then began placing the eggs under the plastic lid. For a while the male continued tending the nest while the female kept the *Dianema* at bay. The male then started coaxing the female back to the nest and after five minutes embracing continued and more eggs were released, followed by bubbles being blown through the gills. This behaviour went on for an hour or more the fish embracing under the lid, releasing eggs, and the female fending off the catfish and the male coaxing her back (sometimes butting her in the side with his snout to do so) and so on.

Approximately 200 eggs were laid, the eggs being 1.2 mm in diameter. *Belontia signata* do not blow a mass of fine bubbles as do *Macropodus opercularis* or *Trichogaster trichopterus*, for example. *B. signata* blow a few large bubbles which run together to form small airpockets under lid or leaf.

The eggs plus lid were placed in a small plastic box and floated in another tank which was at 80°F. The eggs were taken away from the parents because I felt that they would be at risk with the parents at night because of the *Dianema longibarbis* catfish in the tank, though the parents might well have become cannibalistic after the fry were free-swimming. Black water tonic was added to the box to try to combat spawn fungus.

Some of the eggs were hatched the next morning and these were transferred to another plastic box to

prevent overcrowding. The remainder hatched that evening and the infertile eggs were removed by pipette. Quite a lot of the 200 eggs were infertile so at 24 hours only 70 were remaining.

At 24 hours after hatching the fry with their large yolk sacs were moving about by wriggling their tails. They were at this early stage a full 3 mm from head to tail. After another three days only 38 were remaining, the others having died, possibly from bacterial infection.

Though the fry still seemed to have some yolk sac left I tried to feed them on some brine shrimp (*Artemia salina*) and to my surprise they took it at this early stage. After another four days I was able to place the fry in a 13 in. tank, a change that they seemed to appreciate.

After another four days they were able to eat cyclops. From this time on there was no trouble with the fry; they ate cyclops and fine dry food and grew at a good rate, being 8-9 mm after another seven days.

In conclusion I would like to say that *Belontia signata* is a beautiful anabantoid well worth keeping if you have ample tank space.

- (1) Regan, C.T., 1909, The asiatic fishes of the family Anabantidae, Proc. Zool. Soc. London, 54: 767-787 PLS 77-79.
- (2) F.B.A.S. Booklet No. 6, 1975, FCT/RDE. National show fish sizes.
- (3) Hans Joachim Richter, T.F.M., May 1971.

News

from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 5th of the month preceding the month of publication.

THE first April meeting of **Portsmouth A.S.** was devoted to an excellent talk on venomous snakes given by Mr. D. B. Sigourney with live specimens. Not all the snakes he brought with him were poisonous, however, and some of the members were delighted to be able to handle some well behaved, attractively patterned boas.

The second meeting was subtitled to a new venture of the society. The juniors took the stage, as it were, and two enterprising youngsters took it upon themselves to teach the adult members a thing or two. Nigel Forse, only ten years of age, gave a short talk on cichlids, completely without notes and thirteen year old Stephen Mæra gave an excellent forty-five minute talk, using slides, on anabantids.

There was also a table show for the second meeting. The classes were for labyrinth, danios and white cloud mountain minnows and the judge for the evening, Mr. G. Edwards of Bournemouth gave the following awards: Siamese Fighters: 1, 3 and 4, E. Binstead; 2, D. Forse. A.O.S. Labyrinth: 1, D. Forse; 2, S. Mæra; 3, C. Forse; 4, E. Binstead. Danios: 1, G. Hardy; 2, D. Forse; 3, N. Forse. W.C.M.M.: 1, D. Forse. The best fish in show was a zebra danio owned by G. Hardy.

THERE were nearly five hundred entries for the first open show of the **Morley A.S.** Results: Best in Show was won by P. Gregory, Sherwood, Neets; Guppies: 1, Mr. and Mrs. Petty (Ind.); 2, Mrs. S. Harrison (Grimby); 3, J. Mozyska (Morley). Swordtails: 1, Mr. and Mrs. Lake (S. Humber-side); 2, J. Harrison (Grimby); 3, Mr. and Mrs. Stevenson (Oldham). Platies: 1, Mr. and Mrs. Chadwick (Castleford); 2, C. Fawcington (Ind.); 3, Mr. Charvet (Morley). Mollys: 1, Mr. and Mrs. Corley (Doncaster); 2, R. Bradbrook (Tower); 3, J. Britten (Morley). A.O.V. Livebearers: 1, Mr. and Mrs. Richardson (Scarborough); 2, Mr. and Mrs. Petty (Ind.); 3, Mr. and Mrs. Daines (Doncaster). Small Barbs: 1, M. Price (Castleford); 2, D. Harris (Mexbro.); 3, Mr. and Mrs. Daines (Doncaster). Large Barbs: 1, Mr. and Mrs. Hardy (David Brown Hdfd); 2, Mr. and Mrs. Roberts (Doncaster); 3, Mr. and Mrs. Honnor (Doncaster). Small Characins: 1, Mr. and Mrs. Lake (S. Humber-side); 2, Mr. and Mrs. Richardson (Scarbro); 3, L. Bush (Morley). Large Characins: 1, M. Price (Castleford); 2, B. Sleight (Mexbro.); 3, J. M. Freer (Swillington). Rasboras, Danios and Minnows: 1, A. Piggot (Grimby/Greethorpes); 2, Mr. and Mrs. Daines (Doncaster); 3, Mrs. Harrison (Grimby). Sharks and Flying Fox: 1, D. Sugden (Bradford); 2, Mr. and Mrs. Corley (Doncaster); 3, L. Bush (Morley). Killifish: 1, Miss A. Hollingworth (Sherwood); 2, E. Rice (Barnsley); 3, B. Sleight (Mexbro.). Fighters: 1, Mrs. D. Anderson (Wyke); 2, Mr. and Mrs. Clark David Brown Hdfd; 3, S. Jarman (Barnsley). Small Anabantids: 1, L. Gatenby (Bradford); 2, D. Sugden (Bradford); 3, Mr. Shaw (Ind.). Large Anabantids: 1, Mr. and Mrs. Corley (Doncaster); 2, A. and P. Barker (York and Dist.); 3, L. Bush (Morley). Small Cichlids: 1, G. Wigglesworth (Barnsley); 2, D. Harris (Mexbro.); 3, T. Stanfield (Castleford). Large Cichlids: 1, D. Harris (Mexbro.); 2, P. Northrop (Ind.); 3, Mr. and Mrs. Chadwick (Castleford). Angel Fish: 1 and 2, Mr. and Mrs. Jarman (Barnsley); 3, L. Bush (Morley). Malawi Cichlids: A.V.: 1 and 2, M. Price

(Castleford); 3, Mr. and Mrs. Hardy (David Brown Hdfd). Corydoras and Brochis: 1, M. Price (Castleford); 2, 1, Cuff (Ind.); 3, D. Copley (Morley). A.O.V. Catfish: 1, P. Gregory (Sherwood); 2, Mr. and Mrs. N. Stevenson (Oldham); 3, T. Stanfield (Castleford). Loaches and Botia: 1, Mr. and Mrs. Daines (Doncaster); 2, R. S. Cherry Holme (Barnsley); 3, P. Camfield (Castleford). A.O.V. Tropical: 1, T. Busfield (Barnsley); 2, Mr. and Mrs. Copley (Doncaster). Joint: 3, A. Frisby (Wyke); Mr. and Mrs. Bilker (Scarbro). Breeders Livebearers (1-10): 1, Mr. and Mrs. Litter (Sheffield); 2, Mr. and Mrs. Copley (Doncaster); 3, T. Busfield (Barnsley). Breeders Livebearers (11-20): 1, T. Busfield (Barnsley); 2, Mr. and Mrs. Hill (Barnsley); 3, Mr. Harrison (Grimby). Breeders Egg Layers (1-10): 1, Mr. and Mrs. Richardson (Scarbro); 2, Mr. Barratt (Thorne); 3, Mr. and Mrs. Honnor (Doncaster). Breeders Egg Layers (11-20): 1, Mr. and Mrs. Copley (Doncaster); 2, D. Banks (Thorne); 3, D. Barratt (Thorne). Pairs Livebearers: 1, Mr. and Mrs. Lake (S. Humber-side); 2, T. Busfield (Barnsley); 3, Mr. and Mrs. Corley (Doncaster). Pairs Egg Layers: 1, B. Sleight (Mexbro.); 2, R. Banks (Thorne); 3, Mr. and Mrs. Daines (Doncaster). Common Goldfish: 1, K. Cherman (Mexbro.); 2, A. D. Fisher (Bradford); 3, Mr. and Mrs. Chadwick (Castleford). Fancy Goldfish: 1, I. Hawkhead (N.G.P.S.); 2 and 3, Mr. and Mrs. Englund (Barnsley). A.O.V. Cold Water: 1 and 2, Mr. and Mrs. Snowden (York and Dist.); 3, B. Banks (Thorne A.S.). Novice: 1, S. Sutton (Barnsley); 2, E. Whalley (Barnsley); 3, Miss H. Brown (Morley). Junior: 1 and 3, Master R. Stanfield (Castleford); 2, Master R. Gatenby (Bradford).

THIS year is a milestone in the history of the Federation of the British Aquarist Societies—it is the 40th Anniversary of its founding. Commencing this Anniversary year, the F.B.A.S. is pleased to announce the publication of two new booklets: No. 10—Scientific Names and their Meanings, price 50p; No. 11—Aquatic Plants, Furnished Aquaria & Aquascapes, price 50p. No. 10 Booklet is a companion volume to the popular Dictionary of Proper & Common Names of Freshwater Fishes, bringing an extra dimension to the hobby and dispelling notions that scientific names were only invented to make things more difficult for the hobbyist. No. 11 gives valuable information upon the exhibiting side of those oft-neglected aquarium inmates—aquatic plants, together with a section which directs the plant-keeper to the exact page in the plant reference works.

An International weekend is planned for the 23/24th September; an Anniversary Dinner and Dance will be held; a meeting of the Aquarist-International delegates, where the Federation will be playing host to its European Federation counterparts, and the third F.B.A.S. Convention at London Zoo. Additional titles are planned for the AquaTalk series of tape/cassette/slide programmes, including Marine Fishkeeping, Furnished Aquaria & Aquascapes, and other aquatic subjects.

THE main item at the May meeting of the **Mid-Sussex A.S.** was a talk and slide show on 'Fish Diseases' by Mr. Mugeridge. At this meeting the second leg of the 'Over the Downs' competition with Brighton & Southern A.S.

was to be held but as they were unable to attend, a special club table show was set up consisting of two classes. Results:—Special Novice: 1, J. Maddocks; 2 and 4, J. Birch; 3, S. Warner. Extras: 1, B. Perrins; 2, A. Temple. Further information regarding the Society can be obtained from the Secretary, Mr. B. Slade (Haywards Heath 5747), 'Sundown', Bolney Road, Ansty, Haywards Heath.

THE **Port Talbot** show results were:—Ad: 1, M. Haggerty (Mthr.); Ba: 1, D. F. C. Kenwood (N'sea); E. C. & J. Richards (Sud.); 3, Mr. and Mrs. M. Price (P.T.); 4, T. Sullivan (S.A.S.). B: 1, A. P. Willis (Adr.); 2, C. & J. Richards (Sud.); 3, P. Burton (Adr.); 4, M. Cooper (Adr.); C: 1 and 2, M. Davies (S.A.S.); 3, C. & J. Richards (Sud.); 4, P. Collins (S.A.S.); Ca: 1 and 2, C. & J. Richards (Sud.); 3, T. Reed (Adr.); 4, T. Sullivan (S.A.S.). D: 1 and 4, J. Egan (P.T.); 2 and 3, Mr. and Mrs. P. Fitchett (N'sea). Da: 1 and 2, B. Fouracre (P.T.); 3, Mr. and Mrs. P. Fitchett (N'sea); 4, Mr. and Mrs. R. Cotton (P.R.). Db: 1, A. Thomas (S'wa); 2, Mr. and Mrs. G. Williams (P.T.); 3, R. D. Perkins (Pres.); 4, Mr. and Mrs. M. Price (P.T.). Dc: 1, P. Burton (Adr.); 2, A. P. Willis (Adr.); 3, M. Gifford (G. Fy.); 4, C. Morrison (P.T.). Dd: 1, T. Sullivan (S.A.S.); 2 and 4, T. Reed (Adr.); 3, C. McIntosh (Pres.). Ea: 1, B. Selway (Std.); 2, C. & D. Finnis (Std.); 3, R. Perkins (P.T.); 4, Joint—C. & J. Richards (Sud.) and E. Perkins (P.T.). F: 1, 2 and 3, C. Morrison (P.T.); 4, B. Witteridge (Std.). G: 1, C. Davies (Adr.); 2 and 3, C. & J. Richards (Sud.); 4, P. Burton (Adr.). H: 1 and 3, M. Netherell (S.A.S.); 2, J. Egan (P.T.); 4, C. & D. Finnis (Std.). J: 1, B. Bow (S.A.S.); 2 and 4, B. Witteridge (Std.); 3, T. Sullivan (S.A.S.). K: 1, C. & J. Richards (Sud.); 2, C. & D. Finnis (Std.); 3, T. Sullivan (S.A.S.); 4, E. Perkins (P.T.). L: C. & D. Finnis (Std.); 2, C. & J. Richards (Sud.); 3, M. Cooper (Adr.); 4, B. Bow (S.A.S.). M: 1, C. & D. Finnis (Std.); 2, T. Sullivan (S.A.S.); 3, C. Morrison (P.T.); 4, C. Davies (Adr.). N: 1 and 3, B. Bow (S.A.S.); 2, T. Reed (Adr.); 4, T. Sullivan (S.A.S.). O: 1, R. D. Perkins (Pres.); 2, T. Reed (Adr.); 3, E. Jones (P.T.); 4, A. P. Willis (Adr.). P: 1 and 2, C. & D. Finnis (Std.); 3, T. Reed (Adr.); 4, T. J. Davies (S'wa). Q: 1, A. P. Willis (Adr.); 2, 3 and 4, C. & D. Finnis (Std.). R: 1, C. & D. Finnis (Std.); 2, E. Perkins (P.T.); 3, Mr. and Mrs. P. Fitchett (N'sea); 4, J. Egan (P.T.). S: 1 and 2, B. Bow (S.A.S.); 3 and 4, C. & D. Finnis (Std.). T: 1 and 2, H. Dibble (N'sea); 3, M. Davies (S.A.S.); 4, C. & D. Finnis (Std.). U: 1, 2, 3 and 4, C. Rupert (P.T.). V: 1, 2, 3 and 4, C. Rupert (P.T.). W: 1, 2, 3 and 4, C. Rupert (P.T.). XBM: 1, P. Burton (Adr.); 2 and 3, Mr. and Mrs. R. Thomas (Pres.); 4, D. Bizes (S.A.S.). XO-T: 1 and 4, M. Davies (S.A.S.); 2, T. Sullivan (S.A.S.); 3, I. H. Dibble (N'sea). B-MY: 1 and 4, C. Morgan (Mthr.); 2 and 3, J. Arnold (P.T.). O-TY: 1 and 3, B. Bow (S.A.S.); 2, S. Williams (P.T.); 4, P. Collins (S.A.S.). Best Fish in show: C. & D. Finnis (Stood A.S.). Best Breeders Team: M. Davies (S.A.S.). Best Junior Fish in show: B. Bow (S.A.S.). Highest Pointed Visiting Society: Selected A.S. Highest Aggregate Points: C. & D. Finnis (Stood A.S.). Abbreviations:—Mthr. (Merthyr A.S.); N'sea (Nailsea A.S.); Sud. (Sudbury A.S.); S.A.S. (Selected A.S.); Adr. (Aberdare A.S.); P.T. (Port Talbot A.S.); S'wa (Swansea A.S.); Pres. (Prescilli A.S.); G'fy. (Greenfly A.S.); Std. (Stood A.S.).

THREE club members formed a panel to answer questions on building ponds and which plants and fish to put in them at the first

DISINFECT NEW PLANTS AND FISH WITH  **halamid**
Hillside Aquatics London N12

meeting in April of the **Walthamstow and District A.S.**

An Interclub table show was arranged at the second meeting with East London A.S. The speakers for the evening were Mr. C. Stott and Mr. J. Howard who gave a very interesting talk on their past experiences of breeding various types of fish.

New members are always welcome. For further details please phone G. Smith 527-6303.

RESULTS of the M.A.L. League Show and Mini Open Show staged by **Nuneaton A.S.** who were the host society were as follows:
M.A.L. Classes A.V. Anabantid: 1 and 3, C. & M. Chamberlain (Leamington); 2, Mr. and Mrs. Underwood (Unit 59); 4, T. S. F. N. (Coventry). **A.V. Loach:** 1, Booth (Loughborough); 2, G. Howe (Loughborough); 3, G. Nesbitt (Nuneaton); 4, T. S. F. N. (Coventry). **A.V. Livebearer (Pairs):** 1, 3 and 4, Mr. and Mrs. Underwood (Unit 59); 2, B. Frye (Leamington). **A.V. Barb:** 1, Mr. and Mrs. Underwood (Unit 59); 2, J. Booth (Loughborough); 3, B. Chittenden (Leamington); 4, G. Nesbitt (Nuneaton). **Best Fish in M.A.L. Classes J. Booth, Loach Class.** **League Points** after this first show of four. **Unit 59,** 30 pts, Leamington, 27 pts, Loughborough, 27 pts, Nuneaton, 19 pts, Coventry, 18 pts, Rugby, 8 pts. **Mini Open Show Results:** **A.V. Rasbora:** 1, Mr. and Mrs. G. Nesbitt (Nuneaton); 2, J. & P. Patching (Wellingboro); 3, Mr. and Mrs. J. Salisbury (Nuneaton); 4, Mr. Twynham (Rugby). **A.V. Catfish:** 1 and 4, S. M. I. N. (Nuneaton); 2, S. & P. Whitmore (Wolverhampton); 3, B. Brown (Leamington). **A.V. Cichlid:** 1, Mr. and Mrs. J. Salisbury (Nuneaton); 2, J. & P. Patching (Wellingboro); 3, Jackson Bros (Sherwood); 4, B. Chittenden (Leamington). **Characin "A":** 1 and 2, S. & J. Whitehouse (Wolverhampton); 3, A. Ormslow (Loughborough); 4, Mr. and Mrs. Underwood (Unit 59). **A.V. Livebearer:** 1, Jackson Bros (Sherwood); 2, 3 and 4, J. Myyle (N.G.L.S.). **A.V. Barb:** 1, A. M. Crew (Wellingboro); 2 and 4, J. Myyle (N.G.L.S.); 3, Jackson Bros (Sherwood). **A.V. Danio and W.C.M.M.:** 1 and 2, J. Booth (Loughborough); 3, Mr. and Mrs. G. Cox (Nuneaton); 4, Mr. and Mrs. Underwood (Unit 59). **Characin "B":** 1, T. S. F. N. (Coventry); 2, P. & C. Hinde (Coventry); 3, S. M. I. N. (Nuneaton); 4, Mr. and Mrs. Underwood (Unit 59). **Best Fish in the Open Show S.M.L.N. Catfish Class.**

THE May meeting of Bristol A.S. was the occasion of a competition for an attractive trophy presented by Terry Ball and Jim Whiting for the Best Coloured Bristol Shubunkin. Full results were—Bristol Shubunkins: 1, 2 and 3, G. Bell; 4, P. Norman, Mosses; 1 and 2, R. Pincock; 3, H. C. B. Thomas; 4, S. Howells. **Orandas:** 1, 3 and 4, S. Howells; 2, V. Cole. The increased membership and unusual programme resulted in a capacity meeting.

ABOUT seventy members of the **Merseyside A.S.** attended a slide show, with accompanying cassette on the subject of Barbs. This April lecture covered all varieties of Barbs, and was highly informative to all who attended. Also in April, a quiz organised by Mr. T. Kilgallon, Magazine Editor was held. Mr. F. Mulla, Chairman, chaired the quiz at which forty members of the Society had an extremely enjoyable meeting. The table show results were—Guppies: 1, T. Faux; 2, J. Harrison; 3, I. Jamieson. **Swords:** 1 and 3, T. Lye; 5, Farrell. **A.O.V. Livebearers:** 1, R. I. Payne; 2, J. Lynch. **Fighters:** 1 and 3, B. Faux; 2, D. Francis. **Platies:** 1, S. Farrell; 2, T. Lye;

3, I. Jamieson. **Mollies:** 1, T. Williams. **Small Characins:** 1, R. I. Payne; 2 and 3, J. Walker. **Large Characins:** 1, J. Walker. **A.O.V. Anabantid:** 1, J. Harrison; 2, S. Farrell; 3, J. Walker. **Killies:** 1 and 3, R. I. Payne; 2, J. Walker. **Small Barbs:** 1, 2 and 3, T. Faux. **Large Barbs:** 1 and 2, T. Lye; 3, J. Lynch. **Large Cichlids:** 1, J. Lynch; 2, B. Faux. **Dwarf Cichlids:** 1, R. I. Payne. **Rift Valley Cichlids:** 1, B. Faux; 2, D. Francis. **Angels:** 1, D. Francis. **Rasbora, Danios & Minnows:** 1, S. Farrell; 2, J. Walker; 3, T. Williams. **Sharks & Foxes:** 1, T. Faux; 2, J. Lynch; 3, R. I. Payne. **Corydoras:** 1 and 3, D. Francis; 2, S. Darracott. **A.O.V. Catfish:** 1, D. Francis; 2, J. Harrison; 3, T. Williams. **Loaches:** 1, J. Harrison; 2 and 3, J. Walker. **Pairs Egglayers:** 1, D. Francis; 2, J. Harrison; 3, T. Williams. **Pairs Livebearers:** 1, T. Lye; 2, R. I. Payne; 3, S. Farrell. **Breeders Egg-layers:** 1, D. Francis. **Breeders Livebearers:** 1, D. Francis. **A.O.V. Tropical:** 1, D. Francis. **Ladies, Any Variety:** 1 and 2, Mrs. Smeltzer. **Fancy Goldfish:** 1, S. Darracott. **Junior Egglayers:** 1 and 2, K. Corbett; 3, T. Wright. **Junior Livebearers:** 1 and 3, K. Corbett; 2, I. McCallum. **Junior Coldwater:** 1 and 2, F. Lye; 3, Miss L. Faux.

THE Ostram A.S. wish to apologise for the change of venue this year. This became necessary when the overhead cable blew down at the usual venue, the Ostram Social Club. Unfortunately the new cable had to go underground and could not be done in time. So, the Society had two days only to re-arrange the show. As time was too short to warn anyone, the Society could neither cancel nor move too far away, and, consequently had to pick a rather small school with very few facilities.

The results were as follows:—**Anabantid:** 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Stott (Oldham); 3, B. & J. McCartney (St Helens). **Fighters:** 1, A. Unsworth (St Helens); 2, B. & J. McCartney (St Helens); 3, D. Conway (Darwen). **Small Barbs:** 1, R. & A. Johnson (Hyde); 2, N. Stevenson (Ostram); 3, Mr. and Mrs. Underwood (Southport). **Large Barbs:** 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. F. Mulla (Merseyside); 3, N. Wallbank (Morecambe Bay). **Laedos, Sharks & Foxes:** 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. Hodge (Southport); 3, W. Chapman (Bridge-water). **Small Characins:** 1, D. Hulce (Oldham); 2, G. Wilson (Skelmersdale); 3, Mr. and Mrs. Underwood (Southport). **Large Characins:** 1, N. Stevenson (Ostram); 2, Mr. and Mrs. Underwood (Southport); 3, R. & A. Johnson (Hyde). **Dwarf Cichlids:** 1 and 2, N. Stevenson (Ostram); 3, B. Wilson (Skelmersdale). **Large Cichlids:** 1, Mrs. P. A. Taylor (Atlantic); 2, Mr. and Mrs. Widd (Ostram); 3, Misses P. & S. Taylor (Atlantic). **Angels:** 1, Mr. and Mrs. Muckle (Runcorn); 2, N. Stevenson (Ostram); 3, Mr. and Mrs. Aspinall (Sandgrounders). **Rift Valley Cichlids:** 1, K. & A. Aldred (Hyde); 2, Mr. and Mrs. Iddon (Sandgrounders); 3, B. Wilson (Skelmersdale). **Toothcarps:** 1 and 2, R. Scottock (Ostram); 3, R. I. Payne (Merseyside). **Rasbora, Danios & Minnows:** 1 and 3, Mr. and Mrs. Underwood (Southport); 2, J. Halsey (Darwen). **Guppies:** 1, K. & A. Aldred (Hyde); 2 and 3, D. Conway (Darwen). **Savordails:** 1, A. Unsworth (St Helens); 2, B. W. Carter (St Helens); 3, N. Greenhag (Ostram). **Mollies:** 1, Mr. and Mrs. Aspinall (Sandgrounders); 2, T. L. Penny (St Helens); 3, Mr. and Mrs. Iddon (Sandgrounders). **Platies:** 1, P. Squitrel (Wythenshawe); 2 and 3, B. & G. McCartney (St Helens). **A.O.V. Livebearers:** 1, K. Thompson (Merseyside); 2, Mr. & Mrs. Baldwin (Sandgrounders); 3, R. I. Payne (Merseyside). **Loaches:** 1, J. Booth (Loughborough); 2, Mr. and Mrs. Underwood (Southport); 3, R. I. Payne (Merseyside). **Corydoras & Brochis:** 1, B. W. Carter (St Helens); 2, K. Thompson (Merseyside); 3, R. Hodge (Southport). **A.O.V. Catfish:** 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, B. & J. McCartney (St Helens); 3, M. Cummings (Merseyside). **Goldfish & Comets:** 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Dawson (Heywood); 3, Mr. and Mrs. Hewitt (Ostram). **Shubunkins:** 1 and 3, Mr. Howarth (N.G.P.S.);

2, Mr. and Mrs. Hewitt (Ostram). **Veltair:** 1, Mr. and Mrs. Hewitt (Ostram); 2 and 3, C. Whitley (Accrington). **Orandas:** 1 and 2, R. Dingley (Heywood); 3, Mr. and Mrs. Hewitt (Ostram). **Lionheads:** 1, Mr. and Mrs. Hewitt (Ostram); 2, R. Dingley (Heywood); 3, Mrs. Beaman (Ostram). **Fantails:** 1, Mr. and Mrs. Hewitt (Ostram); 2, C. Whitley (Accrington); 3, Mr. Howarth (N.G.P.S.). **Moors:** 1, Mr. and Mrs. Widd (Ostram); 2, R. Dingley (Heywood); 3, Mr. and Mrs. Hewitt (Ostram). **A.O.V. Fancy Goldfish:** 1, B. Howarth (Accrington); 2 and 3, Mr. and Mrs. Hewitt (Ostram). **A.O.V. Asian or U.S.A. Coldwater:** 1, Mr. and Mrs. Underwood (Southport); 2, G. & C. Berry (Blackburn); 3, D. Heywood (Sandgrounders). **A.O.V. European Coldwater:** 1, Mr. and Mrs. Hewitt (Ostram); 2 and 3, Mr. and Mrs. Widd (Ostram). **Pairs Coldwater:** 1 and 2, R. Dingley (Heywood); 3, K. & A. Aldred (Hyde). **Breeders Egglayers "C":** 1, W. Edwards (Bridge-water); 2, D. Hulce (Oldham); 3, B. Wilson (Skelmersdale). **Breeders Egglayers "D":** 1, F. & A. Howwood (Blackburn); 2, Miss Andrews (N.G.P.S.). **Breeders Livebearers "B":** 1, G. & C. Berry (Blackburn). **Breeders Livebearers "C":** 1, Mr. and Mrs. Goddard (Macclesfield). **Breeders Livebearers "D":** 1, Mr. and Mrs. Stott (Oldham); 2, N. & M. Rimmer (Sandgrounders). **A.O.V. Not Listed:** 1, N. Stevenson (Ostram); 2, K. & A. Aldred (Hyde). **Pairs (Egglayers):** 1 and 3, K. Thompson (Merseyside); 2, B. W. Carter (St Helens). **Pairs (Livebearers):** 1, K. Thompson (Merseyside); 2, Mr. and Mrs. Goddard (Macclesfield); 3, R. I. Payne (Merseyside). **Mini Jars (natural):** 1, 2 and 3, N. Stevenson (Ostram). **Mini Jars (novelty):** 1, N. Stevenson (Ostram); 2, Mr. and Mrs. Hewitt (Ostram); 3, R. O'Connell (Ostram). **Marine (Single Fish):** 1, K. Miller (Heywood); 2, J. Bonser (Hyde); 3, Mr. and Mrs. Iddon (Sandgrounders). **Best Coldwater Fish in show:** B. Howarth (Accrington). **Best Tropical Fish in show other than best fish in show:** K. Thompson (Merseyside). **Best Fish in show:** K. & A. Aldred (Hyde).

THERE were over fifty members and guests at the April meeting of the **Kings Lynn A.S.** to enjoy a talk and colour slide show on the identification of Common Parasites and Diseases. Guest speaker was Mr. Morris from Chatteris, Cambridge. A bench show on Characins was split into two sections, the results of which were: **Small:** 1, R. Warner; 2, G. Oiler; 3, V. George; 4, Mr. Brown. **Large:** 1 and 3, A. Freeman; 2 and 4, R. Warner. The monthly trophy was collected by A. Freeman.

Meetings are held on the second Thursday of each month, at the North Star Public House, Kings Lynn, and new members are always welcome.

THE Bournemouth A.S. held their Annual Open Show in May and the results of the 32 classes were: **B:** 1, Mrs. I. Bebb; 2, G. Arnold; 3, Mrs. D. Cruickshank; 4, J. Armitage. **C:** 1, Mrs. V. A. Feast; 2, T. Cruickshank; 3, Mrs. B. Scates; 4, N. J. Miles. **Cs:** 1, M. Myers; 2, 3 and 4, A. I. Feast. **D:** 1, F. May; 2, D. Jennings; 3, D. Eddlestein; 4, D. Kerr. **Da:** 1, D. J. Luker; 2, F. P. Griggs; 3, N. J. Miles; 4, P. Hammett. **Db:** 1, Mrs. I. Bebb; 2, A. I. Feast; 3, J. Govier; 4, E. J. Middlemich. **De:** 1, W. A. Knight (Aulonocara sp.) (Best Fish in Show); 2, W. A. Knight; 3 and 4, D. Eddlestein. **E:** 1, Mrs. I. Bebb; 2, G. Stallwood; 3, G. Arnold; 4, D. Jennings. **Ea:** 1 and 2, A. Fisher; 3 and 4, D. H. Miles. **F:** 1 and 3, Mrs. B. Scates; 2, Mrs. I. Bebb; 4, J. Jackson. **G:** 1, T. Fraser; 2, J. Jennings; 3, K. Taylor; 4, G. Arnold. **H:** 1, T. Cruickshank; 2, K. Taylor; 3 and 4, J. Carpenter. **I:** 1, Mrs. I. Bebb; 2 and 4, L. A. Yates; 3, A. I. Feast. **K:** 1, T. Fraser; 2, B. Scates; 3, W. West; 4, D. Kerr. **L:** 1, A. I. Feast; 2, A. Chaplin; 3, K. Taylor; 4, H. Armitage. **M:** 1, Mrs. I. Bebb; 2 and 3, G. Arnold; 4, G. Barkham. **Mv:** 1, B. R. Tobbs; 2, N. J. Miles; 3, P. G. Willis; 4, P. Hammett. **NB-M:** 1, J. Jackson; 2, Mrs. I. Bebb; 3, D. Jennings; 4, W. West. **NO-T:** 1, Mrs. I. Bebb; 2, R. Gray; 3, D. Cruickshank; 4, W. West. **O:** 1 and 2, L. A. Yates; 3, A. I. Feast; 4, P. Baker. **P:** 1, L. A. Yates; 2, G. Arnold; 3, A. Tobbs; 4,

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A. Fisher. Q: 1 and 4, S. Picher; 2 and 3, Mrs. I. Bebb; R: 1, D. J. Luker; 2, M. Wansbridge; 3, E. H. Chatfield; 4, M. Legg; S: 1 and 3, A. A. Chaplin; 2, Mrs. I. Bebb; 4, H. Greenhalgh. T: 1, M. Wansbridge; 2, D. Crickbank; 3, H. Armitage; 4, T. Fraser. U: 1, 2 and 3, K. Forward; 4, D. S. Langdon. Va: 1, J. Jupp; 2, Mrs. I. Bebb; 3, H. Greenhalgh; 4, G. Arnold. V: 1, K. Forward; 2, Mr. Pursedden; 3 and 4, E. Jennings. W: 1, J. Jennings; 2, G. Arnold; 3, W. West; 4, D. Kerr. XB-M: 1, J. Jennings; 2 and 3, A. Tubb; 4, J. Jackson. XO-T: 1, A. I. Feast; 2 and 3, R. Gray; 4, A. Jennings. XU-W: 1, A. J. Jeffries; 2, W. West; 3, T. Nicholls.

AT a well attended May meeting, **Evesham Fishkeepers Society** played host to **Malvern & District A.S.** for a six-a-side contest. Evesham's chairman B. R. Goll acted as question master for the quiz which was held during the judging was in progress. A very friendly atmosphere prevailed throughout the evening and although Evesham won the quiz 81 to 60 points, Malvern took the honours in the fish show—final total 825 to 816 points.

A return match is to be arranged in the near future. The first three individual placings for which cards were awarded were—Egglayers 1, Mrs. S. Saunders (Malvern); 2, J. Walton (Malvern); 3, Mrs. L. Wright (Evesham). Livebearers: 1, A. Person (Malvern); 2, G. Ludlow (Evesham); 3, G. Johns (Evesham).

The Society meets on the first Tuesday of every month at 8.00 p.m. Visitors and new members welcomed. Please contact club secretary, Mr. K. R. Baker, 124 Kings Road, Evesham, Worcs., for further details.

RESULTS of the Aireborough & District A.S. open show were—Best Exhibit: J. P. Royle-Evatt (Aireborough) 75 pts. Highest Pointed Exhibitor: M. Price (Castleford) 19 pts. Mr. and Mrs. Lake (S. Humberside) 19pts. Highest Pointed Society: Castleford & South Humberside (see 77 pgs). Section 1 (Livebearers)—Guppies: 1, Mr. and Mrs. Chadwick (Castleford); 2, Mr. and Mrs. Petty (Independent); 3, D. Rosindale (South Leeds). Platies: 1, Mr. and Mrs. Chadwick (Castleford, section winner); 2, Mr. and Mrs. Petty (Independent); 3, M. Price (Castleford). Swordtails: 1, P. Smith (Aireborough); 2, Mr. and Mrs. Lake (South Humberside); 3, J. P. Royle-Evatt (Aireborough). Mollies: 1, D. & W. Jordan (South Humberside); 2, Mr. and Mrs. Lake (South Humberside); 3, Mr. and Mrs. K. Welsh (Y.D.A.S.). A.O.V. Livebearers: 1, Mr. and Mrs. Petty (Independent); 2, J. P. Royle-Evatt (Aireborough); 3, Mr. and Mrs. F. Richardson (Scarborough). Section 2 (Pairs)—Livebearers: 1, Mr. and Mrs. Lake (South Humberside). Egglayers: 1, B. Banks (Thorne, section winner); 2, Mr. L. Gray (Wyke); 3, Mr. and Mrs. Petty (Independent). Section 3 (Anabantids)—Fighters: 1 and 2, J. & M. Freer (Swillington); 3, Mrs. B. Anderson (Wyke). Annabantids (Up to 10 cms): 1, Mr. and Mrs. K. Welsh (Y.D.A.S., section winner); 2, R. Shaw (Independent); 3, J. & M. Freer (Swillington). A.O.V. Annabantids: 1 and 2, G. Dean (South Leeds); 3, J. & M. Freer (Swillington). Section 4 (Barbs)—Small Barbs (Up to 10 cms): 1, D. & W. Jordan (South Humberside, section winner); 2 and 3, M. Price (Castleford). A.O.V. Barbs: 1, D. & P. Birdhall (Independent). Section 5 (Characins) Clarke Shields—Small Characins (Up to 10 cms): 1, Mr. and Mrs. Lake (South Humberside, section winner); 2 and 3, Mr. and Mrs. J. Richards (Scarborough). A.O.V. Characins: 1, M. Price (Castleford); 2 and 3, J. & M. Freer (Swillington). Section 6 (Cichlids)—Dwarf Cichlids: 1, Mr. and Mrs. Petty (Independent); 2, I. Gray (Wyke); 3, Mrs. B. Anderson (Wyke). Angels: 1, Mr. and Mrs. K. Welsh (Y.D.A.S.); 2, A. Frisby (Wyke); 3, Mr. and Mrs. Berriman (Independent). Rift Valley Cichlids: 1, 2 and 3, N. Price (Castleford, section winner). A.O.V. Cichlids: 1, M. Price (Castleford); 2, A. Frisby (Wyke); 3, Mr. and Mrs. James (Half Moon). Section 7 (Catfish & Loach)—Corydoras Catfish: 1, M. Price (Castleford); 2, Mr. and Mrs. Lake (South Humberside); 3, Mr. and Mrs. Petty

(Independent). Loaches & Botia: 1, K. & M. Wood (Bridlington); 2, R. Shaw (Independent); 3, B. Banks (Thorne). A.O.V. Catfish: 1, K. Richardson (Wyke); 2 and 3, Mr. and Mrs. K. Welsh (Y.D.A.S.). Section 8—Sharks & Foxes: 1, R. Shaw (Independent); 2, J. Shackleton (Halifax); 3, B. Craig (Wyke). Toothcarps: 1, E. Harrison (Independent, section winner); 2 and 3, J. Roberts (Independent). Rasbora: 1, Mr. and Mrs. Lake (South Humberside). Danio & Minnow: 1, Mr. and Mrs. Lake (South Humberside); 2, Mr. and Mrs. K. Welsh (Y.D.A.S.); 3, Mr. and Mrs. S. Richardson (Wyke). Section 9—A.O.V.: 1, J. P. Royle-Evatt (Aireborough, section winner); 2, A. Frisby (Wyke); 3, Mr. and Mrs. Lake (South Humberside). A.V. Junior: 1, T. Phillips (Hull, section winner); 2, Master S. Wood (Bridlington); 3, S. Stanfield (Bradford). A.V. Novice: 1, Mrs. G. Phillips (Hull); 2, S. Stanfield (Bradford); 3, N. Rosindale (South Leeds). Section 11—Livebearers Breeders 1-10: 1, J. P. Royle-Evatt (Aireborough); 2, Mr. and Mrs. James (Half Moon). Egglayers Breeders 1-10: 1, Mr. and Mrs. F. Richardson (Scarborough); 2 and 3, D. Barrett (Thorne). Egglayers Breeders 11-20: 1, D. Barrett (Thorne, section winner); 2, B. Banks (Thorne); 3, J. Shackleton (Halifax). Section 12 (Coldwater)—Common Goldfish & Cornets: 1 and 3, R. M. Dingley (Heywood); 2, Mr. and Mrs. Chadwick (Castleford). Shubunkins: 1 and 3, R. M. Dingley (Heywood); 2, C. Wallbank (Accrington). A.O.V. Fancy Goldfish: 1 and 2, C. Wallbank (Accrington); 3, D. & P. Birdhall (Independent). A.O.V. Coldwater: 1 and 3, K. & M. Wood (Bedlington, section winner); 2, D. & W. Jordan (South Humberside).

RESULTS of the Stockton-on-Tees A.S. Open Show were: Swordtail: 1 and 3, Mr. Gledhill (Redcar); 2, Mr. Dodd (B. Auckland); 4, Mr. Athewate (Halfmoon). Breeders (Egglayers) 1 and 3, K. Nunn (Stockton); 2, D. Routree (Walsend). Male Guppy: 1, K. Westward (Stockton Jnr. A.S.); 2 and 3, Miss M. Wright (Sunderland); 4, J. King (Redcar). Barbs (Large): 1, D. Russell (Stanbury); 2 and 4, Mr. Mrs. Embleton (Novos); 3, J. Page (Halfmoon). Platy: 1, Campbell Family (Mt. Pleasant); 2, W. Smith (Redcar); 3, P. Fry (Houghton District); 4, J. King (Redcar). Characins (Small): 1, J. and P. Duffill (Redcar); 2, S. Burgess (Whaby); 3, J. English (Throckley); 4, R. Wrightson (Billingham). Pairs (Egglayers): 1 and 2, Campbell Family (Mt. Pleasant); 3, Wright and Dixon (Stanway); 4, J. English (Throckley). A.O.S. (Egglayer): 1, P. Napper (S. Shields); 2, Mr. Frost (Stockton); 3, Mr. Readman (Redcar); 4, Mr. and Mrs. Knibbs (Stockton). Danio and W.C.M.M.: 1, Miss D. Knibbs (Stockton Jnr. A.S.); 2, D. Thackeray (Stockton); 3, R. D. Lunn (Ind.); 4, K. King (Mt. Pleasant). Labyrinth: 1, L. Collins (Stockton); 2, S. Hay (Hartlepool); 3, R. Leighton (Stockton); 4, Mr. and Mrs. Knibbs (Stockton). Barbs (Small): 1, Mr. and Mrs. Knibbs (Stockton); 2 and 4, Mr. Frost (Stockton); 3, D. McClurg (Stockton Jnr. A.S.). Dwarf Cichlids: 1, D. McClurg (Stockton Jnr. A.S.); 2, Mr. and Mrs. McClurg (Stockton); 3, D. Lawrence (Redcar); 4, Campbell Family (Mt. Pleasant). Breeders (Livebearers): 1, B. Shackloth & Son (Halfmoon); 2, R. Kirkup (Mt. Pleasant); 3, A. Clegg (Novos). Catfish: 1, P. Wright (Sunderland); 2, D. Lawrence (Redcar); 3, Mr. and Mrs. Granville (Halfmoon); 4, Miss D. Knibbs (Stockton Jnr. A.S.). Corydoras: 1, Mr. and Mrs. Knibbs (Stockton); 2, P. Fry (Houghton District); 3, Mr. and Mrs. Embleton (Novos); 4, S. Bradshaw (Redcar). Labeo: 1, M. A. McCartney (Ind.); 2, J. Page (Halfmoon); 3, Dean Geldart (Stockton Jnr. A.S.); 4, P. Fry (Houghton District). Rasbora: 1, S. Jackson (Redcar); 2, D. Lawrence (Redcar); 3 and 4, J. Middlemast (Ind.). Coldwater: 1, G. Rawlinson (Ind.); 2, L. Nelson (Ind.); 3, Mrs. Frame (North-Allerton). Pairs (Livebearers): 1, Mr. Gledhill (Redcar); 2, A. Clegg (Novos); 3, Campbell Family (Mt. Pleasant); 4, D. Thackeray (Stockton). Rift Valley Cichlids: 1 and 3, H. Garthwaite. Rift Valley Cichlids: 1 and 3, H. Garthwaite (Hartlepool); 2, S. Hay (Hartle-

pool); 4, J. King (Redcar). E.L.T.C.: 1, H. Harrison (Ind.); 2 and 3, K. Nunn (Stockton); 4, C. Robinson (Stanley). Molly: 1, Mr. Dodd (B.P. Auckland); 2, R. Kirkup (Mt. Pleasant); 3, L. Hunt (Halfmoon). A.O.V. (Livebearers): 1, L. Collins (Stockton); 2, J. English (Throckley); 3, W. Smith (Redcar); 4, Mr. and Mrs. McClurg (Stockton). Cichlids: 1, H. Garthwaite (Hartlepool); 2, D. Horn (Halfmoon); 3, L. Hunt (Halfmoon); 4, Mr. and Mrs. Embleton (Novos). Characins (Large): 1, S. Hay (Hartlepool); 2, Mr. Auners (Redcar); 3, Mr. and Mrs. D. Smith (Killingworth); 4, R. D. Lunn (Ind.). Fighters: 1, C. Robinson (Stanley); 2, J. Middlemast (Ind.); 3, P. Wright (Sunderland); 4, Mr. and Mrs. Knibbs (Stockton). Junior Class: 1, L. Armstrong (Stockton); 2, D. Rain (Houghton District); 4, T. M. Duffill (Redcar).

Best Livebearer } L. Collins
Best Fish in Show }

OFFICERS elected at the third annual general meeting of the **Village Bar A.S.** to serve for 1978-9. Chairman, P. Rogers; society manager, G. Corum; treasurer, J. Gilligan. Special Projects, A. Shelley-Fisher.

Due to lack of interest and a drop in membership the society are unable to stage competitive table shows and will become a discussion group, however they will continue to support the major open shows. The society will stage an exhibition for the general public on 16th November.

The headquarters are at the community Centre, Ridgeacre Road, Birmingham 32.

THERE were over one hundred different species of Catfish on display at the **Catfish Association G.B.'s Open Show** and with 284 entries this proved to be the Association's best show yet. The results were as follows:—G: 1, Janet Boakes (C.A.G.B.); 2, Mr. and Mrs. Brook (S.E.L.A.S.); 3 and 4, P. & L. Hills (C.A.G.B.). Bagridae: 1, B. Risbridge (C.A.G.B.); 2, Janet Waller (B.G.A.S.); 3, K. Taylor (Havant); 4, May Netherell (Riverside). Callichthyidae: 1, M. Goss (Riverside); 2, P. & L. Hills (C.A.G.B.); 3 and 4, M. Traynor (Folkestone). Clariidae: 1, Mr. and Mrs. Brook (C.A.G.B.); 2, P. Jones (C.A.G.B.); 3 and 4, W. F. Woodward (Bexleyheath). Doradidae: 1 and 4, Janet Boakes (C.A.G.B.); 2, M. Sandford (Reigate & Redhill); 3, P. Bryden (C.A.G.B.). Loricariidae: 1, R. Thoday (E.L.A.P.A.); 2, B. Price (Tonbridge); 3, Janet Boakes (C.A.G.B.); 4, P. & L. Hills (C.A.G.B.). Mochokidae: 1 and 2, Diane Raggatt (C.A.G.B.); 3, P. Rushbrooke (Reading); 4, A. Ashwin (Riverside). Pimelodontidae: 1 and 2, T. Fraser (Basingstoke); 3, R. C. Andrews (Strood); 4, D. D. Sands (C.A.G.B.). Schilbiidae & Siluridae: 1, Mr. and Mrs. Brook (S.E.L.A.S.); 2, Doris Winder (E.D.A.S.); A.O.S. Catfish: 1, Janet Waller (B.G.A.S.); 2, P. Rushbrooke (Reading); 3, W. F. Sutton (C.A.G.B.); 4, Gina Sandford (Reigate & Redhill). A.O.S. Catfish Pairs: 1, D. D. Sands (C.A.G.B.); 2, P. Rushbrooke (Reading); 3, B. Price (Tonbridge); 4, F. May (Basingstoke). Corydoras & Brochis Pairs: 1, J. Carpenter (Hounslow); 2, C. Sykes (C.A.G.B.); 3, T. Woolley (Saracens); 4, B. Price (Tonbridge). Brochis: 1 and 4, My Netherell (Riverside); 2, T. Fraser (Basingstoke); 3, J. Carpenter (Hounslow). Corydoras 21 in. and under: 1, R. Jones (Rom. & Bec.); 2 and 3, Colin Sykes (C.A.G.B.); 4, K. Taylor (Havant). Corydoras over 21 in.: 1, W. F. Sutton (C.A.G.B.); 2, B. Bryden (C.A.G.B.); 3, A. Gibson (Reading); 4, C. Sykes (C.A.G.B.). Corydoras Types: 1, R. Jones (Rom. & Bec.). Corydoras, not on site

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sheet; 1, C. Sykes (C.A.G.B.); 2, D. D. Sands (C.A.G.B.); 3, T. Fraser (Basingstoke); A.O.S. Catfish Breeders: 1, D. Allison (Hendon); 2, A. Gibson (Reading); 3, P. Rushbrooke (Reading); 4, Gina Sandford (Reigate & Redhill); Corydoras & Brochis Breeders: 1, R. Thoday (E.L.A.P.A.); 2, 3 and 4, T. Duffy (Bracknell). Special Class: 1, H. Johnson (Bradleyhead); 2, Mr. Wood (Havant); 3, Diana Ruggert (C.A.G.B.); 4, F. May (Basingstoke). Best Fish in show: Janet Boskes (Pseudorasbora niger).

OPEN Show results of the Skegness & District A.S. were:—Guppies: 1, S. Harrison (Grimsby & Cleethorpes); 2, H. Plastow (Immingham); 3, T. Stanfield (Castleford). Mollies: 1, Mr. and Mrs. W. D. Jordan (South Humberside); 2, S. Richardson (Wyke); 3, T. Sands (Boston). Swordtails: 1, J. Harrison (Grimsby & Cleethorpes); 2, Mr. Newton (South Humberside); 3, C. Dunham (Boston). Platies: 1, Mrs. Bee (Grimsby & Cleethorpes); 2, A. Frisby (Wyke); 3, M. Place (Castleford). A.O.V. Livebearers: 1, K. Prendergast (Boston); 2, Mr. and Mrs. W. D. Jordan (South Humberside); 3, A. Piggett (Grimsby & Cleethorpes). Large Barbs: 1, J. Upsall (Skegness & District); 2, J. Evans (Castleford). Small Barbs: 1, M. Price (Castleford); 2, P. Matthews (Immingham); 3, Mrs. Bee (Grimsby & Cleethorpes). Small Characins: 1, J. Harrison (Grimsby & Cleethorpes); 2, Mr. Cadman (Sheaf Valley); 3, Mr. Vernon (Idall). Large Characins: 1, B. Sight (Mexborough); 2, Mr. Daines (Doncaster); 3, Mr. Bradley (Retford). Corydoras: 1, M. Price (Castleford); 2, Mr. and Mrs. Copley (Doncaster); 3, S. Hill (Alfreton). A.O.V. Catfish: 1, Mr. and Mrs. P. Gregory (Sherwood); 2, Mr. T. Stanfield (Castleford); 3, K. Fisher (Sherwood). Bocas & Loaches: 1, Mr. Hornner (Doncaster); 2, Mr. Daines (Doncaster); 3, Mr. Barlow (Sheaf Valley). Dwarf Cichlids: 1 and 2, Mrs. Bee (Grimsby & Cleethorpes); 2, Mr. Gray (Wyke). Large Cichlids: 1, M. Price (Castleford); 2, Mrs. Bee (Grimsby & Cleethorpes); 3, T. Stanfield (Castleford). Angels: 1, R. Ranson (Grimsby & Cleethorpes); 2, I. Johnson (Louth); 3, Mr. Smith (Skegness). Rift Valley Cichlids: 1, Mr. Oiler (Kings Lynn); 2, M. Laws (Kings Lynn); 3, A. Frisby (Wyke). Sharks & Foxes: 1, A. Piggett (Grimsby & Cleethorpes); 2 and 3, T. Stanfield (Castleford). Fishers: 1 and 2, Mrs. Bee (Grimsby & Cleethorpes); 3, Mr. Newton (South Humberside). Small Anabantids: 1 and 2, Mr. Newton (South Humberside); 3, P. Matthews (Immingham). A.O.V. Anabantids: 1, Mr. and Mrs. Copley (Doncaster); 2, Mrs. Bee (Grimsby & Cleethorpes); 3, F. Wilson (Grimsby & Cleethorpes). Minnows & Danios: 1, S. Richardson (Wyke); 2, D. Colley (Sherwood); 3, S. Harrison (Grimsby & Cleethorpes). Raboas: 1, Mr. Bradley (Retford); 2, Mr. Daines (Doncaster); 3, Mr. Vernon (Idall). Toothcarps: 1, B. Sight (Mexborough); 2, S. Smalley (Grimsby & Cleethorpes). A.O.V. Tropicals: 1, A. Frisby (Wyke); 2 and 3, H. Plastow (Immingham). Breeders (Egglayers A & B): 1, S. Smalley (Grimsby & Cleethorpes); 2, Mr. Stanfield (Castleford). Breeders (Egglayers C & D): 1, Mr. Copley (Doncaster); 2, B. Sight (Mexborough); 3, Mr. Waller (Chesterfield). Breeders (Livebearers A & B): 1, M. Littler (Sheffield); 2, Mr. and Mrs. Copley (Doncaster); 3, T. Sands (Boston). Breeders (Livebearers C & D): 1 and 2, Mr. T. Sands (Boston). Pairs (Egglayers): 1, Mr. Bradley (Retford); 2, Mr. and Mrs. Copley (Doncaster); 3, B. Sight (Mexborough). Pairs (Livebearers): 1, Mr. and Mrs. Copley (Doncaster); 2, K. Prendergast (Boston); 3, Mr. and Mrs. Daines (Doncaster). Goldfish & Comets: 1 and 2, Mr. Waller (Chesterfield); 3, M. Gray (Wyke). Shubunkins & Fancy Goldfish: 1 and 2, Mr. and Mrs. England (Barnsley); 3, L. Wilson (Grimsby & Cleethorpes). A.O.V. Coldwater: 1 and 2, D. Jordan (South Humberside); 3, P. Matthews (Immingham). Juniors (Egglayers): 1, R. Stanfield (Castleford); 2, I. Bee (Grimsby & Cleethorpes); 3, K. & L. Oiler (Kings Lynn). Juniors (Livebearers): 1 and 2, W. Jordan (South Humberside); 2, Miss S. Sands (Boston). Plants: 1, M. Butler (Skeg-

ness); 2 and 3, K. Prendergast (Boston). Mini-Tanks: 1 and 2, Mrs. V. Lee (Chesterfield); 3, Mr. Barlow (Sheaf Valley). The Best Fish in Show Award was won by Mr. and Mrs. P. Gregory from Sherwood Society with a Parasitic Cichlid. Society with most points: Grimsby & Cleethorpes.

RESULTS of inter-club comp. between Novo A.S., Mount Pleasant A.S. and Priory A.S. Guppy Male: 1 and 2, A. Clegg (Novo); 3, G. Learoyd (Novo). Mollies: 1, K. Ring (M.P.A.S.); 2, D. Kirkup (M.P.A.S.); 3, J. Bloomfield (M.P.A.S.). A.V. Swordtail: 1, Mr. and Mrs. Embleton (Novo); 2, G. Quantrell (Priory); 3, D. Kirkup (M.P.A.S.). Platies: 1, G. Learoyd (Novo); 2, Mr. and Mrs. Embleton (Novo); 3, R. Kirkup (Novo). Small Barbs: 1, Mr. and Mrs. Risbridge (Novo); 2 and 3, Mr. and Mrs. Embleton (Novo). Large Barbs: 1, E. Conely (Priory). Small Characins: 1 and 2, M. Hall (Novo); 3, W. and I. Grant (Priory). Large Characins: 1, M. Hall (Novo); 2, Mr. and Mrs. Embleton (Novo); 3, B. Bryson (Priory). A.V. Labyrinth: 1, K. Dobbie (Priory); 2, P. Best (Priory); 3, R. Kirkup (Novo). A.V. Fighter: 1, Mr. and Mrs. Embleton (Novo); 2, G. Quantrell (Priory); 3, D. Kirkup (M.P.A.S.). Large Cichlids: 1, Mr. Caddle (Novo); 2, S. Todd (Priory); 3, K. Dobbie (Priory). Small Cichlids: 1, B. Turrell (M.P.A.S.); 2, D. Campbell (M.P.A.S.); 3, D. Hulme (M.P.A.S.). R.V. Cichlids: 1 and 3, T. Nixon (Novo); 2, K. Dobbie (Priory). Sharks, Labeo, Flying Fox: 1, W. and I. Grant (Priory); 2, J. Bloomfield (M.P.A.S.); 3, M. Campbell (M.P.A.S.). Rabora, Danio, Minnow: 1, K. Dobbie (Priory); 2, M. Hall (Novo); 3, Mr. and Mrs. Risbridge (Novo). R.L.T.C.: 1, Mr. and Mrs. Risbridge (Novo). Corydoras and Brochis: 1, Mr. and Mrs. Risbridge (Novo); 2, M. Hall (Novo); 3, Mr. and Mrs. Embleton (Novo). A.O.V. Catfish: 1, G. Quantrell (Priory); 2, W. and I. Grant (Priory); 3, D. Campbell (M.P.A.S.). Loach: 1, S. Todd (Priory); 2, R. Lawson (Novo); 3, M. Hall (Novo). Breeding Pairs Livebearer: 1, D. Kirkup (M.P.A.S.); 2, E. Conely (Priory). Breeding Pairs Egglayer: 1, E. Conely (Priory); 2, P. Best (Priory); 3, D. Campbell (M.P.A.S.). Breeders Class Livebearer: 1, A. Clegg (Novo); 2, D. Kirkup (M.P.A.S.); 3, W. Walton (Priory). Breeders Class Egglayer: 1, Mr. and Mrs. Risbridge (Novo); 2 and 3, B. Turrell (M.P.A.S.). A.O.V. Tropical Livebearer: 1, A. Clegg (Novo); 2, R. Kirkup (Novo). A.O.V. Tropical Egglayer: 1 and 2, M. Hall (Novo); 3, Mr. and Mrs. Risbridge (Novo). A.V. Coldwater: 1, Mr. and Mrs. Risbridge (Novo); 2, S. Todd (Priory); 3, D. Hulme (M.P.A.S.). Plants: 1, 2 and 3, W. and I. Grant (Priory). Best Fish in Show: M. Hall (Novo). Points Result: Novo A.S. 80 pts. Priory A.S. 49 pts. Mount Pleasant A.S. 23. 28 pts.

ELECTION of Officers of the New Forest A.S. at the annual general meeting was as follows: chairman: P. Norup; secretary: R. Travers. "The Bungalow", Ashley-Arnewood, New Milton, Hants BH25 5QA; treasurer: G. Edwards; show secretary: P. Wheeler; asst. show secretary: C. Head; committee members: L. Rickman, S. Harman, junior committee member: T. Mathews; auditor: J. Jeffery; librarian: P. Norup; public relations officer, R. Travers.

In his report the Secretary appealed to members to give greater support when visiting local Societies for quiz and table-shows. The Treasurer's report was satisfactory. The Show Secretary asked for continued support in entries for the monthly table shows, bearing in mind that some new valuable trophies had been donated for this purpose, during recent months. Award of trophies was—Tropical: Points: 1, J. Menhennett; 2, P. Norup; 3, R. Travers. Breeders Trophy: 1, S. Harman; 2, P. Norup. Coldwater Trophy: 1, L. Menhennett; 2, R. Travers. Home Furnished Aquaria Competitions: 1, P. Norup; 2 and 3, S. Harman. Champion Tropical: J. Menhennett. Champion Coldwater: L. Menhennett. Barbs Trophy: 1, R. Travers; 2, T. Mathews. Swordtail Trophy: 1, Mrs.

Laraman. Molly Trophy: 1, S. Harman; 2 and 3, T. Mathews; 2 and 4, R. Travers. The F.B.A.S. judge for the evening was Mr. Gerry Markum of Petersfield A.S. and in his comments on the entries, he said that several tanks had bubbles on the glass, and traces of stale food, and this could mean disqualification under F.B.A.S. rules. The Secretary will be pleased to welcome new members at meetings, held on third Monday each month.

A VERY interesting talk was given by Mr. A. Cavill to Taunton & District A.S. on Showing Fish and the Right Procedure to carry out at an open show. The Society would like to thank the proprietors of Furdon Guest House for donating a trophy for the table show, and it is to be called the Furdon Cup.

A table show was held of the following classes of Characin—Hyphessobrycon, Herotilapia, Cherodon—1, B. Guppy; 2 and 3, S. Jones; 4, B. Hancock. A.O.V. Characin: 1 and 2, R. Elliott; 3, D. Gillett; 4, G. Ward. Best Fish in show: Emperor, Tetra: R. Elliott.

RESULTS of the Midland Aquarist League Inter-Society Show at Leamington Spa—A. V. Rasbora: 1 and 4, G. Nesbitt (Nuneaton A.S.); 2, S.M.I.N. (Nuneaton A.S.); 3, B. Chittenden (Leamington & D.A.S.). A.V. Livebearer: 1 and 3, Mr. and Mrs. Underwood (Unit '59'); 2, S.M.I.N. (Nuneaton A.S.); 4, Mr. and Mrs. Ruel (Coventry Fishkeepers). Egg-layer Pairs: 1, F. Hurst (Coventry Pool & A.S.); 2, A. Maxfield (Leamington & D.A.S.); 3, Mr. and Mrs. Underwood (Unit '59'); 4, Mr. Sweeneyham (Rugby Fishkeepers). A.V. Catfish: 1, G. L. Brine (Nuneaton A.S.—Best in Show); 2 and 4, S.M.I.N. (Nuneaton A.S.); 3, T.S.F.N. (Coventry Pool & A.S.). Positions after the second of the four yearly shows: 1, Nuneaton A.S. (55 pts); 2, Unit '59' (54 pts); 3, Leamington & D.A.S. (48 pts); 4, Loughborough & D.A.S. (43 pts); 5, Coventry Pool & A.S. (40 pts); 6, Rugby Fishkeepers (25 pts). Individual Points Leaders: 1, Mr. and Mrs. Underwood (22 pts—Unit '59'); 2, S.M.I.N. (10 pts—Nuneaton A.S.).

NEARLY three hundred entries were received at the Trowbridge & District A.S. & P.S. open show. Results—B: 1, D. Goss; 2, D. Kenwood; 3, P. Lawrence; 4, R. Hollings. R: 1, T. Wines; Ca: 1 and 2, A. Chaplin; 3, T. Burville; 4, D. Parry. Bb: 1 and 3, P. Lawrence; 2, D. Kenwood; 4, D. Parry. C: 1, T. Burville; 2, A. Chaplin; 3, P. Lawrence; 4, P. Grist. Da: 1, P. Fitchett; 2, J. New; 3, J. McEhane. Db: 1, M. Butcher; 2, G. Palmer; 3, M. Almadi; 4, J. New. Dc: 1, M. Thomas; 2, E. F. May; 2 and 3, P. Fitchett; 4, J. New. E: 1 and 2, N. Wallage; 3, D. Clark; 4, D. Goss. Ee: 1, B. Burton; 2, M. Thomas; 3, J. Bennett; 1 and 2, R. Bond; 3, M. Almadi. G: 1, A. Chaplin; 2, M. Patrick; 3, F. May; 4, P. Taylor. H: 1, D. Parry; 2, D. Kenwood; 3, R. Bond; 4, P. Taylor. J: 1, D. Parry; 2, D. Goss; 3, R. Hollings; 4, G. Palmer. K: 1 and 4, D. Goss; 2, P. Lawrence; 3, R. Hollings. L: 1, D. Parry; 2, R. Collier; 3, A. Chaplin; 4, R. Patrick. M: 1, D. Parry; 2, D. Clark; 3, P. Lawrence; 4, N. Wallage. N: 1, J. McEhane; 2 and 4, B. Burton; 3, R. Bond. O: 1, M. Almadi; 2 and 3, F. May; 4, D. Clark. P: 1, M. Curtis; 2 and 3, S. Richards; 4, R. Barrett. Q: 1 and 3, D. Parry; 2, R. Collier; 4, W. Holland. R: 1, T. Burville; 2, P. Fitchett; 3, D. Kenwood; 4, N. Wallage. S: 1 and 2, A. Chaplin; 3, B. Burton; 4, N. Wallage. T: 1, D. Kenwood; 2, B. Burton; 3, A. Duffey; 4, P. Fitchett. Uad: 1 and 3, G. Axe; 2, M. Butcher; 4, B. Burton. Ubc: 1 and 2, G. Axe; 3, M. Patrick; 4, B. Burton. V: 1 and 2, G. Axe; 3, M. Curtis; 4, M. Wallage. W: 1 and 2, G. Axe; 3, R. Bond; 4, M. Almadi. XBM: 1, M. Thomas; 2 and 3, B. Burton; 4, F. May. XOT: 1 and 3, M. Thomas; 2, B. Burton; 4, P. Grist. Best Tropical Fish in show: African Characin (T. Burville). Best Coldwater in show won by Mr. G. Axe.

SECRETARY CHANGES
Blackpool and Fylde A.S. K. C. Smith, 14 Moss Bank Pl. Marton, Blackpool. Tel: 64840.

Priory A.S. W. J. Walton, 25 Rutherford St., High Howdon, Wallsend, Tyne and Wear NE28 0AW.

North West Cheshire A.S. J. V. G. Drake, 50 Curdiffe Close, Palace Fields, Runcorn, Cheshire WA7 2QJ. Tel: 09285-68250.

NEW SOCIETY

A new society has been formed called the **Ashby Fish Keeping Society**. It meets on the second and fourth Tuesday of the month at the Ashby Community Hall, High Street, Ashby, South Humberside. The meetings commence at 7.30 p.m. and any new members in the area would be welcome. The Secretary is Mr. R. E. Burman, 3 Beck Lane, Broughton Brigg, South Humberside DN20 0HR.

A new society has been formed in Stafford called the **Stafford Aquatic Society**. Meetings are held on the first and third Tuesdays in the month at 7.30 p.m. at the Stafford District voluntary Services at Chell Road. Anyone interested should contact secretary, C. Davis, 8 Castle Street, Stafford ST16 2ED.

If anyone would like to start a new society in the City of Bath. Please Ring Saltford 3228 when some assistance will be forthcoming.

MISSING TROPHIES

Once again the **Stroud and District A.S.** are appealing for the return of any of the fifteen missing trophies that are still outstanding from the 1976 show. These should be returned to C. P. Whitaker, 1 Springbank Middle Spring Roscombe Stroud Glos. Last years winners did not receive them and this year's show is to be held shortly.

The **Blackpool and Fylde A.S.** see still three trophies short from 1975. The society state that these were won by the Poulton Brothers but they do not have their address and the last they heard were that the winners were members of **Atlantis A.S.** The society would appreciate any help in recovering these trophies before this years show on August 8th.

AQUARIST CALENDAR 1978

1st July: Cardiff A.S. Annual Open Show at St. Margaret's Church Hall, Rother, Cardiff.

2nd July: Brighton and Southern A.S. Open Show at Portslade Town Hall, Victoria Road, Portslade, Sussex. Show secretary, M. Rooney, 66 Portslade Villas, Hove, Sussex. Tel: Brighton 411131.

2nd July: Blackburn Aquarist Waterlife Society Annual Open Show in the Windsor Hall, Blackburn. Schedules will be available shortly from the secretary, J. Oldcorn, Highridge, 4 Mollington Road, Blackburn, Lancs., BB2 6DG.

2nd July: The Chard and District A.S. will be holding its Fourth Annual Open Show at Furnham School, Chard, Somerset. Details from Mr. A. Griffin, 24 Thornton Road, Yeovil, Somerset. Tel: Yeovil 23231. Show schedules available end of April.

2nd July: Midland Koi Association Open Show at the Whitley Abbey School, Coventry. Schedules and further information from R. Casner, 8 Swinburne Road, Hinckley, Leics.

2nd July: Billingham A.S. open show.

7th, 8th and 9th July: Three Rivers Fish-keeping Exhibition to be held this year in the shopping complex Eldon Square, Newcastle-on-Tyne. Further details, contact Show manager, G. T. Liddle, 17 Palmerston Avenue, Walkergate, Newcastle NE6 4RD. Tel: 655794.

8th-9th July: Romford and Becontree A.S. Open Show (Dagenham Town Show) Central Park, Dagenham. Schedules (April): Mr. G. Sceptowe, 35 Conston Way, Elm Park, Hornchurch, Essex. Phone: Hornchurch 44057.

9th July: Lytham A.S. Annual Open Show to be held at Lytham Baths, Diccotson Terrace, Lytham, Lytham St. Anne's. Benching from 11.00 a.m. to 2.15 p.m. Further details and show schedules from: Show Secretary, P. Ham, 1 Windygrove Grove, Freckleton, Preston, PR4 1DE. Tel: Freckleton 633182.

9th July: Scunthorpe and District A.S. annual show. Trophies to be returned immediately to secretary, P. Battersby, 6 West View Yaddletorpe, Scunthorpe.

15th July: Goldfish Society of Great Britain general meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London, W.C.2.

16th July: Scarborough A.D.A.S. Open Show at Gladstone Road Junior School, Wooler Street, Scarborough. Schedules (March) from J. F. Richardson, 5 Keld Garth, Pickering, N. Yorks. YO18 8DG.

16th July: Sandgoose A.S. are holding their Open Show at Menis Cop School, Meols Cop Road, Southport. All enquiries to B. Baldwin, show secretary, 10 Olive Grove, Southport PR8 6BG.

16th July: SELAS Open Show at 141 Greenwich High Road, S.E.10. Enquiries to Mr. S. Jeffrey, 83 Alwood Crescent, Lee, S.E.12. Tel: 01-854 0262 (Asst.).

22nd July: Basingstoke and District A.S. once again this year are holding a specialist show for all livebearing fishes in the Carnival Hall, Basingstoke. Schedules from T. Fraser, 151 Culver Road, Basingstoke, Hants.

23rd July: Gosport and District Aquarist Society Annual Open Show at Crofton Community Centre, Stoughton, Hants. Show Secretary: Mr. G. Arnold, 83 Quinzel Avenue, Porchester, Nr. Fareham, Hants.

30th July: Dorchester T.F.S. First Open Show. Schedules available from Show Secretary: G. Fox, 4 Wanchard Lane, Charminster, Dorchester, Dorset.

30th July: British Koi-Keepers Society (East Anglia Section) Show will be held in the grounds of The Waveney Fish Farm, Diss, Norfolk (courtesy of D. Laughlin), and is open to all Koi-keepers. Benching closes at 12 noon. The public will be admitted as soon as benching finishes. Details from K. Groom, 24 Hunter Road, Norwich, Norfolk NR5 3PY.

6th August: Blackpool and Fylde A.S. Open Show at St. Kentigerna School, Newton Drive, Devonshire Square, Blackpool. Schedules from show secretary, Doreen Moxley, Flat 80, Foeshaw Avenue, Grange Park, Blackpool. Tel: Blackpool 36456.

12th-13th August: Kings Lynn A.S. will be holding their second Exhibition at the Youth Centre, Providence Street, off London Road, Kings Lynn. Trade stands, Fish displays, Auctions, Childrens competitions, Refreshments available. Opening times: Sat. 12th 1.00 p.m. until 8.00 p.m. Sun. 13th 10.00 a.m. until 5.00 p.m.

13th August: The Oldham and District A.S. Annual Open Show is to be held at Werneth Park, Oldham. Further information and show schedules can be obtained from P. Harris, 37 Droffield Road, Salford M7 7RA. Tel: 061-789 1757.

13th August: Grimby & Cleethorpes A.S. are holding their seventh open show at the Cleethorpes Memorial Hall. Benching from 12 noon to 2 p.m. Details and schedules available from the show secretary, Mrs. B. Mathews, 16 Swales Road, Humberston.

20th August: Stroud and District A.S. next open show at the Subscription Rooms, Stroud. Show manager, J. Cole, The Hill, Randwick, Stroud, Glos. Tel: Stroud 4504.

20th August: Stretdford and District A.S. Annual Open Show is being held at Baile Hill High School, Eccles Old Road, Salford. Details can be obtained from Mr. L. Evans, 67 Edgerton Road South, Chorlton, Manchester.

27th August: Long Eaton A.S. Open Show to be held at Gregory's Rose Gardens, Toton, Nottingham. Schedules available later.

27th August: Sunday Bank Holiday Redditch Third Open Fish and Reptile Show at the Abbey Sports Stadium, Birmingham Road, Redditch, Worcs. Organized by Delton Aquatic Society and Abel Morrell Aquatic Society incorporating International Herpetological Society.

"Gold Pin," Trades Stands, all day bar and refreshments, M.A.A.S. and I.H.S. Show Rules. Information Mr. P. J. Binsley, 612 Eversham Road, Crabbs Cross, Redditch, Worcs. or phone Redditch 42205 Evenings only.

27th-28th August: Great Yarmouth and District A.S. Exhibition 78. Tropical and Coldwater fish plus Society Tableau. Hopton Village Hall (on A12 between Great Yarmouth and Lowestoft).

28th August: Petersfield and District A.S. First Open Show at the Town Hall, Heath Road, Petersfield, Hants. Show Secretary, Mr. G. Stacey, 6 Highfield Road, Petersfield, Hants.

28th August (Bank Holiday): The Yorkshire Koi Society Second Open Show will be held at Harewood House, Nr. Leeds. Champion Fish plus the attraction of the House and Gardens. Trade stands will also be present.

28th August: Southport A.S. will be holding their second open show at the Oakleaf Hall, Formby British Legion Club, Whitehouse Lane, Formby.

2nd September: C.N.A.A. Welsh National Open Show at the Drill Hall, Park Street (near Bus and Rail, General Station), Cardiff. Details from C. Turner, 146 Arran Street, Rother, Cardiff. Tel: 498982.

3rd September: Bridgewater A.S. Open Show at St. Georges Community Centre, Kenyon Way, Little Hulton, Worsley, Manchester. Details from Show Secretary, M. Burgoyne, 15 Pansy Road, Farnworth, Bolton, Lancs. Tel: Farnworth 792263.

3rd September: Castleford A.S. Open Show, Castleford Civic Centre. Secretary: Miss B. Stansill, 4 Milnes Grove, Alredale, Castleford WF10 2E2. Tel: 559615.

3rd September: Bridgwater and District Aquarist Society. First Annual Show to be held at the Newmarket Hotel, Bridgwater, Somerset.

3rd September: Open Show in aid of 'Action Research for the Crippled Child' at Sberland Road Hall, Southmead, Bristol. Schedules: D. Chann, 28A Cavendish Road, Henleaze, Bristol 9. S.A.E. please.

3rd September: Wellingborough & District A.S. open show. Details from D. Thirkettle, 96 Grangeway, Rushden, Northants.

9th September: Hounslow and District A.S. Open Show at Hounslow Youth Centre, Cecil Road, Hounslow, Middx. Schedules obtainable from show secretary, Mr. A. Constantine, 77 Sparrow Farm Drive, Feltham, Middx. Tel: 01-751 0340.

9th September: Kingston and District A.S. Open Show. The venue will be The Raynes Park Methodist Church Hall, Worpole Road, Raynes Park, SW20. Judging will commence at mid-day.

9th September: Bristol A.S. Oren Coldwater Show. St. Ambrose Parish Hall, Srexford Road, Whitehall, Bristol 5. Schedules from W. G. Ham, 18 Imperial Road, Bristol BS14 9ED. Tel: 0272 776924.

10th September: Longridge and District A.S. second open show at Longridge Civic Hall, Willows Park Lane, Longridge, Preston, Lancs. (15 minutes from the M6). Details available later.

10th September: Huddersfield T.F.S. Open Show. Venue: Deighton Youth Centre. Show secretary, D. Hill, 30 Calandine Avenue, Salendine Nook, Huddersfield. Tel: Huddersfield 650437.

10th September: First Open Show of the Evesham Fishkeepers Society. Venue, Public Hall, Evesham, Worcs. Schedules available at a later date.

17th September: Whitby & D.A.S. Third Annual Open Show will be held at the 'Spa Pavilion', Whitby. Schedules will be available at a later date from the Show Secretary.

17th September: Wythenshawe and District A.S. Open Show at the Forum Hall, Civic Centre, Wythenshawe, Manchester.

17th September: Barnsley A.S. Open Show, Ardsley Oaks, Youth Centre, Doncaster Road, Ardsley. Please note change of venue. Benching from 12 (noon) to 2 p.m. Schedules obtainable from: Secretary, M. Whinley, 80 Crough Road, Hoyland, Barnsley. Tel: Barnsley 742646.

17th September: Hastings & St. Leonards Open Show at The Zodiac Centre, Priory Road, Hastings, East Sussex. Show Manager: Mr. C. Pannell, 9 Edwin Road, Hastings, East Sussex TN35 5JT.

17th September: Priory A.S. Tynemouth open show Schedules from W. J. Walton 25 Rutherford St., High Howdon, Wallsend, Tyne and Wear NE28 0AW.

17th September: Wyre Forest A.S. open show, details to follow shortly.

17th September: West Cumberland A.C. open show to be held at The Calder Club, Mirehouse, Whitehaven, Cumbria. Show secretary, C. M. Davison, 3 Wodow Road, Thornhill, Egremont Cumbria CA22 2SD.

19th September: Aireborough and District A.S. Autumn mini-show and auction to be held at Greenacre Hall New Road, Side, Rawdon Nr. Leeds; details from show secretary, Mr. P. J. Smith 10 Wynford Rise Leeds 16. Tel: 675712.

22-23-24th September: Grimsby & Cleethorpes A.S. are displaying a Tableaux Stand in The Hobbies For All Exhibition at the Memorial Hall, Cleethorpes.

24th September: Midlands Aquatic Study Group Open Show at the Cannock Community Centre, Avon Road, Cannock, Staffs, 37 classes. Judging to FBAS standards. Schedules available May from I. Fuller, 38 Cambrian Lane, Rugeley, Staffs WS15 2XH. Please enclose s.a.e.

24th September: Chesterfield and District A.S. Annual Show at Clay Cross Social Centre. Details from B. Boyden, show secretary, 229 Lockford Lane, Tagton, Chesterfield Derby.

1st October: Eboracum A.S. Open Show at Nunthorpe School, Scarcroft Road, York. Judging starts approx. 2.15 p.m. Show secretary: M. L. Nobler, 6 Bellhouse Way, Ainsty Park Hatfield, York.

1st October: David Brown A.S. Second Open Show. Held in the Works Canteen, David Brown Tractors, Meltham, Nr. Huddersfield. Schedules available July onwards. For details send s.a.e. to the show secretary, Mr. I. Sykes, 27 Penistone Road, New Mill, Nr. Huddersfield. Or telephone (0484) 43398.

1st October: Midland Aquarist League Open

Show, Loughborough. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.

1st October: British Killifish Association, Annual General Meeting with members table show and auction of fish and eggs. Enquiries to Mrs. B. A. Brown, Publicity Officer, 173 Parr Lane, Bury, BL9 8JN.

1st October: North Wilts A. S. Second Open Show at the Mechanics Institute, Emlay Square Swindon Wilts. Schedules from P. Taylor 7 Ridgeway Road Stratton Nr. Swindon Wilts. Tel: 0793-82-4114.

7th October: East London A. and P.K. Annual Open Breeders Show at Ripple Road School, Suffolk Road, Barking, Essex. Show schedules available later from show secretary, Mr. T. Waller, 1 Sparsholt Road, Barking, Essex.

8th October: Newbury and District A.S. Open Show at the Corn Exchange, Newbury. Schedules available from the Show Secretary, Mrs. S. Canning, 6 South End, Cold Ash, Thatcham, Berks. Phone No. Thatcham 64254.

15th October: South Leeds A.S. (SLAS) is holding its annual open show in Hunslet Boy's Club, Hillidge Road, Leeds, 10. Judging commences at 2.00 p.m., benching starts at 12.00 noon.

15th October: Darwin A.S. Open Show at the Darwin Tower Room (Town Centre). Details from Mr. M. Jones, 16 Eaton Street, Darwin, Lancs BB3 3JS.

29th October: Midland Aquarist League Open Show and Last Inter-Society Show of the Year, Rugby. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.

29th October: Doncaster and D.A.S. Open Show. Venue: Don Valley High School, Jossey Lane, Scawthorpe, Nr. Doncaster. Details from Show Secretary, Mr. B. Honnor, 57 Carr View Avenue, Halby, Doncaster.

5th November: Halifax A.S. Open Show at The Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Thirteen livebearer classes, plus eleven coldwater. Furnished aquaria, plants, etc. Schedules sent only on request. S.A.E. to: D. Shields, "Cobblestones," Gaimst, King Cross, Halifax, HX2 7DT, or ring for details Halifax 60116.

12th November: Bradford & District A.S. Open Show is to be held at Textile Hall, Westgate, Bradford 1. Schedules and other information can be obtained from Mr. J. Cornforth (Show Secretary), 15 Weymouth Avenue, Allerton, Bradford, West Yorkshire.

18th November: Goldfish Society of Great Britain general meeting, 2.30 p.m., Conway Hall, Red Lion Square, London, W.C.2.

18th November: Catfish Association Great Britain Convention at Aylward Lower School, Windmill Road, Edmonton, London N18. From Holland, guest speakers Dr. H. Niessen and Mr. I. Isbrucker. Tickets £1.50 from Gina Sandford, 5 Victoria Road, Earlswood Redhill, Surrey. Redhill 69339.

19th November: A.S.A.S. Convention Speakers D. Allison on Catfish, R. Roberts on Killifish 11 a.m. at Portsmouth Community Centre. Tickets 50p from G. A. Edwards 4 Hibberd Way, Bournemouth BH10 4EL (0202) 523746.

19th November: Northallerton and District A.S. Open Show. Schedules available later, Show Secretary, B. P. Summerscales, 97 Long Street, Thirsk.

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