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THE **AQUARIST**  
AND PONDKEEPER





# THE AQUARIST

AND PONDKEEPER

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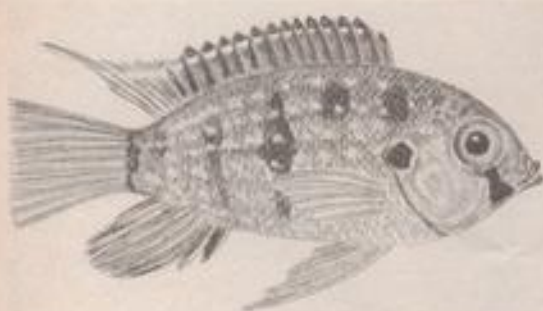
## OUR EXPERTS' ANSWERS TO YOUR QUERIES

### 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



*Pelmatochromis thomasi*

I have purchased a medium-sized cichlid called *Pelmatochromis thomasi*. Please give me some information about it?

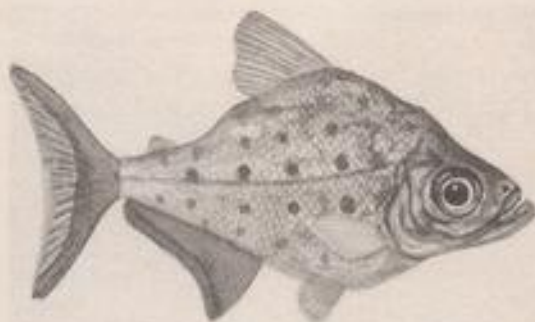
The fish you have bought is from Sierra Leone. The male attains a length of about 4 in., the female about 3 in. Young fish are rather colourless but as they increase in size both sexes become well marked in shining and muted tones of bronzy gold, green, blue, beige and red. The male is the more streamlined of the two and the lines of blue dots on his sides are very beautiful. The colours show up best when the fish are kept in peaty acid water. The sexes can be spiteful towards each other but almost always they leave other fishes of similar size alone. *P. thomasi* flourishes well on a mixed diet of whiteworms, gnat larvae, shredded red meat and flake food. A temperature in the middle to upper seventies (°F) is best.

Could you please identify two barbs I have just bought. The dealer called them two-spot barbs but they do not resemble in external appearance the two-spot barb (*Barbus ticto*) illustrated in my books. My barbs are more torpedo-like in shape

by Jack Hems

and coloured brassy to silver overlaid with green. A flame red band extends from about the eye to the tail. A black spot is present near the base of the dorsal fin. A similar spot adorns the caudal peduncle. At the time of writing the fish are about 2 in., not counting the caudal fin.

I feel certain that the fish you have is Puckell's barb or *B. puckelli*. This species from Africa is peaceable and very active in the middle and lower levels of the water. It has hair-fine barbels and well-defined scales. It eats anything taken by a non-faddy fish and has a life span of upward of five years. It is not faddy about the quality of the water but the temperature should be kept at about 75° F (24° C).



*Serrasalmus hollandi*

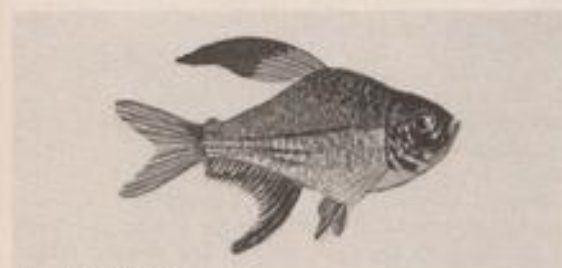
A friend gave me what he insisted was a young Natterer's piranha. I looked this fish up in my books. They describe this species as having a red anal fin and a red breast. My fish has a red anal fin but no red breast. Do you think I have a genuine Natterer's piranha?

Natterer's piranha (*Serrasalmus nattereri*) is rather variable in coloration, and the red in the breast does

not usually start to show until the fish has reached a fair size. If, however, your fish is more elongated in the body and the head than the *S. nattereri* illustrated in your books, then it is quite possible that you have a less common species (in the aquarium) of piranha called *S. hollandi*. *S. hollandi* has some greyish to blackish blotches on silvery sides, some red in the anal fin and a ribbon of grey to black extending round the base of the caudal fin. Another point, *S. hollandi* does not grow very large—perhaps 5 to 6 in. at most. *S. nattereri* reaches about a foot.

I set up a 3 ft. tropical aquarium about 6 months ago. Since then I have stocked up the tank with a number of different fishes which included 24 neon tetras, 2 sucking loaches, 6 glowlight tetras, 6 zebra danios, 6 penguin fish, 6 harlequin fish, 2 rams and some wasp gobies and swordtails. All went well until a few weeks ago, when fishes started to show injuries and die off for no apparent cause. Could you give me any explanation for the fatalities in my tank?

Firstly, you introduced far, far too many fishes into your tank. About 22 small fishes should have been about the limit. Also, it is always necessary to choose fishes that are genuinely peaceable and do not exceed—among a collection of smaller species—a length of more than about 2½ in. The so-called sucking loach often causes trouble in a community tank. As it increases in size it sometimes develops the nasty habit of clinging to the sides of certain fishes and inflicting wounds. Some male swordtails turn into spiteful bullies. Wasp gobies (better known as bumblebee gobies) are fin nippers. Rid your tank of the potentially dangerous fishes and I think everything will turn out right.



*Hypheosobrycon rosaceus*

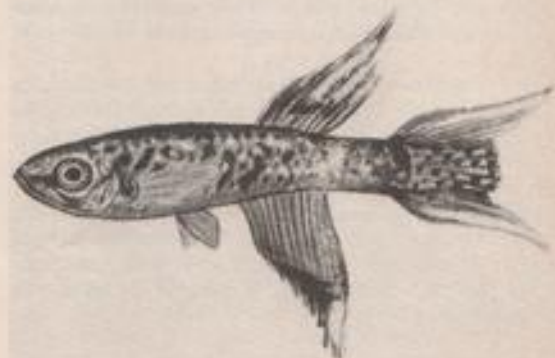
I should appreciate some information on the tetra known as *Hypheosobrycon rosaceus* or the rosy tetra.

This characin is native to Guyana and reaches a length of about 2 in. The male has a much larger and more pointed dorsal fin than that of the female. *H. rosaceus* calls for a well-planted tank and very clear peaty acid water. It feeds avidly on gnat larvae, whiteworms, crushed flake food and shredded meat

and usually haunts the middle and upper levels of the water. It is peaceable and adds much life and colour to a community tank.

I bought a pair of Mozambique mouth-brooders about a week ago and I am worried about the appearance and behaviour of the female. Seemingly she cannot close her mouth and refuses all food. The male hovers around and eats any food I drop in for her. Do you think the female is suffering from some disease?

I hazard the guess that the female is incubating eggs in her mouth. Isolate the sexes by inserting a sheet of glass across the middle of the tank or remove the male to fresh quarters. The fry should emerge from the mouth of the mother fish within the space of ten days.



*Aphyosemion australe*

What sort of tank makes a good home for a pair of *Aphyosemion australe*?

A tank about 18 in. by 10 in. by 10 in. would suit a pair. As always, however, a more spacious tank would be better. It should be filled with very clear peaty acid water. Some salt should be added. About a teaspoonful of ordinary cooking salt (not table salt with its chemical additives) to every gallon. Once salt is added, please no more. Illumination should not be bright, so plants that flourish well in subdued lighting are called for. Java moss (*Vesicularia dubyana*) is cut out for the job. The moss can be weighted to or pushed under well-washed grit carpeting the bottom. On top of this a thin scattering of well-soaked peat. This encourages the moss to grow. In time, the moss reaches the surface of the water. Hence it makes a good spawning plant for the cyprinodonts which prefer to deposit their eggs in feathery or finely divided plants well clear of the bottom. Temperature of the water should be maintained in the lower to middle seventies (°F). The tank should be kept properly covered with a piece of glass, for the fish are great jumpers.

**I have a pair of *Hyphessobrycon pulchripinnis* in breeding condition. If I introduce them into a prepared tank how many eggs do you think I can save if I remove the parent fish immediately spawning is over?**

As a rule some 200 eggs are released by a well-grown female in tip-top condition. You are almost certain to lose some of the eggs to the parent fish; for egg-scattering goes on, with occasional pauses, for some two or three hours. The best plan would be to sit watching the spawning take place for as long as you can and then, immediately the fish start to lose interest in chasing and pick at the plants remove them without delay to another tank. If you are fortunate you may save 150 fry.

**I should be most grateful for any information you can give me on the requirements of *Pangasius sutchi*.**

It is important to give this fish a few companions of its own kind. It often goes off its food and mopes if placed in a tank of "strangers". Two, three or more pangasius will play together and keep happy. It is, you see, a shoaling fish. It likes plenty of plants to explore and hide behind. It is active, but does have periods of rest when it lies up in corners or behind stones. It eats most things such as whiteworms, flake food, chopped earthworms, shredded red meat. A temperature of 75°F (24°C) suits it well.

**What can you tell me about the behaviour, maximum size, and breeding habits of *Herotilapia multispinosa*?**

This species (the only one in its genus) attains a length of about 4 in. and, for a cichlid, is quite mild mannered and seldom or never causes any trouble in a fair-sized community tank stocked with fishes of about its own size. Breeding in captivity is quite common but sexing is difficult because both male and female look much alike. A female in spawning condition does, however, look more bloated than a male of similar size. *H. multispinosa* is quite tolerant of plants.

**I have been told that the oscar will spawn and raise a family in almost any sort of water. Is this true?**

This oscar is not faddy about the water it lives and breeds in provided it is neither unreasonably hard and alkaline nor too soft and acid. It is of supreme importance though that the water is kept clean and well oxygenated. Bear in mind that a healthy oscar is a glutton for food and its eating habits and copious

waste products soon muddy its aquarium. Hence an efficient filtering system is important.

**My heated aquarium of 24 in. by 15 in. by 12 in. houses a population of 3 angel fish, 10 neon tetras, 2 mollies, 2 platies, 2 guppies, 1 loach, 1 red-tailed shark and 2 dwarf gouramies. My problem concerns the angels; their black stripes fade right away every so often. A fellow aquarium keeper told me that angel fish lose their dark stripes after a fright, but surely my three fish are not experiencing a fright at such frequent intervals? Please tell me what is wrong?**

The black markings do come and go more in some angel fish than in others. As a rule, the black stripes are more likely to remain intact if there are plenty of plants along the back and ends of the tank. For heavy plantings mean easy access to shade and shelter which gives the fish a sense of security. I hasten to point out, however, that you have too many fishes in your tank, and angel fish do like peace and quiet. Again, you failed to mention the scientific name of your loach. Some species of loach can be great tormentors and bullies of other fishes. If your tank is thinly planted make good the deficiency. Otherwise leave well alone.

**I bought a noticeably pregnant lyre-tail molly from my local aquarium shop and after introducing her into my tank she became very mopy and refused food. Eventually she delivered several dozen fry and now both mother and young seem perfectly all right. Do pregnant mollies always become quiet and moody before giving birth to young?**

All female mollies should be handled with care when carrying young. Advanced pregnancy is denoted by very distended sides. At this stage the female fish should not be scared by netting or removal to another tank; for no matter how carefully the catching is done any shock at this time is likely to result in premature births, too many deformed young or death of the female. I repeat: always treat a pregnant molly—or any other female livebearer—with loving care and attention. Give the fish plenty of fine-foliaged plants to hide in and a non-fluctuating temperature in the upper seventies (°F).

**Please can you supply me with the scientific name, temperature requirements and maximum size of the pearl sucker cat fish?**

I believe I am correct in stating that the scientific name of the pearl sucker catfish is *Ancistrus hoplogenyis*. This South American species has a range of temperature from about the middle sixties to the middle eighties (°F) and reaches a length of about 5 in.

# COLDWATER QUERIES

by Arthur Boarder

I have a tank, 30 × 12 × 15 inches with two lionheads, one oranda and a fantail. I bought a male moor and when I put him in the tank he chased and butted the other fishes until they became quite distressed and I had to remove him. I waited a day or two and then tried him again but the same thing happened. The fish already in the tank are much smaller than the moor. Is there anything I can do?

It is obvious that your original fishes were not ready to spawn, perhaps not old or large enough. It is not a good idea to put a large fish in with smaller ones and if your small fishes were not ready to spawn then the chasing could injure them. You may have to wait until the winter before you can put the large fish back. One idea you can try is to place a sheet of glass in the tank as a partition and secure it with longitudinal halves of rubber tubing. Put the male fish in one part so that he may get used to seeing the fish but not reach them and after a time the glass can be removed to see if it has had the desired effect. When spawning takes place in a pond there is usually plenty of space for the female fish to escape from the too fierce attentions of the male fish and water plants in which they can hide. In a comparatively small tank this is not possible.

We have a tank, 3 ft. × 12 in. × 18 in., with some moors, orandas and fantails. We have only had the fish for a few weeks and we have now found two anchor worms on one of the moors. Shall we have to disinfect the tank and how did the fish become infested?

It is probable that the fish was infested when purchased. The anchor worms, *Lernaea* are actually crustaceans and the ones on the fish would be females. They have a bunch of eggs on their rear end and from the eggs hatch out tiny nauplii. These can swim around to find a host and can spend some time in the gills of a fish before maturing. It is probable that if you see that there are more pests on any of the fishes you may be able to empty and disinfect the tank and then have no further trouble. Keep a watch on the fish and if any more pests are seen they should be removed with tweezers after first touching them with neat T.C.P.

I have a tank, 24 in. × 12 in. × 15 in. with an undergravel filter. Is there any way of calculating the number of fish which this tank will

hold or does one stock it with fish until it looks as though there are too many fish?

It would be quite wrong to stock the tank as you suggest; what might appear all right to one person could be very different to another. The safe stocking rule to adopt, whether there is a filter or an aerator, is to allow an inch of body length of fish to each 24 square inches of surface area of water.

Is it possible to keep such fishes as:—gudgeon, bleak, bream, perch, and crucian carp with goldfish? If so where can I get them? I have a tank, 24 in. × 12 in. × 15 in. in which to keep them.

I do not think that it would be a good idea to try to keep the fishes you mention with goldfish in a tank. Some of them could be kept with goldfish in a garden pond but in a small area it would be quite different. The perch is carnivorous and so would eat any fishes smaller than itself. The bream is not a good fish for a tank and could grow very large. The bleak prefers a river and may not remain healthy in a tank for long. The gudgeon is mostly a bottom feeder and not a very good subject for a community tank. The crucian carp would be all right but could soon grow too large for your tank. I think that it will be better to stick to varieties of goldfish as they can make a very attractive group. The address of a supplier is added.

Is it wise to cross breed varieties of fancy goldfish? I have various coloured orandas and calico globe-eyes?

It is not a good idea to try to cross any of the fancy varieties of goldfish. If you do you are likely to get many odd shapes which would not be worth the food they ate. It is difficult enough to breed a goodly number of good quality fancy goldfish without mixing them up deliberately. It is surprising how many different types one can get from a very good pair of fancy goldfish without mixing them up further. I have included an address from where you can get the fish you require.

Could you give me some idea as to why two small goldfish I gave to a friend died within a few days? They were healthy when I gave them away.

It is quite impossible to say why the fish died without further information. The water in the new pond may have been polluted or the fish may have received

some damage when they were caught or being transferred to the other pond. It is very easy to remove some of the mucus protective covering when netting a fish. Once the covering is disturbed it will not take long for disease or pests to take a hold on a fish. Many would-be aquarists and pondkeepers go wrong by not taking the trouble to find out something about fishkeeping before obtaining any fish. There are plenty of books about on the subject and some could be obtained from a library if necessary. Many people only seek advice when it may be too late to solve a problem.

**I have recently constructed a concrete pond and have some koi, shubunkins and orfe in it. They appear to be healthy but often rub themselves against the sides of the pond or around the pipe of a fountain. I cannot see any white spots on them. What do you think is the matter with them?**

There may be nothing the matter with the fish but it could be the condition of the water. There may be some free lime in the water from the concrete and this will incline the fishes to rub as you describe. Any lime in the water can upset the fish very quickly. I suggest that you empty the pond, scrub it round well and refill then after a couple of days, repeat the process and then all should be well. Fish will sometimes act as you describe when they are infested with flukes, but there are usually other signs as stated in my book.

**A short time ago I turned from tropicals to coldwater fishes. I set up a tank with some moors and fantails and these are doing well. I then got the book "Coldwater Fishkeeping" and the G.S.G.B. standards book. I have since spent a lot of cash travelling to dealers to find at least a few fancy goldfish nearing the standards quoted, without success. I accept that the usual pet shop would not be likely to provide me with good specimens but why is it that I just cannot find any fancy goldfish remotely resembling the standards?**

As I have stated before there seems to be a dearth of good quality fancy goldfish around but I am enclosing an address from where you should be able to get the fish you require. For many years the large majority of fish fanciers have concentrated on tropicals and so there was not sufficient call for good quality fancy goldfish. Now my correspondence proves to me that there has been a large turn-over from tropicals to coldwater fishes but unfortunately the dealers have not yet realised what is happening. It is not easy to either obtain or produce good specimens in a short time, but the breeder I am recommending you to contact deals in and breeds only coldwater fishes, and so I feel confident that he will be able to supply you with your needs.

**I have been keeping tropicals for many years but have decided to turn over to keeping coldwater fishes owing to the high cost of electricity. I have a tank, 4 ft. x 15 in. x 12 in. and think of getting a pair of fantails, veiltails and shubunkins. Do you think this will be all right?**

Your tank will hold about 26 inches of body length of fish. Your choice should give an attractive tank but you could add a pair of moors to make a contrast in colour. I am not surprised that you have found electricity too expensive. I have had very many aquarists writing to me with the same trouble. Many appear to object to the added cost of fuel (coal) with which to make the electricity and one suggested that the next thing will be that the tailor will charge fifty pounds to make you a new suit and add ten pounds for the cloth with which to make it.

**I would like to know more about the young goldfish and other inhabitants of my pond. Is it possible to have a feature on this in The Aquarist?**

Articles are published at intervals on the various aspects of pond keeping but a very good way of finding out all about the maintenance and breeding of fish in the pond, as well as other inhabitants is to get my book, "Coldwater Fishkeeping" as advertised in The Aquarist.

**I have a pond 20 ft. x 9 ft. by 18 in. and keep koi and golden orfe in it. I run an aquarium air pump continuously but still cannot keep the water clear. What should I do to improve matters?**

An aerator is not likely to keep the water clear but you might need a filter. However, a lot depends on the number of water plants you have. These play a very important part in keeping the water in good condition. The use of an under-gravel filter as you suggest might be all right but the base of the pond could hold the secret of its success. If there is a lot of mulm or mud at the bottom, this would soon clog up the filter and any undue movement near the bottom would also stir up detritus. One good method is to have an external filter, such as a large drum with an outlet near the base. This could be partly filled with filter material and a pump provided at one end of the pond to run the water into the drum and the outlet running the water back at the other end of the pond. By this means you may be able to create a steady movement of water from one end of the pond to the other. The fact that the drum is above the water will make it much easier to clean it out when necessary. Your pond is rather shallow to house koi through a bad winter.

I have a depression in my orchard which looks as if it may have been a pond at some time, I am thinking of remaking a pond there and it would be about 20 ft. in diameter and 5 ft. deep. Cattle would not be able to get to it, but sheep might and I think that they could damage a plastic liner if I used one. Could I make it or line it with clay, which is available?

I do not think the sheep would damage the liner if you covered the overlap with slabs or large stones. It is usual when lining a pond to have the overlap covered with concrete slabs not only to secure it whilst the pond is being filled but also to make a good firm path to walk around on. If you do try clay then you must use a good layer and bring it well up above the intended water level or you could get a leakage near the top. As you suspect that there was once a pond at the site it should not be difficult to remake it. Some goldfish would do well in the pond, but if you use clay then leave the pond for some days after making so that the water clears.

I am unable to make a pond but have a bath, 54 in. x 24 in. x 20 in. which I intend to sink in the garden. How many bunches of oxygenating plants shall I need? How many water lilies should I plant? Would Hornwort flourish without being planted in a pot of soil? Would the white colour of the bath upset the fish? Would the bath freeze over in winter and should I cover it then?

The bath will not be likely to house a water lily, although if you really need one, you might try one of the Pygmaea types of *Nymphaea*. Hornwort would be all right for the bath and need not be set in a container with soil. This plant makes no roots and so the best method to adopt when introducing it to a tank or pond is to place a few cuttings in a plastic net bag, (as used for oranges), add a large stone and throw the lot into the water. The plant will send out shoots through the bag and the stone will prevent the lot from rising to the surface. You could cover the bath in severe weather to prevent severe freezing of the surface. The white colour of the bath would not affect the fish for long as it would soon become green with algae. At first it could cause the fish to turn pale, as it often happens that if a fish is taken from a pond and placed in an all glass tank, it will lose much of its colouring. However, I do not think that you need to worry about the fish in your bath.

I have experienced difficulty in feeding goldfish fry. I have used hard boiled egg but it seems to become fused together in the water and rubbery so that the fry cannot eat it. Can you inform me as to the best method of feeding goldfish fry?

I do not like hard boiled egg, as having tried it once very many years ago, I found that the fry developed fungus within a few days. I have found the following to be an excellent method to use. Add Liquifry to the hatching tank two days before the fry are due to hatch. A day or so after hatching, add some more. Then add a little each day and if you have a garden pond, add some of the water if it is at all green. Then as the fry grow add some powder-fine dried food which can be bought at a pet shop. As the fry grow you can add some mashed garden worm or white worm, sifted through a fine net to remove large pieces. From then on gradually increase the size of food as the fry grow. The times to add food to the tank will depend on the temperature of the water. If it is about 70 F, (a very good one), then the fry will grow quickly and need more food, but if at about 60 F, then hold back the larger food for a time. Warmer water may need some aeration.

I have a tank, 20 in. x 12 in. x 10 in. and would like to know how many fish I can keep in it. Do I need a filter and aerator. I already have a lamp. I can obtain common goldfish and mollies locally and wonder if they would agree as they would make a good contrast in colour?

Your tank will hold ten inches of body length of fish. You will not need a filter nor an aerator as long as you do not exceed the recommended stocking. Mollies are not for you as they are tropical fish and require a higher temperature than do goldfish. If you want black fish then get moors as these are cold-water fancy goldfish which will live with ordinary goldfish.

I am setting up two tanks for my living room but I find that the temperature of the water in them is now 68-73 F., and wonder if this is too high for coldwater fishes, as I have read in some books that this is so?

The stated temperatures will not be too high for fancy goldfish. They will welcome this warmth and after all, many outdoor ponds are as warm or warmer than this in the summer months. The fish will enjoy the warmth and grow faster if fed well. However, you must realise that the warmer the water the less oxygen will it hold. Do not over-stock your tanks with fishes. The 24 in. x 12 in. x 15 in. will hold 12 in. of body length of fish if 12 in wide and 15 in. of fish if 15 in. wide. It is usual to state the length then the width and lastly the depth of a tank. The other tank will hold 10 in. of fish as it is only 10 in. wide.



After a warm, sultry night recently I found 3 Orfe and 2 Koi dead in the morning. I have no pump in my pond but all the fish have been alright until that night. There is plenty of oxygenating plant in the pond so, although I have added a few fish this season, I do not think that shortage of oxygen was the cause and I would be pleased to have your advice.

You did not give the size of your pond or number of fish but it is fairly certain that your Orfe and Koi died through lack of oxygen. During the hours of daylight oxygenating plants give off oxygen but during the dark, night hours this process is reversed and the plants give off carbon dioxide. Fish need oxygen at all times and warm water contains less oxygen than cold water, so with a mass of plants releasing carbon dioxide and nothing providing oxygen a critical period is reached, often proving fatal to fish. Had you been up earlier you would probably have seen the fish gasping on the surface and may have saved them by spraying the pond with water from a hose. If your plants have grown, plus the fact that you have added fish without providing any means of aerating the water, (especially during warm nights that can be expected in late summer) then I believe you have had to learn the hard way, that fish have needs that must be met if they are to survive and the most important of these is well-oxygenated water.

I hope you will consider a pump next season, especially if you hope to keep Koi or Orfe, and that if you are not in a position to run it all the time you will remember that the hours of darkness are more dangerous in terms of oxygen-deficiency than the day time because it is always bad news to lose fish that were healthy.

**I intend to build a pond about 10 feet by 8 feet and hope to keep Koi but not having the earlier issues of "The Aquarist" I am confused about the construction of filters. Can you help with the specifications and what is meant by 1/2 inch screen gravel? Also, do you know of any books you can recommend for a "Koi starter?"**

You can make either an external or under-gravel filter for your pond and I recommend an u/gravel filter situated in the shallower part. From my own experience over several years these are remarkably efficient and trouble-free. For the size of your pond your filter should measure at least 20-25 square feet but can be any shape. The deeper area should be at least 4 feet to protect the Koi from rapid fluctuations

in temperature which are harmful, and ideally a bottom drain should be fitted to remove the dirtiest water. Generally, 1/2 inch screen gravel means what it implies, namely that the stones are about 1/2 inch in size, this can be ordered from any builders merchant who can usually supply the plastic pipe needed to construct the filter. I have sent you a leaflet, also the names of two books on Koi and where they may be obtained. Joining a Koi Society has the advantage of being able to meet and exchange opinions with others in the hobby.

**As my pond is only very small I recently decided to empty and clean it before the winter. The plastic liner was brittle so I replaced this and also the foam in the filter, both items were bought in my local market. The following day 2 small Koi were dead and 2 others died later; as they were quite alright when they were returned to the pond can you say why they died?**

It appears that your Koi were poisoned and either the new plastic liner or plastic foam could have been a source of trouble. Cheap plastic sheeting may contain additives that are toxic to fish and the foam may have been chemically treated, possibly to make it flameproof, it is impossible to say. I am sorry of course to hear of your misfortune after your good intentions but it illustrates the need for care when buying items for use with fish. Most of us need to economise, but clearly it pays to buy safe products from specialist suppliers and I have sent you the names and addresses of two. At this time of year all ponds should be kept as clean as possible, quantities of settled mulm, leaves etc. must be removed to ensure that the Koi will safely overwinter in clean conditions. Partial water changing should continue but can be reduced depending upon the temperature and behaviour of the Koi, as long as they are feeding the water must not be allowed to become polluted or foul through neglect.

Observation is all important, never overfeed, or offer any food when falling temperatures are forecast or the Koi show no interest. Only small quantities of food that sinks should be given during cold weather and any left after a few minutes should be removed. As a general rule Koi should not be fed when the temperature of the water is below 45°F, digestion is slower and indigestion can cause problems including swim-bladder trouble when the Koi cannot maintain its normal, swimming position but may turn on its side or sink to the bottom.



### Water hardness

In July issue of *Aquarist* there was an article Aquatic Chemistry (3) by Dr. P. A. Lewis. In it there were some slight errors which could mislead the readers (this may well be printing errors).

1. Definition of German system quoted "The German system uses the symbol DH and expresses hardness as parts per million calcium oxide (CaO)." \*However the German system expresses hardness as parts per hundred thousand calcium oxide (CaO).

However in the article the factor to convert 1 DH to p.p.m. was correct.

2. At the beginning of this section the article states, quote "The British and American system is to express hardness as parts per million calcium carbonate (CaCO<sub>3</sub>), this gives a value for the number of parts of calcium carbonate hardness present in a million parts of water under test." And then goes on to say, quote "whereas 1 British or U.S. degree is equal to 14.3 p.p.m. CaCO<sub>3</sub>."

\*The article states that the British system is p.p.m. CaCO<sub>3</sub>, but then says the British system equal to 14.3 p.p.m. CaCO<sub>3</sub>. Written another way the article implies the 1 p.p.m. CaCO<sub>3</sub>.

Yours faithfully,  
Roy Mathers,  
29 Hawarden Road,  
Hope,  
Wrexham,  
Clwyd LL12 9NL.

I am grateful to Mr. R. Mathers of Wrexham, Clwyd for bringing to my attention a series of anomalies in my article, Aquatic Chemistry (3) relating to water hardness. It would appear that, in attempting to present a simplified summary of the methods of expressing hardness, I only served to add to the confusion. Hopefully the following paragraph will achieve what I set out to do initially and give a simple account of the systems, old and new, for expressing hardness.

Three different systems exist for expressing the hardness of water. They are:

1. *Parts per million (p.p.m.) calcium carbonate*: expressed as the number of parts of calcium carbonate in a million parts of the test sample.

2. *English or Clark degree*: expressed as the number of grains of calcium carbonate in one imperial gallon

of water i.e. parts of calcium carbonate in 70,000 parts of the test sample.

3. *German Degree (DH)*: expressed as the number of parts of calcium oxide in 100,000 parts of the test sample.

Because of the fact that the German System uses calcium oxide not calcium carbonate as the factor for measurement and also that the English System uses a weight/volume relationship the three systems are not directly comparable. For all practical purposes:

1 English degree = 0.8 DH = 14.3 p.p.m. calcium carbonate.

1 German degree = 1.25 English degree = 17.9 p.p.m. calcium carbonate.

Dr. P. A. Lewis,  
Brighouse,  
Yorks.

### Ameca splendens

STR.—In reading the excellent article by Mr. Dawes on the Livebearer *Ameca splendens* I feel I can fill in some of the gaps from my own personal experience with this species. I was one of the first to obtain these fish in Scotland early last year, one pair about 1 and 1½ inch long. I placed the pair in a 12 in. × 12 in. × 2 ft. tank and fed them both heavily with all kinds of live foods. The pair did not take long to respond to this first class menu. They grew rapidly and reached a good size in only 5 weeks. I first suspected the female was gravid by the ever increasing girth around the ventral opening; they show no gravid spot. Nearing the stage for delivering her fry, the female took on a shape like a fat torpedo. The girth of the fish made it difficult for her to swim properly. I removed the male at this stage because of his insistence on mating and he was obviously tiring her out. The fry were dropped early one morning. The female was lying in one corner of the tank looking like a deflated balloon and not making much of the whole thing. The fry, 22 in all, were around ½ in. long and all swimming above the Java moss I had in the tank. The female at the time of giving birth was 2½ in. These fry grew very quickly on live foods and were sexable at about 4-5 weeks old, and were able to breed at about 10-12 weeks old. I must add at this stage, it is very difficult to get the female looking like a good specimen after giving birth. Even feeding heavily on white worm, it took about 8 weeks before I could put her back beside the male. Since my first successful breeding of these fish I have had much larger batches of fry, 45 being the most from one very good 3 in. long fish. I have noticed that individual males have a different colour on the reflective scales; some are a distinct blue/green and others are a brilliant gold. I have produced well in excess of 300 fry from my original pair. I personally believe that given good conditions and a good menu these fish can produce even more than my 45 from the one female. And not the tiny

amount widely reported at between 7 and 10. I have one female 3½ in. long and a male 2½ in., this being my largest pair. As a footnote: the *Goodea atripinnis* produce even larger fry ½ in to ¾ in. long at birth. I hope you can make use of this account of my experience with *A. splendens* at some stage in your magazine.

All the best.

GEORGE L. KANE,  
161 Beatty Crescent,  
Kirkcaldy,  
Fife, Scotland.

#### Cost increase

Since you printed my letter in your readers letters column in January this year, I have been able to help many hobbyists out by making replacement Diatom Filter bags for them. These as you know are unobtainable in any shop now. Unfortunately, owing to the increase in the cost of bag material, I have had to increase the price of a reconditioned bag to £3, p & p included. This is unavoidable as I am having to pay the price asked for material. Would hobbyists please note also my new house number. Number 1 not number 12 as before. I would also like to remind those who wish replacement filter bags, that it is essential that they send me the bakelite cap and nylon mesh inner securely packed please, I would be grateful if you could print this letter in your readers letters column please. Thanking you,

Yours sincerely,  
Mr. B. J. Stone,  
1 Horsecroft Close,  
Orpington,  
Kent, BR6 0RA.

#### White worms

Although not a dedicated breeder of tropical fish, I have had some success with Siamese Fighting fish, blue and gold Gouramies, etc., and persuaded the Paradise fish and Dwarf Gouramies to build a nest and to lay eggs, but never managed to raise the young.

It was, therefore, with regret that I heard that Mr. E. Arnold, who advertised "I've got millions" in *The Aquarist*, had passed away, especially as some of his Microworm and White worm cultures had kept my baby fish growing for years.

It appears to be quite difficult, this far north, to obtain microworm cultures, but I've several lots growing well now, and would be quite willing to pass a few cultures on to other enthusiastic breeders, if you wish. I must however say, as a working man with a very full time job, I could never hope to follow Mr. Arnold's boast of having millions.

Yours faithfully,  
ROY H. SHACKLEFORD,  
2 Cromwell Crescent,  
Carlisle CA3 9NN.

#### OBITUARY



**JIM  
BUTLER**

It is with deep regret that we have to report the sudden death of one of our oldest and best known colleagues.

James (Jim) Butler was born in 1907, the son of a police superintendent, raised within the sound of Bow Bells and was in every sense a true Londoner.

He first joined Buckley Press Ltd., publishers of 'The Aquarist', in 1925 and stayed with the Company until 1941 at which point he was called to service with the Royal Artillery Regiment with whom he saw active service in Europe during the Second World War.

Demobbed in 1947 he returned to Buckley Press as Advertisement Manager for 'The Aquarist' and in 1951 was a member of the committee responsible for initiating the first 'British Aquarists Festival' which, as everyone knows, has been a major annual event in the aquarists' calendar ever since.

Jim Butler was a very sincere and forthright man and a true friend to those closest to him. He was passionately interested in sport with a particular bias towards athletics, an activity at which both his children excelled.

Prior to his retirement from Buckley Press, after 51 years service, he had for some years been involved with various other publications produced by the Company, but in spite of this, never lost interest in 'The Aquarist' or the Pet Industry. His consistent enthusiasm and roguish sense of humour earned him the nickname of 'Peter Pan of the Pet Trade'.

He was a great 'character' who will be sorely missed by all who knew him and we extend our deepest sympathy to his wife Frances, family and many friends on this most sad occasion.



## THE WATER SOLDIER

by Philip Swindells

THE WATER SOLDIER, *Stratiotes aloides*, is one of the most distinctive and useful hardy floating aquatic plants for the garden pool. A widely distributed native of Europe and north-west Asia, it produces dense rosettes of dark green spiny leaves reminiscent of a pineapple top. Its creamy-white flowers are produced throughout late summer either solitarily from the leaf axils (female) or in clusters in a pinkish papery spathe (male).

In plants growing in their natural state only those producing female flowers occur in the northern area of distribution, while those in the south are exclusively male and both kinds occur equally in the intermediate zone. The female form is therefore the one growing wild in Britain, however, as cultivated *Stratiotes* have been collected from different sources in years gone by it is possible to obtain male plants from a commercial

source.

Not surprisingly, in view of the curious distribution of the sexual forms of the water soldier, seed is not considered as an important means of reproduction, this being performed admirably by long wiry stolons bearing young plants which arise from the swollen leaf bases of mature adult plants. Under cultivation these can be detached as soon as manageable, and indeed during their young life can be used with considerable effect in the coldwater aquarium.

Generally the plants, in common with other floating aquatics, float during the spring and summer months but remain submerged throughout the winter. However, the buoyancy of *Stratiotes* in the summer is thought to be additionally affected by the changes in the concentration of calcium carbonate on the leaves.

# BREEDING HALF-BEAKS

by Ernest Boughton

HAVING for some time had the wish to try to breed those quaint fishes—half beaks (*Dermogenys pusillus*)—on 18th April 1978 I was in the local aquarist's shop, selling some young angel fishes, and saw that he had some in stock. So I bought four, hoping to find at least one pair.

My reference book is "Innes" 1959 edition which has a minimum of information on half-beaks and so had several books in the public libraries.

I put the fishes in a 16 in. × 8 in. × 8 in. tank with the surface of the water half covered with riccia and the four inmates immediately took cover. They came out when all was quiet but dashed back at any movement.

Feeding was the first problem to be solved and, as they didn't eat flake food while I was there, I looked round for some live food. In the cold weather of April there were no greenflies about and very few other small insects. However, in the greenhouse, where my very small breeding establishment is housed, there were ants. The half-beaks ate these with great gusto, whether I was there or not. Most of the ants were alive and I suddenly thought of the formic acid which might build up, both by biting and ingesting, so I rang a scientific friend who didn't know either but rather agreed with me. He did, however, provide me with a fruit fly culture.

One fish died on 25th April and another on the 26th but I had stopped feeding ants by then and had put some *daphnia* in the tank. Owing to the waxy nature of the *daphnia* shells some usually float.

The feeding of winged fruit flies is almost impossible as for every one that stays on the water surface ten fly away. Again my friend turned up trumps with some wing-less flies which only jump and mostly are eaten. By this time the remaining two fishes were less shy, were growing and eating some dry food and *daphnia*.

By the second week in May one fish was growing

faster than the other and was less shy so I hoped I had a pair. This became obviously so by the end of the month, the thinner and smaller fish having brighter blue edging to his fins.

The first young one appeared on 2nd June and on the following day there were three. By 2nd July there were thirteen but the number in the tank fluctuates and I assume that the adults eat some young. The final figure of young by 1st August was twenty two, then production stopped.

The courting is somewhat similar to many fishes, swimming alongside each other with plenty of "wagging" of bodies and fins and they also turn at right angles for a session of beak rubbing. In the mating the male turns over slightly, so that the vents come close, with his tail and end of body curved partly over the female but not so much as can be seen in white cloud mountain minnows.

The details, then, are as follows: The young, when produced, are almost half an inch long, larger than guppies; they grow quickly and at one month old are about one inch long; they will eat fine, flake food, greenfly, rubbed dried *tubifex*, mites off the top of white worm cultures, small mosquito larvae, small *daphnia* and probably almost anything floating and suitably sized. When the food falls they snatch at it and can be further stimulated to feed by blowing gently on the water surface to move the particles about.

The adults soon become tame and eat almost anything floating. I have even persuaded them to take white worms from tweezers. They are rather immobile and only show speed when fed with fruit flies or similar attractive animals. On several occasions I have accidentally dropped tweezers or my metal food grater into the water without any disturbance and they can be touched with the finger without showing interest. Perhaps it is more correct to say that they are apathetic rather than tame and I can't see their ever being in the "top ten" popularity list.

# YORKSHIRE AQUARIST FESTIVAL 1978

THE 4TH Yorkshire Aquarists Festival, held at Doncaster Racecourse, on Saturday and Sunday, 19th-20th August proved yet again, to have increased in popularity, and number of visitors attending.

Many people were arriving in cars and coaches, well before the time of opening, at 9.30 a.m. on the first day. It was the kind of opening day which all organisers must pray for, bright and sunny, with ever increasing numbers of people queuing at the ticket offices. The Hall very quickly filled with visitors, and with many an admiring comment, they commenced their tour of the Society Tableaux Stands. Once again, the Aquarists involved in the creation of these, had surpassed themselves, and the Panel of Tableaux Judges were faced with no easy task.

Bridlington's highly ingenious "Oil Rig," was an outstanding example. Beautifully made, and with



The winning Tableau from Bridlington A.S.

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A section of the Exhibition Hall

every conceivable detail of the real thing. It took a very well deserved 1st place, along with a cash prize of £80. York were placed 2nd, with a very attractive "Paddle Boat" and Wyke Show Society, only formed this year, made their debut with a very nicely designed and well finished "Barge," which took 3rd Place.

Half Moon, A.S. from the Tyne and Tees area, were placed 4th, with a "Hovercraft", and Mexborough came 5th, with their "Mac-U-Plane", which appeared to be a cross between a Flying Saucer and a Discotheque, with a Robot driving it, and many flashing lights and electronic gadgets.

Skegness, I thought, were very unlucky not to be included in the list of winners. Their "Windmill", was a very realistic model, with sails turning, and grain elevators working, etc. A fine example of the ingenuity which some of our Aquarist Members possess.

Goole had a rather novel idea, which depicted a floodlit "Football Match", using fish for the players, referee, and linesmen.

Darfield's "Dalek", was one of the smaller Tableaux, but nevertheless, was extremely well made and finished, as also was Sheaf Valley's old time gramophone, "His Masters Voice".

As for the remainder of the 22 Tableaux entries they all reflected great credit on the hard working members of the Societies which took part in this event.

Without the variety and many different ideas carried out in the form of these Tableaux, our Yorkshire Festival would undoubtedly lose a great deal of its attraction. To the ones not in the winning list, I can only say, on behalf of the Y.A.F. Committee, "thank you for your support, without which there could be no Show, and we wish you better luck next time."

The 28 Trade Stands at the Show were well stocked with a wide variety of Fish, Plants, etc., and traders were reported to have been very busy during the whole period of the Show.

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# From a Naturalist's Notebook

by Eric Hardy

AFTER "Green Lizzie", concocted by conservationists describing research on the last sand-lizards on Southport's Ainsdale dunes and Hesketh gold-course, one finds the otherwise admirable Audubon Society coining "Santa Cruz Sally" for the endangered Santa Cruz long-toed salamander. Its last few marshes lie a few miles apart in Santa Cruz County, on the Californian coast. Now it has "SPs"—salamander protection districts, where all new curbs and gutters must be rounded, building sites must be passable for crawling salamanders, grading and vegetable removal must be minimized and retaining walls gently sloped as salamander-ramps. Another excursion into the vernacular was in the trade journal *Fishing News* last July, which captioned a "bitch dogfish" for the female.

In Britain, of course, we have so few of those creatures, with a somewhat disastrous season for sand-lizards and a good one for natterjack toads in 1978. Keith Corbett phoned me recently about his interest in the natterjack colony at Sandscale Haws, on the Cumbrian coast at the Duddon Estuary. I was in north Scotland, in Easter Ross, where the night stays light. Up the steepening slope to Ben Wyvis it was interesting to find this unusually turfy mountainside with its boggy burn illustrating the height to which common frogs ascend when conditions are suitable. Here on the Little Wyvis side I encountered them up to nearly 1,000 metres, for of course in southern Europe they are more montane than lowland creatures, the latter in the Pyrenees being longer-legged. There they often reach the snow-line.

Still interested in the distribution of grass-snakes in Scotland where Hawksworth's 1974 *Changing Flora and Fauna of Britain* (Systematics Association) states they are absent, I was intrigued by occasional specimens found over the past 2 years in the vicinity of the ruined Cromarty Castle. Like the records I mentioned the other year from Lomond and East Fife, these could be escaped pets. The slow-worm, which I found up Strath Farrar, is more widespread in Scotland. Grass-snakes continue to thrive on the Salop/Montgomeryshire border. A friend at Llanelwedd, Dyserth Drive, Welshpool reported "dozens" were in and around his garden this past summer, while another friend continues to find them along the Shropshire Canal from there to Newtown.

The recently published 103-page, illustrated guide to *The Brecon Beacons* national park (HMSO £1.25) includes a short account of its reptiles, amphibians and fishes. Adder and grass-snake are both included. The Welsh name *pydru ser* or "star rot" or "star-slime", popularly linked with shooting stars, is given to the decomposed gelatinous lining discarded from the oviducts of frogs and toads, after birds, etc., have eaten them. The palmate newt occurs, not unexpectedly from its montane habits, at 1,950 ft. in Llyn y Fan Fawr. Great crested newts are unknown in Brecknock though all Wales is marked for them in Arnold & Burton's *Field Guides*. The Wye marks the western limit in the natural distribution of several British fresh-water fish, pike, perch and roach being much commoner in Wye than Usk. But such differences in the distribution of carp and grayling are due to their monkish origin, for neither is native. Dace, equally abundant in Wye and Usk, becomes scarcer westwards in Glamorgan rivers. Llangorse Lake is rich in dragonflies and ponds in the park share with North Wales and the New Forest the few known British haunts of the scarce bluetailed damselfly, *Ischnura pumilio*. Its British breeding haunts are not confined to two sites, as the guide book states. There are 3 more in Wales, (Dyfed and Gwynedd) one in Cornwall, 2 in south Dorset and 6 in Hampshire. The common golden-ringed dragonfly, *Cordulegaster boltonii* ranges to 2,000 ft. at Craig Cerrig-gleisiad. Medicinal as well as horse leech occurs in Llangorse Lake and blind white crustaceans inhabit limestone caves in the Tawe and Neath valleys. One might add that the Ostracod bivalve shellfish *Cypridopsis subterranea* and Britain's only cave isopod or hog-louse *Proasellus caviticus* occur numerously in the water in parts of the Ogof Ffynnon Ddu cave at Glyntawe in Brecknock, while the rare cave-mite *Rhagidia odontochela* was found in Ogof Cynnes in 1968. Alpine aquatic plants like quillwort grow at 1,900 ft. in almost barren mountain tarns like Llyn y Fan Fawr and Llyn Cwm-llwch. Llangorse Lake is the only rich haunt of water-plants with bogbean, great spearwort and fringed water-lily as well as true yellow and white water-lilies.

In contrast, the larger new guidebook to *The Pembrokeshire Coast* national park (HMSO £1.95) confines its skimpy notes on fauna to birds and

mammals. Yet there are interesting stocks of adders feeding on lizards, including the "little red viper" which the late Gerald Leighton's book on British reptiles inclined to favour as a separate species, a theory now dropped. Nor is there much given in the way of aquatic plants, though royal ferns grow in moist seepage parts of precipitous cliffs from St Bride's Bay to Cemais Head, and the rare floating water-plantain, *Luronium natans* grows with lesser bladderwort, bog-St Johnswort and pillwort in the Dowrog and Trefeiddan pools. Marsh-helleborine orchids grow in dune-pools at Freshwater West. Dunes near Newport and Parrog share with west Cornwall the only British haunts of bright pink tufts of perennial centaury, *Centaureum portense*. One might add the only Welsh site for fibrous tussock-sedge on Dowrog common, where long and round-leaved sundews grow, as well as lesser bladderwort and other aquatics. Tenby Burrows shared with Gower dunes Britain's only haunts of the bog or dune-gentian, *uliginosa*.

Bog-plants in other parts of Britain have their ups and downs. In Scotland recently I found that the bog where the rare yellow-spotted white alpine butterwort *Pinguicula alpina* formerly grew, on the Black Isle of Easter Ross, is drained and that it is believed extinct at its only other British haunt, the mostly drained away Moss of Achter flow, Belmaduthy, Easter Ross. A small area being conserved at the latter, at 500 ft., an acid heathland with some calcium-rich runnels, has an interesting flora with globe-flowers, broad-leaved cottongrass, alpine bistort and alpine meadow-rue, plus 9 sedges and several orchids, including lesser twayblade.

I've seen the large-flowered *Pinguicula grandiflora* flowering in sheets of violet on the famous weeping wall (of dripping, shaded moss), at Lisdoonvanna in County Clare; but it was introduced there from the bogs of Kerry and Cork. It is also naturalized at Tremethick Moor near Penzance and in Randnor and Cardiganshire.

Water-life in Scotland is often linked with hydro-electric schemes, water-abstraction and land-reclamation. One plan for a river-regulating reservoir on the Duneaton and Crawick waters high up the Clyde would allow 150 million gallons a day to be abstracted at Bonnington, resulting in a high river level with less shingle-bank in summer above this point, but a low level for a longer time below it than formerly, and the Clyde Gorge more often empty. A new reserve at Falls of Clyde along the edge of the gorge above New Lanark and opposite the Corehouse reserve has a very high woodland with clubmoss, cat's ear and purple saxifrage. Five sedges, including the hammer-sedge *hirta*, scarce in north Scotland, quaking grass, globe-flower and marsh-orchids are amongst plants in the Brerechan Meadows reserve in the

Tarvie Estate, Strathardle, Perthshire, between A924 and Brerechan Water.

From the Highlands to the slag-heaps of Wigan! Population-explosions occur among marsh-orchids when their minute, long-living seeds, 60,000 to a capsule, find moist clay in railway-cuttings, or basic lime or calcium carbonate in industrial rubbish-tips. Dr. Ray Gemmell told me of 3 more near Wigan where thousands of Spotted, Early, Northern and Southern, and Helleborine marsh-orchids are increasing annually and hybridising—Wigan Power-Works' tip, Kirkless Lane blast-furnace slag at New Springs, and a clay-pit in a barley-field between Coppull Moor and the railway.

Tropical and temperate species of prawns have been reared in heated effluent water from Hinkley Point Power Station, Somerset. Success with the common prawn of our rocky coast pools, also with Canadian spot prawn and Malasian giant freshwater prawn at the Conway experimental station tanks, by J. W. Wickins and T. W. Beard, has resulted in a most interesting 41 page Laboratory Leaflet 42, *Prawn Culture Research* (MAFF, Lowestoft). Many who keep marine aquaria will learn much from this new publication. 10 species of prawn and shrimp were eventually used, allowing selected breeding females to spawn in the dark in isolation, stimulated by well-aerated sea-water 2 to 3 deg C and 2-4% higher salinity than normal. These were in concrete tanks 2.9 x 1.6 x 0.6 m deep, some only 0.36 m deep.

Weaned larvae were then transferred to concrete tanks, 2.9 x 1.6 m with 0.6 m of water, and cultured for 4 months until females matured for spawning. The water, receiving 16 hrs of natural and artificial light a day, was circulated through a biological filter and foam-separator, renewing 40% of the water weekly. Eggs were collected by flowing water at night through a mesh screen. During 11-12 days culturing, when cannibalism is frequent if larvae of different ages are mixed, salinity was reduced gradually to 25‰. The first stages were fed with unicellular algae, *Tetraselmis* (cultured in glass flasks) and later with brine-shrimps (nauplii or larvae) though the latter will eat the algae if together. The post-larval prawns were then weaned from newly-hatched brine-shrimps to prepared or pelleted foods, and finally fed with fresh mussel and frozen shrimp. Unlike fish, prawns break up food outside the mouth and any excess leads to decomposing remains, unless removed along with excreta. Switching on room lights can cause panic damage. Poor quality water or faulty nutrition leads to moulting difficulties. *Penaeus merguensis*, the Australian banana-shrimp, matured in 4.5 months, but with another 1½ months attained greater size and fecundity. Philippines jumbo prawn, *P. monodon* was outstandingly successful and easy to handle.



# FEEDING

# FISH

by Dr. Christopher Andrews

Technical Consultant, TetraMin (UK) Ltd.

## Introduction: the variety of feeding habits

FISH OCCUPY most of the watery habitats of the world. For example, the cold waters of the Antarctic are home for the Ice-fish (*Chaenocephalus*), a fish whose blood is prevented from freezing by the presence of a unique form of anti-freeze. In sharp contrast, the Pup-fish (*Cyprinodon*) lives in the hot springs of the North American desert, where water temperatures may reach a staggering 49°C (120°F). As a result of the variety of habitats that fish fill, they show an immense diversity of feeding habits, made possible by the evolution of a range of jaw, mouth and other structures. In Lake Victoria over 170 species of Cichlid have a spectrum of feeding habits: some feed on snails and other molluscs and have strong, blunt crushing teeth, others have chisel-like teeth and feed on algae scraped from rocks, whilst another group have wide jaws with small teeth and prey on the eggs and young of other fish. Some Cichlids (along with certain South American Characoids and a few marine fish) even feed to a large extent on the scales of other living fish.

Fish may be divided into *herbivores* (plant eaters) and *carnivores* (meat or animal eaters), though most eat a little of both and are called *omnivores*.



Omnivorous fish include the Carp (*Cyprinus*) and the Roach (*Rutilus*) from our local waters. These cyprinid fish have throat or *pharyngeal* teeth that grind up their food as it passes to the stomach. Many of the common pond and aquarium fish are also best termed omnivorous. Relatively few fish are strict herbivores. Many fish that appear to be largely or wholly herbivorous, accidentally ingest a variety of small insects, snails, etc. as they feed on water weeds. The Silver carp (*Hypophthalmichthys*) is an unusual herbivore that filters tiny algae that are suspended in the water using specially adapted gill structures called *rakers*. Under certain circumstances these fish may be of use in controlling algal blooms. Carnivorous fish may be divided into those that feed on small invertebrate organisms (such as worms, snails, water fleas, insects, etc.), and those which are more voracious predators (feeding on other fish, frogs, small birds, etc.). Fish that feed on snails and other animals that live amongst the weed and bottom mud often have sensory *barbules* around their mouth. One extreme example of this type of fish is the Elephant fish (*Gnathonemus*). This fish probes the floor of its African home for food: using a specially adapted sensory "snout". Fish that live in more open water

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situations may filter water fleas using their gill rakers, in the way described for the Silver carp. The more predatory carnivores often have strong jaws and teeth to hold and tear at their prey. A shoal of Piranha (*Serrasalmus*) can strip the flesh from a Capybara (a large South American rodent, about the size of an Alsatian dog) in just a few minutes. Other predators that swallow their food whole (eg. Pike, *Esox*) may have an especially muscular throat and stomach wall, to contain the struggles of their prey.

#### Digestion of food

From the above it should be clear that when food is eaten by fish it may arrive in the stomach whole, or in small crushed or torn pieces. The general structure of the digestive system is similar in most fish, though the degree of development of each part may vary considerably. Digestion begins in the stomach with the secretion of acid digestive juices. In the predatory fish the stomach is often large and well defined, whilst in herbivorous fish (or some omnivores) it may be less distinct and lead gradually into the intestine. In the intestine the acid stomach secretions are neutralised by alkaline juices and enzymes. Because plant material is less easily digested than animal material, the intestine of herbivorous and omnivorous fish may be ten or more times as long as that of carnivorous fish of the same size.

As food passes along the intestine it is digested by the various secretions. The products of this digestion are absorbed into the blood system of the wall of the intestine and distributed around the body, for use, storage or modification. Excess or indigestible food may be voided with the faeces. It is important to remember that fish are cold blooded animals. Their bodily functions (including digestive processes) are largely determined by environmental temperatures. As temperatures increase fish are more active and need more food. The ability to digest food also increases, so a goldfish at 25°C can digest its food two or three times as fast as at 12°C.

#### A Balanced Diet

We have seen that fish have varied feeding habits. Even one species of fish may feed on many different organisms at different times of the year, or at different stages in its life history. What are the components that go to make up a healthy balanced diet?

With the recent surge of interest in Carp and Trout farming, much information is being accumulated about the precise nutritional requirements of these fish. In general terms, a balanced diet should contain proteins, fats, carbohydrates, vitamins and minerals, all present in the correct amounts.

Proteins are complex compounds that are essential for the growth of young fish, and the repair of damaged or worn out tissues. They may be supplied from

animal (eg. fish meal) sources or plant (eg. soya meal) sources, though the former may be more easily digested by some fish. Fish cannot store protein, so it is important that their diet contains a continuous, adequate supply. Many commercial brands of fish food contain somewhere between 20-45% protein. Fats and carbohydrates occur in a variety of forms (oils, cereals, etc.), and are important as energy producing foods. Should the diet be too rich in either of these two nutrients the excess may be stored, and in extreme cases this may have serious side effects. Vitamins and minerals needs only to be present in relatively small amounts, though they are essential for a healthy, balanced diet. Vegetable foods are a good source of vitamins, whilst minerals such as calcium and phosphorus are present at trace levels in a variety of foods.

#### Nutritional Disorders

It was stated earlier that a balanced diet contains certain nutrients, *present in the correct amounts*. This latter phrase is very important, since too little or too much of some foods can cause problems. For example, too little protein in the diet will adversely affect the growth rate and breeding success of fish. In contrast, too much carbohydrate or fat (perhaps aggravated by the lazy, well fed life that many aquarium fish may lead) can produce fatty infiltration of the internal organs. Excess fat invades the liver and other visceral organs. The fish so affected may become noticeably more susceptible to some infectious diseases. The effects of mineral or vitamin deficiencies have been relatively well studied in fish. A diet with too little vitamin A (or carotene, its starting derivative) may cause poor growth, swollen and cloudy eyes, and an accumulation of fluid in the body cavity. Lack of vitamins of the vitamin B group may cause stomach, intestinal or nervous disorders, adversely affect growth and lower resistance to disease.

#### Feeding Pond and Aquarium Fish

Having considered some of the background to feeding and nutrition in fish, let us relate this to the care of pond and aquarium fish. Taken from their natural or semi-natural home, fish become largely or totally dependant upon us to provide them with a balanced diet. Under confined conditions it is difficult if not impossible to duplicate the variety of foods that they may have eaten whilst in the wild. Therefore many aquarists turn to dried, prepared foods, offering their fish live or fresh food only occasionally. However, it is not simply a matter of convenience that most aquarists rely to a large extent on prepared foods. They can be of extremely high quality and, of course, free from disease organisms, toxic substances, etc. Many brands include staple diets, to which may be added growth foods, colour-

promoting foods, vegetable conditioners, and the like. Used regularly, these provide variety to the diet, and also promote good growth rates, vibrant colouration and resistance to disease.

Examples of nutritional disorders have been given above. The importance of correct feeding and nutrition to pond and aquarium fish cannot be overstated. It not only reflects in the health, appearance and overall vitality of fish, but also results in an attractive, well balanced aquarium or pond. The most important rule when keeping fish is *do not overfeed*. In the wild many of the commonly kept aquarium fish may feed almost continuously throughout the day. Transferred to an aquarium and offered food once or twice a day can hardly be regarded as satisfactory. Experienced aquarists will be familiar with the *little and often* routine. When offered dried, prepared foods (which are comparatively *concentrated* compared

to natural, live foods, which may be 75% water) the fish will often eat enough to satisfy their immediate appetite, leaving any excess food to foul the tank. It is therefore particularly important (especially when keeping small Barbs, Tetras, etc.) to offer small quantities of food 4-5 times daily. The food that is put into the tank should be completely consumed in several minutes, or you may be overfeeding. Consequently the fish should rise eagerly at the next feeding, and their tank or pond appear well balanced and free from pollution. One day per week it is a good idea to miss a feed, as this will keep the fish and the tank in peak condition. Over the weekend or even week-long holidays I always prefer to fast my fish, rather than rely on well meaning, though often over-enthusiastic neighbours and friends. Healthy, well cared for fish will come to no harm if not fed for this period of time.

## BOOK REVIEW

**A Key to Adult Males of British Chironomidae.**  
by L. C. V. Pinder (2 vols, illust by Angela M. Matthews,  
Freshwater Biological Association, £4.50).

Why be interested in the Chironomidae? They form the smoke-dance of non-biting midges whose larvae, most numerous of freshwater insects, replace earthworms on mountains and range from soft-water butts to bird-baths; from Regents Park lake to aristocratic Blagdon, converting organic detritus into food for fishes and aquatic insects as an important part of freshwater economy. Some haunt the tidal salt-marshes of Sheerness, others hot springs, icy arctic waters, caves, even oceans and sewage-farms where they effect an important filter-balance.

Called bloodworms because most are red with haemoglobin, which stores oxygen to survive long periods in muddy bottoms without oxygen (some are olive), they wriggle to the surface at night to replenish it. They undulate their bodies for a current of water for respiration (dissolving oxygen through their tail-skin) and to bring food, filtering detritus and plankton in a salivary net across their tubes. Other mud-dwellers ingest mud without a filter; some mine leaves of Potamogetons, water-soldier, reeds and reedmace and some sewage-farm larvae feed carnivorously on eggs and larvae of moth-flies, other newly hatched bloodworms, or cocoons of earthworms.

Though some have popular names like the plumed midge (the anglers' golden dun midge) named from the feathery antenna distinguishing the male, harlequin-fly (in sewage-beds), green midge and olive midge, some 440 British species make identification even with a microscope a skilled and often lengthy task. Hence the importance of these new volumes, with keys and drawings based largely on the hypopygium, the curving tip of the male's abdomen. The

long-legged adult fly or "buzzer" which skims about the surface and sometimes "rises" before the sun in slow reaches and slack water, is not such important fish-food as the wriggling pupa, hanging head-first on the surface-film before emergence, or the larva suspended at night head down. These larvae grow by moulting. The head-capsules of their cast skin, as well as pupal cases, often litter the shore and accumulate in pond-sediment, revealing as at Malham Tarn the change of species as food and other factors changed in the long history of the lake.

Using these keys is a formidable task. At the quickest these flies need examining beneath a low power dissecting microscope. Dissection is often necessary to obtain finer material. Collected specimens are killed in 70% alcohol, chloroform, amyl acetate or a volatile fluid. Microscope specimens are mounted in euparal, or in dimethyl hydantoin formaldehyde resin directly from the alcohol without further dehydration, while berlese fluid has further advantages. A detailed account of their external anatomy includes the important diagnosis of wing-pattern (often all that can be teased out of the food-pulp in a swift's or swallow's throat), as well as leg-segments. First they have to be separated from other confusing Diptera or two-winged flies, like the Phantom Midges, *Chaoborinae*.

The key could have included more synonyms, like *Tendipes*, used instead of *Chironomus* by Walshe as recently as 1951, and it would have added value with some notes on distribution or emergence-periods, *Metriocnemus hygroptericus* flying mainly in winter, for instance. The author is making a reference collection of named larvae for a future key. The male of *Zavrelia marmorata*, the only member of its genus, is unknown. There is much scope for the enthusiast, for whom these two volumes are essential.

ERIC HARDY

# AQUATIC CHEMISTRY (5)

by Dr. P. A. Lewis

ICHTHYOPHTHIRIASIS, "Ich" or White Spot Disease, is probably the most common disease of freshwater and marine fish of both temperate and tropical waters. Caused by the invasion of the epidermal layers of the body, fins and gills of a fish by the ciliate protozoan '*Ichthyophthiriasis multifiliis*' the infection is essentially a cool water disease with the parasite being most active at temperatures below 80°F. In fact, the optimum temperature range for the parasites well-being is from 70 to 75°F; optimum also for keeping the majority of tropical fish. In order to fully understand the disease and the way we, as aquarists, may go about its treatment I would like to first describe the life cycle of the parasite.

The first stage in the parasite's life cycle is to seek out a suitable host, since without a host the parasite will rapidly perish. On finding a host the parasite penetrates the layer of body slime and into the upper or epidermal layer of the skin. Here the parasite feeds on red blood corpuscles, damaged tissue and body fluids. The presence of the parasite results in irritation of the host with the result that the host reacts by formation of a bladder or skin blister which covers the area of irritation and the white spot parasite. (This can be compared with the reaction of human body tissue when it forms a "water blister" over a splinter or foreign body in the skin). Thus the bladder or "white spot" is formed by the host in reaction to the movement and irritation of the parasite and not by the parasite itself. After an appropriate period, 3-4 days at 70-75°F, the parasite becomes fully grown and bores through the covering epidermal blister and leaves the host for reproduction. At this stage in their life the parasites are 0.2-0.5 mm. in diameter and are visible using a low power microscope. The mature parasite then secretes a soft, jelly-like covering about itself and in so doing forms a protective or reproductive cyst. In this cyst the parasite undergoes rapid sub-division where as many as 1000 daughter parasites can be formed. At 70-75°F this process takes 18-22 hours. When sub-division is complete the cyst ruptures and releases the invasive or tomite stage of the parasite

(0.03-0.04 mm. diameter). Thus, each young parasite goes in search of a host and the life cycle begins again. At 70-75°F this young parasite has a life of 2-2½ day and if it cannot find a host during this period it will not survive. In a closed environment, such as the aquarist's aquarium or pond, the parasites re-infect the fish again and again in ever increasing numbers until the fish becomes so weak that it dies as a direct result of parasite infection or as a result of a secondary infection, e.g. fungus, which will attack the weakened fish.

## Gooseberry

When examined under the microscope the adult parasite's shape and appearance can be likened to that of a gooseberry. The body is covered with a large number of small hairs (cilia) and it is by moving these hairs that the parasite is able to propel itself through the water with a "rolling" movement. Characteristic features of the parasite are the crescent shaped nucleus (heart) and the tube like mouth.

At temperatures of 70-75°C the whole life cycle of the parasite takes from 3-5 days but at 50°F the cycle is very much extended and can take as long as 5 weeks to complete. It is this variation in the rate of development of the parasite which has rendered treatment of "Ich" difficult and has often necessitated prolonged treatment programmes, particularly with coldwater fish.

To prevent your fish from succumbing as a result of a massive infestation of "Ich", the prime rule to remember is that fish kept in optimal conditions will have a high resistance to the disease and will rarely suffer as the result of a minor infection. Generally, fish have a high resistance to parasite diseases provided they are not suffering from overcrowding, inadequate food or feeding, lack of oxygen or unsuitable tank temperatures. Introduction of the parasite into an otherwise healthy tank can be avoided by quarantining both plants and fish prior to introduction and by feeding live food, e.g. *Daphnia* and mosquito larvae from a source in which no fish are present. Generally,

the parasite will only be found in water where there are fish and, conversely, *Daphnia* and mosquito larvae will not be found in waters rich with fish.

#### What treatment?

Supposing all else fails and you are faced with an outbreak of "Ich" in your aquarium or pond, or, hopefully more likely, suppose the fish in your quarantine develop "Ich"—what means of treatment are available to successfully eradicate the parasite?

Fortunately there are available many methods of attack although some are more effective and practicable than others. A number of the earlier methods of control leave me wondering where the originator of the treatment got the inspiration. For example, Messrs. Harvey and Hems in the 1948 publication entitled "The Goldfish" cite a reported case of "Ich" treatment using a layer of sieved rotted sod on the aquarium floor. (They also state that other workers had no success with this method).

Elevation of temperature is often cited as a treatment for "Ich" the theory being that with temperatures above 85°F the oxygen content of the water is greatly decreased and the parasites die through lack of oxygen. Unfortunately, treatment by this method has not given reliable results and can often have a greater detrimental effect on the fish than the parasite. One possible exception is the treatment of infected labyrinth fish by this method, since labyrinths can breathe atmospheric air they are more likely to withstand any treatment which results in a decrease in the oxygen content of the water. Reportedly the reproductive cyst of the parasite is able to withstand temperature as high as 90°F—another reason why this heat treatment is unreliable.

#### Chemicals

The majority of alternative control methods available all rely on chemical treatment to destroy the parasite. Before continuing to exemplify chemical methods, I would like to stress 3 points: firstly, always follow any dosage instructions to the letter—a "kill or cure" approach will nearly always result in the former. Secondly, as far as my research has shown, there is no chemical available that will kill the "Ich" parasite in the skin of the fish without considerably damaging the fish. This second point arises out of the fact that the fish has produced a protective blister about the irritating parasite and chemicals are unable to penetrate this blister. Finally, since only the free-swimming or encysted parasites respond to chemical treatment, any treatment employed must be employed over a suitable length of time dependant upon the temperature and consequent life cycle of the parasite. As a result of this third point the majority of treatments employed involve keeping the fish in permanent contact with the chemical until all traces of the parasite are removed.

One of the earliest and most frequently used methods of treatment involves the use of Methylene Blue, its use being first described in 1936 by Van Duijn Jnr., the noted Dutch biologist. The actual chemical concentration used to destroy the parasite varies dependant upon the source of the chemical and concentrations ranging from 2 parts per million (ppm) to 5 ppm have been shown to be effective without damaging the fish. To achieve this dosage, make up a stock solution containing 1% of the pure chemical and add 0.5 ml. per gallon of aquarium water for each 1 ppm dosage level, e.g., 3 ppm would require 1.5 ml. of stock solution per gallon of aquarium water. The main advantages of this method is its low fish toxicity and low cost. The fact that the chemical is inactivated by absorbing onto organic detritus present in the tank can be minimised by cleaning the tank before treatment and by increasing the dose slightly or prolonging the treatment. A major disadvantage of this treatment is that methylene blue will colour the water dark blue and can have an adverse effect on the growth of plants. If methylene blue is used ensure that the zinc-free form of the chemical is purchased since any zinc added to the aquarium will have a toxic effect on the fish.

#### Quinine

Quinine, used as the hydrochloride at a concentration of 10 ppm, has been successfully used as a treatment for "Ich". This chemical is most effective at a pH of 6.5 and used in a clean, unplanted tank. I personally use this treatment for stubborn cases of "Ich" and normally remove the infected fish to a small 5 gallon tank containing part fresh water and part water from the infected tank at 75°F. I then add quinine hydrochloride over the course of 12-15 hours to build up a concentration of 15-25 ppm. The fish is then fed only live food during a treatment period of 1-2 weeks dependant upon the severity of the infection. After the treatment period I slowly change the water over a period of 2-3 days before returning the fish to a community tank. The disadvantage of this type of treatment is that the original infested tank has also to be treated in order to destroy the parasites present in the tank. I do not favour the use of quinine "in-situ" in the community tank owing to the long period of treatment and high concentrations required.

Organic chlorine compounds, in general use as disinfectants, such as Chloramine-T and Chloramine-B have been used effectively against "Ich" but require that the aquarist first determines the pH and hardness of the water prior to dosing his tanks. The therapeutic dose of Chloramine-T required for the control of "Ich" in soft waters varies from 2.5 ppm at pH 6.0 to 20 ppm at pH 8.0 and from 7 ppm to 20 ppm in hard water at the same pH values. The toxicity of Chloramine-T to the harlequin, *Rasbora heteromorphus*, in hard water varied from 27 ppm at pH 6.5

to 60 ppm at pH 7.7 ( $LC_{50}$  values at the end of 1 week's exposure). Thus, the toxicity of Chloramine-T to both fish and parasite is greater in acid water and it is therefore necessary to vary the dosage used in accordance with the water conditions. The bactericidal action of Chloramine-T depends upon the liberation of the weak acid known as hypochlorous acid which will be present at higher concentrations the lower the pH.

Malachite green, used as the pure oxalate, at a concentration of 0.1 ppm has been used for many years with considerable success as an "in-situ" treatment for "Ich" infestations. One word of caution, however, is that this bright green dye must be used as the oxalate formulation and not the zinc chloride formulation. Toxicity tests with the harlequin, *Rasbora heteromorpha*, have shown the zinc chloride formulation to be twice as poisonous as the oxalate formulation. Furthermore, since this chemical is toxic to fish at a level very close to that required to kill the *I. multifilis* parasite the dosage instructions should be followed explicitly. The chemical should NOT be added to the infected tank until "the water looks about the right shade of green". Once again, in order for the treatment to be effective, it is important to prolong the treatment over a suitable period. I normally dose an infected tank on the first, third, fifth, seventh and tenth day after first observing the white spot present on the fish. It has been my experience that the treatment works better in a darkened tank and has less side effects on the fish. In the majority of cases infected fish showed a marked improvement within 12-15 hours of the first application.

In conclusion I would like to mention the use of antibiotics which I personally would not advocate for use against "Ich". Penicillin has been reported to be effective at concentrations of 1800 I U per gallon. It is known that penicillin acts against gram-positive bacteria through their well defined cell wall structure, and it is difficult to see how it could combat a protozoan infection. Possibly the beneficial effect noted was due to the effect of penicillin on secondary bacterial infections although most of the bacteria pathogenic (disease forming) to fish are gram negative and resistant to penicillin. Furthermore indiscriminate use of antibiotics in an aquarium may result in serious disturbance of biological equilibrium as a result of the simultaneous destruction of non-pathogenic bacteria which are a necessary part of the nitrogen cycle. I personally feel that antibiotics should never be used to treat any aquarium disease when a chemical alternative is available. Apart from the obvious cost difference imagine the possible disastrous effect if the aquarist using antibiotics ended up by creating a super strain of bacteria with an in-bred resistance to antibiotics.

Since "Ich" is a very common disease of fish and has been known about for a considerable length of time there are available to aquarists a number of products for treatment of the infestation. Marketed in England are products such as Halamid, Contra-ick, WS3, Magicure and Extermin-ick all of which claim to be effective against white spot. However, please remember to follow the manufacturer's instructions. Considerable research has gone into the production of these products and one owes it to the manufacturers to follow their instructions.

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## **The 7th SCOTTISH AQUARISTS FESTIVAL**

will be held at  
**MOTHERWELL CIVIC CENTRE, Nr. GLASGOW**

on  
**MARCH 31st and APRIL 1st 1979**

Organised by:  
**THE FEDERATION OF SCOTTISH AQUATIC SOCIETIES**  
in collaboration with **THE AQUARIST AND PONDKEEPER**

*Further details in this magazine shortly*

# Junior Aquarist

## THE CROAKING GOURAMI

by Peter J. Graham (aged 13 years)

*Trichopsis vittatus*, the croaking gourami (not to be confused with *Trichopsis pumilus*, the dwarf croaking gourami, seen less often than its larger cousin), is a not-too-often seen, but certainly not rare anabantid native to Java, Borneo, Sumatra, Malaya, Indo China and Thailand.

Its body shape is different to that of most gourami looking rather like a stubby Siamese fighting fish. Its adult length is, for females up to 2½ inches, males being up to ½ inch smaller.

While not an outstandingly beautiful fish, it is definitely not unattractive, at least when kept at the correct temperature. Its body colour is brown, with three broken, horizontal, dark lines. The belly is yellowish. The fins are a reddish-brown with, in the male especially, very many red and greenish-yellow dots along them. The caudal and anal fin extensions are a deep reddish-brown, occasionally being a yellowish-green. These extensions, while present in both sexes, are much longer in the male.

In spawning condition a pinkish-purple iridescence adorns the anal fin of the female, along with toned-up colours and an iridescence of a yellowish-green on the male. The eye of both sexes is black ringed with light blue and then red.

Temperature is a critical factor in the maintenance of these beautiful and interesting fishes. If the temperature is allowed to drop below 75°F for more than an hour or so, the fish sicken and perhaps die. The best temperature I have found for general maintenance, is between 78°F-82°F. For spawning it must be very high, anything up to 92°F being suitable, 88°F being just about right.

When first introduced to their new home, the croaking gouramis often become ultra-shy, so much so in fact, that the aquarist has fears for their welfare. Then one morning the fish will lose all traces of this, fighting for food with the other inmates of the tank.

They can successfully be kept in a community tank, providing, of course, that the temperature

requirements are met. In fact they are ideal inmates for such a tank.

As regards food, this fish is easy to please. It will eat with relish any flake or granular food, though undoubtedly prefers most live foods especially *daphnia*. It is also very fond of scraps of lean meat which it grabs at eagerly. On occasion, it will also take small pieces of cooked spinach or lettuce.

I have bred these fish only once, but found it extraordinarily easy. The fish were purchased from a local aquarium store at the modest price of 65 pence per pair. As they were only half-grown when I got them I could not tell their sex but after a few months of good feeding it became apparent that I had a true pair.

Soon after this I noticed that the two were courting, the male croaking whenever the female approached. The croaking seems to be done by the male only, who makes the sound at the same time as rapidly extending and vibrating his gill-covers. I suspect the two events are linked, but this may not be so. I have never seen the female do this. The majority of the croaking seems to take place when the lights have been turned off over the tank but when it is still light outside thus leaving the tank dimly-lit. The croaking is especially frequent at dawn.

A month or two later I was passing the tank when I heard a sudden burst of croaking from the tank, and, on inspection saw the two fish, much more brightly coloured than normal, encircling each other with fins stretched to the limit. They then faced each other and with their mouths stretched open to their fullest extent, sank to the bottom.

These displays went on, with varying frequency for about two weeks when I decided to move them to a separate tank. The size of the tank was 18 in. × 10 in. × 10 in., with 4-5 inches of water depth. It was heavily planted with cabomba, with small off shoots of wisteria and a small amount of duckweed floating around. The temperature was 88°F

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at all times. After a short period of acclimatisation the pair were introduced, and for a few days absolutely nothing happened. Then I placed in the tank a piece of cork bark, size about 5 in. x 2½ in., which floated on the water surface. A little later I was about to remove the bark when I noticed a few small bubbles underneath it which had collected in a small hollow. In view of this I decided to leave the bark in, at least for a little while. A few hours later the number of bubbles had increased incredibly, and the male was still blowing more. By the next day a bubble nest approximately 4 inches in diameter had been formed 24 hours later, at seven o'clock at night, they began to spawn.

At first the male merely pecked at the female when ever she approached, occasionally croaking or displaying his brightly coloured fins. Then he got down to business, hemming the female into corners and attempting to wrap himself around her. Eventually she relented and went up towards the bubble nest. The male grabbed his chance and embraced her violently. The first few embraces produced no eggs but soon anything up to fifteen were spat into the bubble nest by the male. Finally, after a few half-hearted embraces the male allowed the female to go. The total time taken for the spawning was about 3½ hours.

The next morning, when the fish were seen delving

into the depths of the nest I decided to be on the safe side and hatch the eggs artificially. The nest and eggs were gently separated from the cork bark—not an easy task—and placed in a breeding trap where food could be concentrated enough for the fry's requirements.

After about 24 hours a tiny black line was seen emerging from some of the eggs. A day later these had fully hatched. Unfortunately the eggs that had fallen from the surface on to the bottom of the trap did not hatch so I was left with only 20-25 fry from approximately 100-150 eggs, but I had limited tank space and could not hope to have raised any more anyway, so it did not matter greatly.

The fry were tiny, but not quite as small as I had thought they would be. They had relatively small yolk-sacs which disappeared in about 36 hours. The babies soon passed the liquid fry-food stage and graduated to micro-worms, brine shrimp and finely powdered dry foods. As with all anabantids, it is important that in the 2nd-7th week of life the air temperature is equal or nearly equal to that of the water, so that the tiny fry do not get a chill when they start to use their newly-formed labyrinth organ. Adult fish can stand these variations.

The croaking gourami is, then, a good fish to breed as ones' first egg-layer, and is also well worth keeping in the community tank, if the temperature is right.

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By P. H. Moore, M.S. (1974)



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**TRADE ENQUIRIES INVITED**

# BREEDING

## *Geophagus balzanii*

by S. & A. Cass

THIS CICHLID is native to Paraguay, a region not too well known for its tropical fishes due to it being situated rather far south and next to the Andes. These, plus other climatic factors, tend to cause conditions which are too cold for tropical fish.

When mature the fish are very interesting and easy to sex as the male develops a large hump head similar to that of a sperm whale. Also the male has a yellowish underside and is generally a larger fish than the female.

Our fish were obtained in August 1977, four being purchased from a London fish dealer. They measured approximately one inch in length, two being slightly smaller. A long shot, we hoped, would provide us with two males and two females. At first they were rather shy and somewhat nervous, keeping well out of sight and jumping around the tank whenever anyone approached.

However, typical cichlid curiosity coupled with the usual boldness soon overcame this problem and all four soon came to the front of the tank begging for food. They also proved that they were true *Geophagus* members, by constantly picking up and chewing mouthfuls of gravel looking for anything digestible. (*Geophagus* means earth-eater, referring to this habit).

The fish ate ravenously and the two larger fishes grew rather faster than the others, one in particular began to show the typical hump headed appearance coupled with buttering yellow flanks and belly. Also a series of blue dots adorned the upper flanks and all fins except of course the pectorals which were clear and the dorsal fin which possessed bright blueflashes along its length. The base colour of the fish on the higher flanks is brown to green. Whilst not as spectacular as some cichlids, especially some of the east African assembly, its colour is very pleasant, the yellow colour appearing to adorn the whole fish especially in sunlight, the best light in our opinion to view any fish.

One very good point in this fish's favour was that, except when breeding, there was no pugnacity towards other members of the aquarium community even when it included several species of malawis, namely *Aulonocara nyassae* and *Haplochromis ahli*. The only time when any chasing was noticed was when a male *Pseudotropheus lombardoi* tried to exert his dominance and the male *balzanii*, being somewhat larger, refused to be intimidated. No harm, however, came from this encounter.

The fish grew steadily on a diet of live food and various other *a la carte* items, like heart and small chopped earthworms, the larger two reaching a size of approximately six inches, the two smaller fishes reaching a size of three inches.

The long shot had also, to our delight, paid off, for we were now certain that we had two pairs of these very beautiful fishes, the slightly smaller of the two males developing a hump head, not quite so prominent as his larger rival. In fact, in a little less than twelve months we had witnessed the transformation of these fishes from small greenish-brown nondescript little unknowns, covered with vertical bars into magnificent specimens of regality, the males especially looking very graceful with that large head and slow movements. A large black spot is present on this fish throughout its life being prominent in the juvenile stage on both sexes, and also more prominent on the female in adulthood.

At the end of July it was observed that a pair of these fishes had taken over a large half plant pot and were keeping everything in the tank away from the area. The female was by far the more vigorous party in this activity being very aggressive towards the other two *balzanii*. The reason for this became apparent upon closer inspection. The gravel had been removed from inside their cave and the bottom of the tank was

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## PLANT QUERIES

by Vivian De Thabrew

I am a novice, and started a community tank about sixteen months ago. My tank is approx. 26 x 15 x 10. I use a gravel filter, the tank is situated in a recess away from a window where the back ends are restricted from direct light. I use a two foot daylight fluorescent tube, the tank temperature is constant, approx. 70-75. The pump I have running every morning approximately five hours. Whilst I have lost a certain amount of fish since starting, which I have been told can happen with a new tank, my biggest problem and failure is plants. I have purchased many plants since starting, but after a while they die off. The plants used were those recommended by a local shop, mainly *Vallisneria*, *Cabomba*, *Wistaria*. Eventually each time I finish up with plain stems, and these eventually seem to rot at the base and then float to the top. The only information I seem to be able to get from the local shop is to try more light, but I cannot tie him down to what is a lot of light or a little amount of light. I completely stripped my tank, cleaned it all out, renewed all my plants, cleaned the rock and gravel as I thought thoroughly, but my plants are nearly all finished, some gone brown, others just rotted away or died since I cleaned it. I have had a lot of very small snails appear. I know they have been on the plant leaves, and I have destroyed dozens of them. They appear on the inside of the glass, almost pin-head size. Whilst I am sure these cannot help my situation, I do feel I have something wrong somewhere. I only have three fish in my tank at the moment, two neon tetras and one white cloud. I have had these three about eight months and they seem quite healthy, and the water always appears to be quite clear. Could you please offer me any suggestions. I am keen on a tank and would like to make a success of it. Also, could you recommend a book that deals mainly on plant life only.

The problems encountered by you in growing plants is quite a common one, and therefore you need not worry too much. You will find that if you follow some basic principles regarding plant growing you will enjoy reasonable success.

First of all let me point out to you that the three species recommended by your shop, i.e. *Cabomba*, *Vallisneria* and *Wistaria*, are perhaps the commonest of water-plants in demand. However, growing these three species together is not easy. *Vallisneria* requires soft and slightly acid water of a pH value of 6.5-6.8,

and a temperature range of 74-78°F. It will, however, adapt to a wide range of conditions. *Cabomba* also prefers soft and mildly acid water with a pH value of 6.5-7.0 and a temperature range of 72-77°F, and it is essentially needs less turbulent water, therefore a tank with very little aeration is required. It also needs plenty of light from above. *Wistaria* thrives in slightly acid water at a higher temperature range of 75-80°F, though it will tolerate much lower temperatures for some time. It also requires ample light from above and around the tank.

*Vallisneria* and *Wistaria* should best be grown in a clay and peat or unwashed river sand medium. As far as I can gather from your tank condition, you could experiment by adjusting your light intensity and allow more natural light to enter your tank. The temperature given is also adequate. How about the pH of your water? Please check it and maintain it at around 6.5-6.8. Plant your *Wistaria* away from the main current of aeration. I think if you observe these few points you should see a marked improvement in your plant growth. As regards snail infestation, I suggest you use one of the several snail-eradicator on the market.

One of the most informative and readable books on the subject of aquatic plants is Dr Jiri Stodola's Encyclopaedia of water plants.

Thank you very much for your advice concerning propagation of my *E. martii*. I have done as you suggested, and I even brought the pH of the water in the nursery to 7.0 with a few drops of sodium bicarbonate solution.

I now have the same problem (surely not the right word) with a flourishing specimen of *Barclaya longifolia* lily. It is growing vigorously in water with a pH of 6.8 and a DH of 5, and has started a second growing point at the other end of the 1 in long bulb. May I divide the bulb, and if so, should I treat the cut surfaces in any way? At present the lily is rooted in a small clay flower-pot filled with ericaceous potting compost, topped with gravel, and is due to be repotted shortly.

I am pleased to learn that you are experimenting with my technique. I hope you will enjoy good results.

In *Barclaya longifolia*, you are growing one of the prettiest aquarium lilies coming from the tropics. I once saw an entire pondful of these in Burma, and some months ago when I was in the dry zone of Sri Lanka, I saw a disused irrigation tank entirely covered with *Barclaya* blooms, all purple.

This species requires soft water of a pH of 6.0-7.0.

This will ensure that there will be minimal "bleeding" from the cuts. This cell-sap exudation comes to a halt in a matter of a few minutes as the cell emits a certain type of "gel" plasma. In the case of densely grown rootstock, root division can be done by splitting the very bush itself.

You are obviously giving it the correct conditions, as it appears to be thriving and propagating itself. As with most lily rootstocks, you can certainly divide the bulb in the manner recommended by me previously, but always ensure that the severed ends are sealed by rubbing some charcoal dust or even good garden clay.

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## BREEDING *Geophagus bazanii* continued from page 337

covered with eggs. Due to the angle of the actual plant pot it was impossible to see how many there actually were but it was estimated at about 150-200. The eggs were typical of a cichlid: small, about the size of a pin head and yellowish white. The temperature at the time was 78 F with a pH of 7.7.

Immediately we removed all the other fish in the tank in order to give the prospective parents enough peace and quiet to concentrate on spawning. By the end of the day the male was no longer required, illustrated by the fact that the female would not let him anywhere near the spawning site and he contented himself with trying to find food by rummaging in the gravel. Accordingly he was removed to other quarters. The actual spawning took place on Sunday 30 July and the eggs were still on the site on Monday with the female carrying out her maternal duties, cleaning and removing what were presumably diseased eggs.

However, by Tuesday 1 August, the eggs had disappeared, into the female's mouth. As we had previously been informed the fish, like *G. jurupari*, was a mouthbrooder, and indeed was using the same peculiar chewing action to keep the eggs fresh. Indeed this action seems to be typical of those members of the genus, as other fishes which exhibit this mode of reproduction seem to house the eggs in their buccal cavity and aerate them when they take in water for their normal respiratory functions.

The eggs, in fact, remained in the female's mouth until 13 August when a mass of tiny fish were seen swimming around her. The day before two young were observed but they were still burdened by a small yolk sac and were swimming with difficulty, having problems leaving the bottom of the tank. The release was known to be near at hand as a gradual increase in the size of the buccal cavity was observed from day to day.

The necessary fine food was added to the tank, which was well established and must therefore have contained *infusoria* and the young began to develop satisfactorily.

It was approximately a week later that the other female was nowhere to be seen. She had been moved along with the other large *bazanii* into another tank which was full of green water due to a rare spell of sunshine experienced by the region. Two possibilities

existed. Either she had expired or else she had started a family. We suspected the latter as no harm had ever come to her or any other fish in the company of the malawis in the tank. In fact, two pairs *Aequidens Cunicipes* are quite content in the same tank, one pair having spawned four times.

The truth was revealed after a vigorous cleaning with a diatom filter and the female was observed to have a large buccal cavity, chewing a mouthful of eggs in one corner. Due to the constant attention of the male who was doing his fair share of bullying, the female was not defending a specific site, and she had to be moved. However, the only tank available for both her safety and her developing offspring was the one in which the other female was raising her family. Accordingly she was moved and to our relief the fish who had yet to release her young kept well out of the way of the other with free swimming young.

This, however, came to end when the later arrival decided it was time to release her brood. Both sets of young were observed one evening one, naturally enough, being larger than the other. However, the following morning the first (slightly larger) female was at the front of the tank begging for food. One thing was missing. Her offspring. The other female was still out of sight behind a plant pot. As the female which had no young started to chase the other occupant which, it was noticed, was still carrying young, she was removed to avoid any further disaster. In fact, we thought the young had been devoured as they were no-where to be seen.

The mystery was explained later in the afternoon when the remaining female released her young. Not only did she release her young but those of the first female to spawn. The evidence for this was the size of the fishes, some being about twice the size of the remainder. This situation still persists and both sets of fishes still go to the one female which manages to accommodate them despite their increasing size. We will allow her to tend the young until she loses interest as we believe her care is very valuable for their well being.

To summarise: the *Geophagus bazanii* is a peaceful cichlid with very interesting habits its pleasant colours together with an unusual shape and trusting character make it a cichlid well worth keeping.



# 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.

I have been keeping tropicals for about a year and I wish to set up a marine tank.

I have several questions about this which I hope you will be good enough to answer.

(a) Do you think I should set up a tank with just fish first or a tank with fish, living rock, algae, invertebrates etc., first?

(b) What is the best filtration? I intend to use a high turnover subgravel filter with a box filter with wool and marine charcoal in it—is this all right?

(c) In the books I have read, they talk about ozonisers and protein skimmers. Are these really necessary? As I am 15 my budget is somewhat limited, so I can't afford these.

(d) Finally, the books I have read say that live food is necessary for the survival of marine fish; is this true? If so, what could I use? Brine shrimps are unobtainable in my area. How about dried and freeze-dried foods, e.g. *tubifex* or freeze-dried brine shrimp? Are shredded earthworms practical?

(a) *How should one stock a first marine aquarium?*

In view of your age, and the almost unavoidably stringent limitations which this will place on your potential budget, I am certain that the best way for you to commence marine aquatics would be with a coral-fish only aquarium. I have advised you thus for the following reasons:—

- (i) You will be saved the considerable cost of invertebrate, algae and living-rock purchases.
- (ii) You will not need to spend nearly so much money on the very numerous fluorescent tubes/control gears which are an essential prerequisite to success in the culture of algae and

invertebrates. For example, for a 36 in. × 12 in. × 15 in. (= 20 gallons nett capacity) coral-fish-only aquarium, one 24 in. fluorescent tube rated at 20 watts ("GRO-LUX") would be adequate. In order to satisfactorily illuminate the same aquarium for coralfishes, invertebrates and algae you would need at least three (3) two-foot tubes, (i.e. 2 × 20 watt "NORTHLIGHT" and 1 × 20 watt "GRO-LUX"), plus, of course, three (3) control-gears. With fluorescent control-gears now retailing at almost £6.00 each, this is clearly an expenditure item we cannot ignore.

(iii) Like all beginners, your standards of water management will initially be poor. Similarly you will tend to over-feed and not diagnose the resulting disease-status until too late OR (more usually) not even successfully diagnose the presence of disease at all until your fishes begin to die off. Consequently, the ability to use certain rapid-acting disease treatments which are just not tolerated by invertebrates will be a great help to you.

(b) *The best filtration system* for any marine aquarium is probably the reverse-flow under-gravel filter operated by a power-filter. However, a very close second-best is the high-turnover rate air-lift operated under-gravel filter supplemented by a 75 pence box-filter full of ultra-high-activity marine charcoal. Since the latter system, fitted to a 36 in. × 12 in. × 15 in. aquarium (= the *smallest* tank I would recommend to any beginner marine aquarist) would cost only £12.00 total for U/G filter, box-filter and twin air-pump, compared to *SIX TIMES* this amount for the power-filter operated reverse-flow undergravel filter,

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# WHAT IS YOUR OPINION?

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

Photographs by the Author



IN THE September edition 15-years-old David Allford complained about large-flaked fish foods. His comments prompted the following reply from Dr David Ford: "... Your correspondent in the September W.Y.O. wanted to know why tropical fish food is made up of such large flakes and he said that firms make the 'excuse' that it is for selective feeding. Would you let readers know that a great deal of research and technology has gone into the production of our particular large flake (Aquarian) and complaints from users are that the flake has broken down—not that it is too large. The selective feeding is the reason for the large flake and is certainly not an excuse. Our flake contains a specially-developed gelling agent designed to soften on instant contact with the aquarium water so that even young, small fish can bite off their needs with no fear of choking. The gel is also completely digestible and very nutritious—and is the subject of a pending patent. If the correspondent does wish to feed a composite small flake mixture he only has to take a pinch of the big flakes and rub them together over the surface; they are so delicate that the flakes easily crumble for the smallest of fry. It is certainly not "the long and tedious job" quoted.

"Another factor in large flake feeding is that there is little or no dust, which escapes the fish, or passes out through the gills, clouding the water and giving pollution problems. Surplus large flake is readily seen and removed. We do include a small flake blend in the range—called Aquarian Growth Food; it is the same blend of eight individual formulae as the Tropical Flake, but only 2 or 3mm. flakes with boosted protein content for rapid growth. It is quite adequate as a maintenance diet, of course" (As many readers know, Dr. Ford runs the free Aquarian Advisory Service and was responsible for the development of the Aquarian range of fish foods and remedies. He has written an excellent booklet for anyone new to the hobby. If you'd like a free Beginner's Guide, drop him a line—direct to Dr. D. M. Ford, Animal Studies Centre, Freeby Lane, Waltham-on-the-Wolds, Melton Mowbray, Leicestershire, LE14 4RT. Incidentally, Dr Ford was one of the best-known visitors at the recent AQUA '78 show in Belfast. During his visit to Ulster, Dr. Ford toured the aquarium shops in Belfast and met many keen and active retailers.)

Master B. Prys forgot to put his address on his letter—but we'll allow him that omission because he's only 12½ years old. He says: "I am pleased to be writing to you for the first time. I am 12½ years old and started the hobby 1½ years ago; but I started it the cruel way: I won two goldfish, at a fair, and placed them in a large bowl. The two unfortunate fish died after two months. Since then I have found out much more about fish-keeping and now I have two tanks measuring 24 in. × 10 in. × 10 in. and the usual 24 in. × 12 in. × 15 in. They are stocked with: 2 common goldfish, 2 shubunkins, 2 calico fantails, 2 (black) moors, 2 scaled and 2 calico veiltails.

"The first four fish mentioned are much bigger than the rest and are housed in the smaller tank. I have no filter or pump in either of them but both are stocked with the following plants: *Vallisneria*—straight and twisted; *Cabomba*; hornwort; *Elodea*; *Ludwigia* and one beautiful Amazon sword plant for a centre-piece in the bigger tank. I know that Amazon swords are supposed to be kept only in tropical tanks but the temperature in that tank is 68-74°F and the plant appears to be flourishing.

"I use no peat moss or anything else and all the plants and fish are in the peak of condition. Why everyone thinks it is so important to have a pump and/or filter, and peat moss under the gravel, I don't know. If you don't over-stock your tank(s) I really don't see why such are necessary; and I find that the fishes' waste matter is good enough for my flourishing plants."

## Silver Jubilee

I'm sure many readers will wish to join me in congratulating Dr. Neville Carrington and his colleagues and staff, at Interpet, who will be holding their silver jubilee celebrations this month (September). Most of us have made use of the firm's world-famous, liquid fry food during the past twenty-five years—not to mention the many other aquarium products for which Interpet has become famous. Unfortunately I had to decline Dr. Carrington's kind invitation to be present at their celebrations; but several years ago I had the pleasure of visiting their then newly-opened premises at Curtis Road, Dorking, so I know the standard of hospitality and friendliness which I shall miss by being unable to attend on this

important occasion in the firm's history. I hope the next twenty-five years will bring Interpet as much success as have the last.

Many and varied are the letters I've received during the past few weeks. I'll continue with one from the top of the pile. It was written by Miss E. Casley, of 15 Berry Road, Newquay, Cornwall. She says: "I think I can save some of your readers quite a lot of frustration—apart from money and time. Recently (July) I wrote to several firms, that regularly advertise in *The Aquarist & Pondkeeper*, because I live in a part of the country where, to say the least, aquarist shops are far from abundant. Out of seven letters written (I might add, I enclosed a 9p s.a.e. with every letter), I received only two replies. On writing to the same firms, expressing my disgust, I did state that if I failed to hear from them I would write to *The Aquarist & Pondkeeper*. Very quickly I received four more letters saying that they had not received the original letters (I could believe one failing to arrive, but doubt four—especially when sent by first class mail). Nevertheless, they answered the letters, with apologies, to their credit; but the enclosed advertisement is an absolute disgrace—especially as it invites contact. I am sure two letters to them did not go astray. I do think that when people take the trouble to contact firms that advertise in any magazine—especially if the writer encloses a s.a.e.—the least the advertiser can do is give the courtesy of a reply. Because I live in an area of the country where there is a distinct shortage of aquarist shops, trying to acquire a decent-sized tank at reasonable cost is almost impossible; hence one has to resort to writing letters. What is your opinion?" (I can understand Miss Casley's frustration and have passed on her letter, together with the name of the firm that did not reply, to our magazine's Advertisement Manager, Mr. John Young. I've no doubt that Mr. Young should be able to solve the problem.)

#### Air Pump

Recently I noted a falling off in the air output from the quiet and highly-efficient air pump that operates the filters on four of my aquariums. An examination of the interior revealed that the rubber diaphragm had, around about one third of its circumference, slipped off the valve chamber. It was easily pushed back into place, resulting in a return to the excellent output for which I like the pump better than any other brand I have tried and tested; and an additional advantage was that the noise level from the pump dropped considerably to its usual, low level. One tends not to notice such deteriorations because they happen gradually—but it's useful to check one's pump or pumps at regular intervals, checking rubber diaphragm, valves and seals and removing any deposits of dirt that may have collected. Felt air filters should be changed or cleaned regularly because they can clog

up fairly quickly in a dusty or sooty environment. Do not reverse such air filter pads: doing so can allow collected dust to enter the interior valves of the pump. If, like me, you are unable to obtain proper replacement felt filter pads, try cutting your own from, say, a square foot of appropriate felt purchased from a shop that sells such materials. Use the old filter pad as a pattern. One can also save money by cutting one's own pads as it's possible to obtain dozens of pads from only a square foot of felt—depending on the size of the filter pads required. Readers are reminded that pumps' electrical leads should be disconnected from wall power points before fingers or screwdrivers are inserted in the pumps' interiors; this ensures that electric shocks are avoided.

The filter wool in air-operated or power filters should be cleaned or changed regularly to ensure efficient working of filters; there's little point in running filters if the wool is clogged with dirt. Diaphragm-operated pumps can be made much quieter if they are suspended from a stout screw in the wall using knicker elastic; or if placed on a bed of foam rubber or sponge on a non-resonating surface such as a firm shelf. In all cases one should ensure that pumps are situated well above the level of the water surface in the tank farthest from the ground. These points should help to ensure that your tanks are properly filtered and aerated as quietly and safely as possible.

I was greatly saddened and shocked to learn of the death of one of my regular correspondents earlier this month. Tom Jones, who lived at 43 Rudd Street, Hoylake, Wirral, Merseyside, was a keen aquarist and a leading member of the Hoylake and District Aquarist Society. Tom's wife, Nancy, shared his interest in aquarium fishes; and Tom's letters—written in beautiful Copperplate handwriting—showed him to be a dedicated and enthusiastic aquarist and a kind, gentle man. The hobby will be the poorer for his passing—as will the art of calligraphy. I extend my deepest sympathy to Tom's widow, Nancy, the members of his family circle, and those Hoylake aquarists who were lucky enough to know Tom as a personal friend.

#### Photography

Mr. D. A. Ferris's home is at 6 Gauntlet Crescent, Kenley, Surrey. He writes: "I was extremely interested to read in the pages of your column about Mr. Liotard's photographs. A friend has just introduced me to the fascinating subject of fish photography. At the moment I am trying to find—without too much success—some dwarf mosquito fish (*Heterandria formosa*) and some pygmy rasbora (*Rasbora maculata*); but I have only goldfish at the moment and they were not too difficult to photograph. I also tried using some home-made photographic filters to make the fish stand out from their back-

ground more. To try something more exciting I went round to my friend's house and took some photographs of his not-too-co-operative tropical fish. My camera is a Zenith E and I use either Agfa colour slide film or Ilford FP4 black-and-white film. I also have a set of extension tubes and with these I feel that I should be able to get good results any time. Oh yes, I also have a flash for poor light conditions. I will send you some prints if you are interested. Do you find that you get better results with slides or prints; black-and-white or colour? Do you use filters at all in your photography?" (Coloured slides give better results because coloured fish tend to stand out more from tank backgrounds. The films I like best are FP4 and Agfa's slightly-faster colour slide film—that has a DIN rating of 21—ASA 100. I use a Skylight filter on my camera lens for no other reason than that it's there. I always use flash and extension tube(s) for close-ups of individual fishes.

I have never had any films affected but I have been told that X-rays cause a mist or fogging to appear on films or prints. Films are affected only when they are subjected to large doses of X-rays—such as those to which hold baggage is subjected. As it is only hold baggage that is normally affected, if you carry your films in your cabin baggage they should be all right. If you are in any doubt about the equipment in use at an airport you can always ask the security men to carry out a visual check of your cabin baggage." (You have obviously never flown from Belfast to London, or London to Belfast, Mr. Ferris! One's person and one's case/baggage is searched from top to bottom at least once; and men are not allowed any cabin baggage—with the possible exceptions of a coat and magazine or newspaper. My camera bag, which I have to pack inside my case, always causes a lot of searching problems. On occasions I've had to open the camera case, the camera, film containers,



I mount my flash gun on top of my camera using a little flash bracket that was given to me by my late friend, Tom Jones. My camera is a Praktica Super TL which I've been using for about seven years. This month's photographs were taken, as above, on FP4. The fish are quite sharply in focus but, as you can see, light-coloured fish tend to fade into light-coloured backgrounds—and vice versa. This problem does not arise when one uses colour. I do my own monochrome developing and printing, converting my bathroom into a dark room when required. When I get some spare time I'll try to produce an illustrated article on fish photography. I should certainly be pleased to see some of your prints, Mr. Ferris.)

Mr. Ferris continues: "Some time ago you also asked about the effects of X-rays on films. Well,

flash unit pouch, etc.; and spare flash batteries often cause a measure of interest. On one occasion, when my case had been searched and taken away from me, I had a copy of *The Aquarist* in my hand to read on the plane. When I went through the body search, *The Aquarist* itself was given a quick examination. However, I'm prepared to endure such thorough searches if they guarantee that the plane will get me from A to B and not from A to X. Sadly, gone are the days when I could buy some fish in London and fly home with them in my briefcase, on my knee. I've seen what the hold has done to my case; I wouldn't want the same to happen to any fish!

Mr. Ferris goes on to tell of his experiences with digital thermometers. "I have just purchased a new digital thermometer to set up my tropical tank—in



anticipation of my finding some dwarf mosquito fish and pygmy rasboras. It reads about 1° higher than my photographic thermometer. I have great difficulty in reading it because it is graded in 2° steps and the colour changes are not very clear. A friend also bought one and found that his reads 3° high. Neither of us is too happy with them." Mr. Ferris wonders if anyone has tried to get his (or her) fish, aquarium or equipment insured; or the contents of his house insured against floods or leaks from an aquarium. Drop me a line if you've tried. He ends his letter by saying that this feature should always be read first because it contains a wealth of hints and tips.

Photograph 1 shows a pair of glowlights. If you have bred this attractive species, please send me details.

During the summer Master Andrew Young visited



two public aquariums. Writing about the Blackpool Aquarium he says: "... It is situated under the Tower itself and entry is 20p. The aquariums are sited in a very large, dark hall and the room is made to look like a cave. The marine fish caught my eye first, of course, and there were many large butterfly fish in the tanks. All the tanks were in excellent condition with not a dead fish to be seen. The freshwater section was also very interesting, one of the tanks containing discus and angelfish together. They looked fantastic! All in all this public aquarium was very good indeed and well worth a visit." Andrew, who lives at 43 Lawn Drive, Swinton, Lancs., ends his letter by saying that he is amazed to think that despite all the care aquarists give to their fish, the longest-lived goldfish ever lived in a water-butt for over forty years.

No. 9 Wyndham Close, Birch Glen, Colchester,

Essex, heads a letter I received from Mr. R. G. Farrow. Writing about *Cabomba*, he had the following to say: "... Although I have tried to grow this plant at various times, I have never really been able to establish it. Therefore my tanks no longer contain this plant. *Ludwigia* and Amazon swords do very well in my barb community tank—which is 27½ in. × 12 in. × 12 in. It is lit by a 20 watt Gro-lux tube for about eight hours daily. The tank also gets any available sunlight in the morning. The tank is filled with local tap water; the pH is 7.0; hardness is 16°—tested using a Tetra hardness test kit. U/G filters are run all the time. 3 in. of gravel forms the bed for the plants and no other compost is used. I have two Amazon swords at the end of the tank, and one of these has a long spike from which I hope to get more plants. The *Ludwigia* is at the back of the tank and grows very well. The red undersides of the leaves

certainly add to the over-all look of the tank. . ."

Mr. William Ross's home address is 15 Falcon Mews, Downham Road, Ely, Cambridgeshire. He comments: "I am sorry if this letter may be a little late in reply to the letter written by Mr. R. E. Fuller in the July column. At present I am employed in Saudi Arabia and have just received my copy of *The Aquarist* on returning home. I should like to quote a letter written by me in "Our Readers Write" in the October, 1973, *Aquarist*, under the title of "Angels Six". The situation had arisen where I had five adult angels—two pairs and a spare female. "After some time the spare female appeared to join the new pair, making a trio. As this pair was spawning the female became a nuisance by harrassing the fish. One morning as the pair was spawning I removed the spare female. Unfortunately the eggs were not adhering to the filter tube and were lost.

At lunch time I swapped the females and the same male spawned with the spare female that evening. I had noticed that all three fish had been cleaning the filter tube previously."

"Over the past five years I have, on many occasions, selected a male from one pair and a female from another pair and have had numerous successful spawnings. My conclusion is that the angel written about in books is the original, semi-wild species. The angel of today, with its many mutations, is a much more domesticated creature and has lost some of its natural instincts. In 1973 I had, as Mr. Fuller has done, asked for people with similar experiences to write about it, but received no reply."

Photograph 2 shows one of my attractive emperor tetras. Have you kept this most interesting and lively species? If so, please send me details of your experiences.

I'll end with a letter expressing anger. It was written by Mr. Rupert Cook who resides at 50 Bishops Road, Whitchurch, Cardiff. Rupert writes: "Your request for letters on the topic of obtaining spare parts for foreign equipment prompted me to write to you. For some time I had attempted to obtain spares for my Metaframe 425 filter, which, although it functions very satisfactorily, is quite old now. My local aquarist shop informed me that Metaframe aquarium parts were no longer being imported into Britain because they do (*sic.*) conform to the recent electrical

regulations. I therefore resolved to order the parts from the manufacturer in New Jersey.

"I went to the trouble of obtaining a U.S. dollar cheque for \$14.25 (which cost me £1.00 in bank charges). The goods, including postage, converted to £2.00 or so. Total cost £10.00. O.K. The parcel arrived today by air containing the parts I ordered. I have had to pay £12.77 in customs—and V.A.T. in addition!—in order to obtain delivery. I am going to protest to the Post Office as I cannot believe the extra charges, amounting to more than 100% of the value of the goods, can be correct. Anyway, your readers should bear these 'hidden' charges in mind when they go to the trouble, as I have done, of obtaining cheques in foreign currency, writing abroad, collecting the parcel from the Post Office and paying duties.

"I was aware that some duty was payable—but 130%! Well, Mr. Healey . . . (expletive deleted)! Does anyone have a stock of Metaframe spares in this country?"

Please send me your opinions on any of the following for a future issue: (a) breeding catfish; (b) cutting down on heat loss from tropical tanks; (c) cultivating *Cryptocoryne* species; (d) food for white worms; (e) small species of fishes suitable for a community tank of 18-24 in.; and (f) breeding thick-lipped gouramies. I hope you'll write to me this month before the burdens of Christmas descend upon us.

## MARINE QUERIES

*continued from page 340*

I will leave you to your own judgement as to which filtration system to use.

Incidentally, the only advantage which the reverse-flow plus power-filter system has over the vastly cheaper and more easily maintained air-lift operated U/G filter, is that with the former the sea-humus is automatically collected up into the body of the power-filter. This spares you the trouble of scouring the sea-humus out of the coral-sand every time a partial water change falls due.

(c) *Ozonisers and protein-skimmers—are these really necessary?*

A few people make miraculous claims for the former. The latter (i.e. protein-skimmers) are not only not necessary—they don't work in U/G filtered aquaria.

(d) *Live-foods, etc.* Please let me wearily repeat yet again—the only safe live-foods to feed ANY fishes (i.e. saltwater or freshwater, tropical or temperate) are live foods which do NOT originate from aquatic biotopes. In practice, this means live earthworms (chopped up with a razor-blade until they are small enough to fit the fishes mouths) and live white-worm.

In my experience, neither of the above two species of worms ever transmits disease or parasites to fishes, all the other livefoods frequently do!

So, in descending order of importance and value (to the fishes), we can say that the following are the best foods for fishes—coral-fishes or otherwise:—

1. Live earthworm.
2. Live whiteworm.
3. Gamma-ray irradiated seafoods, etc.
4. Freeze-dried foods and finally
5. Prepared flake and pellet foods.

### SPECIAL NOTES

A. By reversing the above list of five food types, one would then have stated them in order of maximum *CONVENIENCE*. I suppose the moral to be drawn here is that there is no convenient, easy way for the lazy man to be successful at fish culture. The old adage, "Strength goes in at the mouth" applies just as much to fishes as it does to people.

B. The above list omits such "fringe foods" as live-brine shrimp, maggots fresh ant pupae and so on on grounds of impracticality.

# PRODUCT REVIEW

However carefully an aquarium is managed, sometimes a fish or fishes will fall ill. It is also true that a sick fish cannot describe its symptoms. To make matters worse, it is not always possible for the aquarist to diagnose the illness (unless it happens to be parasitical and discernible to the naked eye) with any certainty.

An answer to this problem is now provided by New Technology Limited's DISEASE DIAGNOSIS KIT. This kit consists of scientifically prepared slides—stored until needed inside close-stoppered bottles—a sterile swab for taking skin smears, and a lengthy directive for the interpretation of results.

To carry out a test, all that is necessary is to dip the slides into the suspect aquarium and then stopper them up again in their respective bottles to incubate at 25°C or thereabouts. If bacterial or fungal disease is present the causative organisms will show up on the slides in about 48 hours. These visible organisms, together with the external systems present as, for example, frayed or split fins, skin lesions, skin excretions, ulcers, raw patches revealed by sloughed-off scales, etc., will provide a complete diagnosis.

It is interesting to note that fungal infections in a tank will show up on a dip-slide hours or even days before their presence is noted on the external surfaces of a fish. The kit will not diagnose parasitic infections. Which leads me on to say that New Technology's range of products for aquarium health care, specially formulated for the freshwater fishkeeper (tropical or coldwater) is among the best and most advanced in the world.

Parasitical diseases such as *Ichthyophthirius*, *Costia* or *Chilodonella*, among others, can be treated effectively with ICHIDE which, happily enough, is neither harmful to submerged plants nor to aerobic bacteria established in a gravel or grit bed. BACTOCIDE, a wide-spectrum antibacterial drug, is active against slime disease, bacterial septicaemias, fin rot and other diseases where harmful bacteria are implicated. MYXOCIDE has similar antibacterial properties but is especially potent against what is erroneously called mouth-fungus (erroneous because a woolly or linty appearance of the inside of the mouth

is bacterial and not fungal in origin), bloody areas on or around the caudal peduncle and certain infections of the gills. FUNGICIDE is of enormous value in the treatment of *Saprolegnia* and of the bacteria which are often the primary cause of the trouble.

A few of the above drugs can be introduced direct into a furnished and well-populated tank. Some are for use only in a hospital tank. Always, however, the purchaser of drugs should carefully read the instructions; for not a few drugs have a deleterious effect on plants. Another point to remember is that the curative properties of drugs are largely or completely lost when they are passed through a charcoal filter.

## **HILLSIDE Coral Marine Air Diffuser.** *Hillside Aquatics, Potters Bar, Herts. EN6 10A. 72p + 8% VAT.*

This diffuser is above average in appearance and performance; yet its construction is not at all involved. Innumerable synthetic fibres are held tight inside one end of a short length of jointed plastic tube. The other end of the tube is fitted with a regular two-way air-line connector. This oxygen distributing device is ensconced among splayed branches of a beautiful piece of snow-white coral (each piece used specially selected for its pleasing form and decorative charm) which successfully hides most of the diffuser parts from view.

After attaching the connector to an air-line, the diffuser is pushed into the sand on a slant with only the tip of the fibres showing. The weight of the coral, insignificant though it is, provides satisfactory anchorage. With the air pump switched on, the plume of minute bubbles that rise to the surface provides plenty of oxygen to be absorbed by the water.

Although this diffuser is intended for the marine fishkeeper, it is quite suitable for use in a freshwater aquarium stocked with fishes not likely to be harmed by a rise in the hardness or alkalinity of the water. African cichlids from the great lakes, Madagascar rainbow fish, White Cloud Mountain minnows, and mollies are the sort of species I have in mind.

JACK HEMS.

THE AQUARIST

# BOOK REVIEWS

**Characoids of the World** by Dr. Jacques Géry.  
Published by T. F. H. Publications Inc. at £24.10.

Said to be the first modern survey of the suborder Characoidei (embracing tetras, piranhas, hatchetfishes, headstanders etc., etc., etc.) this massive work covers every genus and species almost all of which are described or keyed and, in most cases, illustrated by colour photographs or black and white photographs or drawings.

The preface asserts that the book has two goals: firstly to provide the reader with as many good illustrations of aquarium type characid fishes as possible and secondly, to give zoologists and advanced aquarists a scientific account of present knowledge of the group which has not been reviewed for fifty years. A cursory flip through the pages will confirm the first assertion while a random dip will soon convince the reader of the calibre of the descriptive text allotted to each genus.

With over 1200 species of characid now known to science, a comprehensive work of this nature is needed by aquarists and ichthyologists alike and this book has been compiled in an endeavour to satisfy both schools of aquatic study at the same time.

**Fishes of Lake Tanganyika** by Pierre Brichard.  
Published by T. F. H. Publications Inc. at £14.95.

Lake Tanganyika is the second deepest lake on earth with a maximum depth of 1470 metres but it is in the relative shallows of under 200 metres that life abounds and variety, especially among the fish fauna, is immense. While species of cyprinids, silurids, mormyrids, characids are legion, it is the cichlids which occupy the dominant position. Cichlid species in the lake are endemic like those of Lakes Malawi and Victoria but where in those lakes the species are more numerous, they all stemmed from the genus *Haplochromis* whereas in Lake Tanganyika there are more than 35 genera.

Pierre Brichard became a professional fish collector and the first in the Congo to export fish to the U.S.A. In 1971 he started a collecting station in Bujumbura, Burundi on Lake Tanganyika. From here a team comprising, with others, himself and his son and daughter explored by Scuba along the underwater slopes for a sum total in excess of 1500 hours and

collected much of the data and fish illustrated and described in this key reference to the fishes of Lake Tanganyika. Keys to all species covered are given and colour photographs and drawings are presented in hundreds to help in identification.

**A Plank Bridge by a Pool** by Norman Thelwell.  
Published by Eyre & Methuen Ltd. at £5.95.

To anyone with a fondness for water and its mysteries and for the life forms which it supports, this book will evoke a myriad feelings from wistfulness at the memory of idle days by a pool to acute envy for the author who has achieved an ambition many of us have nursed as a dream. Beyond that achievement he has used his artistic talents to illustrate his book with superb sketches of his wild friends who share the delights of his pool.

Brought up in the industrial north, Norman Thelwell formed a desire in early childhood to own his own stretch of water where he could fish, drift in a boat or just watch and enjoy all those things that are to be found in, on and around water. The dream was haunting and eventually became reality with the acquisition of a cottage in Hampshire near the sparkling River Test.

Creating a large pool or small lake (the author is undecided as to which it is) was the very first essential and work was soon begun on excavating vast quantities of soil seemingly "twice the volume of the hole itself." With a high water table the hole became a pool as rapidly as the soil was removed until the heavy work was completed and Nature's help to round, smooth and populate remained as the final requisite.

Gradually they came, the duck, heron and kingfisher, the water voles, dragonflies and water beetles. Trout were introduced and an inlet from natural waters made to create movement and along with this came pike and other visitors and would-be residents.

The author shares his fatigue with us during the creating of his paradise and also much of the humour arising out of some of the enterprising construction work. But more important he shares the sheer blissful enjoyment he derives from pottering around among his animal friends and his gift for drawing both word and line pictures ensures that the reader is with him at his poolside.



## from AQUARISTS' SOCIETIES

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

THE 1978 Goldwater Fish Show organised by Bristol A.S. provided once again a remarkable display of Fancy Goldfish. The list of exhibitors in the catalogue also emphasised the wide appeal of the venue.

Early arrivals were entertained by a film show prior to the opening.

The Judges, who commented very favourably on the 430 entries were Messrs G. Bell, V. Capaldi, L. Dodge, G. King, R. King, W. Leach, J. Linale, S. Lloyd, J. Powell, W. Ramsden, B. Rothwell, C. Summers and H. C. B. Thomas.

The Best Fish in Show was a fine Red Common Goldfish and Second Best a good Bristol Shubunkin both from N.G.P.S. The Best Exhibit was a fine matched pair of Bristol Shubunkins. The Award for Best Shubunkin Exhibited by a member was won by R. King who also won the Denman Cup for Highest Number of Points. The detailed results were as follows:

Common Goldfish, Red (21): 1, W. Ramsden and B. Rothwell; 2, 4, R. Prendergast; 3, C. Hayes. Common Goldfish, Yellow or Variegated (12): 1, S. Amos; 3, C. Hayes; 4, A. Wright. Bristol Shubunkins 3' limit (61): 1, B. Rothwell; 2, R. King; 3, J. Amos; 4, 5, R. Whittington. Bristol Shubunkins 5' limit (39): 1, V. Cole; 2, 1, Churchill; 3, J. Amos; 4, R. King. Veiltails, Red, Metallic and Calico (18): 1, and 4, J. Moore; 2, J. Linale; 3, R. King. Moors (12): 1, 2 and 3, W. Ramsden; 4, Mr. and Mrs. Hewitt. Bubble Eyes, Pompoms, Pearlscales (6): 1, H. Berger; 2 and 4, Mrs. P. Whittington; 3, Mr. and Mrs. Hewitt. Lionheads (8): 1, 2 and 3, R. Bennett; 4, G. Bell. Orandas, Red, Metallic and Calico (11): 1, A. Wright; 2, 3, H. Berger; 4, Mr. and Mrs. Hewitt. London Shubunkins (6): 1, 2 and 3, Mrs. P. Whittington; 4, A. Wright. Nymphs and Comets, Red, Metallic and Calico (13): 1, P. Norman; 2, Miss B. Widd; 3, C. Hayes; 4, A. Wright. Fantails, Red, Metallic (11): 1 and 3, J. Kingland; 2, R. Bennett; 4, C. Summers. Fantails, Calico (10): 1, J. Amos; 2, R. King; 3, Mr. and Mrs. Hewitt; 4, Miss B. Widd. Red Cap, Chocolate, Blue Orandas, Jikins (14): 1, 4, V. Cole; 2, H. Berger; 3, Mr. and Mrs. Hewitt. Koi Carp 9' limit (20): 1 and 3, S. J. Beck; 2, C. Hayes; 4, W. Gadd. Biterling, Sunfishes, Basses, 9' limit (9): 1, Miss B. Widd; 2, W. Ham; 3, C. Hayes; 4, J. Moore. Coloured and Pond Fish, 9' limit (13): 1, R. King; 2, Mr. and Mrs. Goodfield; 3, C. Cowles; 4, J. Day. River Fish, 9' limit (5): 1, L. Menbenzetti; 2, 4, C. Cowles; 3, Mr. and Mrs. Hewitt. Bristol Shubunkins bred 1978 (23): 1, 2, and 3, J. Whiting; 4, Rothwell. Moors bred 1978 (18): 1, 2, and 4, V. Cole; 3, J. Day. Orandas and Veiltails bred 1978 (11): 1, 2, and 3, R. King; 4, W. Ramsden. Lionheads bred 1978 (10): 1, 2, and 4, J. Parker; 3, R. Pincock. A.O.V. Goldfish bred 1978 (6): 1, 3, and 4, J. Kingland, 2, J. Parker. Team of

4 Bristol Shubunkins bred 1978 (13): 1, J. Whiting; 2, B. Cook; 3, 4, A. Pyne. Team of 4 Veiltails, Orandas or Moors bred 1978 (8): 1, R. King; 2, B. Cook; 3, 4, R. Pincock. Team of 4 One variety, A.O.V. Goldfish bred 1978 (4): 1, G. Bell; 2, and 4, Mrs. Hodgkinson; 3, W. Ramsden. Team of 4 One variety Koi, A.O.V. Pond or River Fish bred 1978 (3): 1, Mrs. J. Amos; 2, and 3, R. King. Bristol Shubunkins, Matched Pairs, 5' limit (12): 1, R. Whittington; 2, V. Cole; 3, A. Churchill; 4, B. Cook. Novice Class Bristol Shubunkins, 5' limit (18): 1, 3, and 4, J. Moore; 2, R. Williams. Novice Class, A.O.V. Goldfish 5' limit (6): 1, and 2, M. Calway; 3, and 4, R. Williams. Any Variety Metallic Variegated Goldfish (9): 1, J. Kingland; 2, 3, and 4, M. Calway.

THERE were 432 entries for the Blackpool and Fylde A.S. and the Best Fish in Show award was won by Mr. & Mrs. Underwood with a Pike Cichlid. The other results were as follows: Common Goldfish: 1, Mr. & Mrs. Baldwin (Sandgrounders); 2, D. Wright (Blackpool); 3, B. Dawson (Heywood). Shubunkins: 1, Mr. & Mrs. J. Hewitt (Osram); 2, S. Walsh (Accrington); 3, Mr. Downy (Sandgrounders). A.O.V. Goldwater: 1, Mr. & Mrs. Roberts (Doncaster); 2, R. Haigh (Blackpool); 3, R. Dingley (Heywood). Veiltails, Fantails & Moors: 1, 2, and 3, Mr. & Mrs. J. Hewitt (Osram). 2, 1, Mr. & Mrs. Harvey (Sandgrounders); 2, R. Dingley (Heywood); 3, Mr. & Mrs. J. Hewitt (Osram). A.O.V. Fancy Goldfish: One Entry, Mr. & Mrs. J. Hewitt (Osram). Breeders Coldwater: One Entry, Mr. & Mrs. Hewitt (Osram). Swordtails: 1, D. Francis (Merseyside); 2, D. Garstang (Longridge); 3, M. J. Bradshaw (Longridge). Platies: 1, D. Garstang (Longridge); 2, M. J. Bradshaw (Longridge); 3, B. W. Carter (St. Helens). Mollies: 1, L. Penney (St. Helens); 2, B. W. Carter (St. Helens); 3, J. Roberts (Nelson). Guppies: 1, S. Lynne (Accrington); 2, M. Smelter (Merseyside); 3, N. & M. Rimmer (Sandgrounders). A.O.V. Livebearers: 1, Mr. & Mrs. Baldwin (Sandgrounders); 2, M. J. Bradshaw (Longridge); 3, N. & M. Rimmer (Sandgrounders). Characins (up to 10 cm): 1, J. Miscell (N. Staffs); 2, Miss S. Goddard (Macclesfield); 3, Mr. & Mrs. North (Morecambe). Characins (over 10 cm): 1, Mr. & Mrs. Underwood (Southport); 2, D. Moseley (Blackpool); 3, J. D. Haley (Darwen). Anabantids (small): 1, Mr. & Mrs. North (Morecambe); 2, Mr. & Mrs. Baldwin (Sandgrounders); 3, J. Walker (Merseyside). Anabantids (over 10 cm): 1, Mr. & Mrs. Baldwin (Sandgrounders); 2, and 3, A. Cook (Blackpool). Fighters: 1, B. W. Carter (St. Helens); 2, D. Garstang (Longridge); 3, J. D. Haley (Darwen). Minnows: 1, Mr. & Mrs. Wallbank (Morecambe);

2, Mr. & Mrs. Underwood (Southport). Danios: 1, E. & B. Callon (Bridgewater); 2, L. Penney (St. Helens); 3, M. Allington (Sandgrounders). Rasboras: 1, J. D. Haley (Darwen); 2, Mr. & Mrs. Wallbank (Morecambe); 3, Mr. & Mrs. Roberts (Doncaster). Labeos & Sharks: 1, Mr. & Mrs. Baldwin (Sandgrounders); 2, J. K. Reid (Loyne); 3, Mr. & Mrs. Roberts (Doncaster). Barb (to 10 cm): 1, and 3, B. W. Carter (St. Helens); 2, Mr. & Mrs. Underwood (Southport). Barb (over 10 cm): 1, J. Mackinnon (Southport); 2, Mr. & Mrs. Baldwin (Sandgrounders); 3, Mr. & Mrs. Wallbank (Morecambe). Toothcarps: 1, J. Roberts (Nelson); 2, M. Allington (Sandgrounders); 3, R. Clint (Longridge). Dwarf Cichlids: 1, J. Penney (St. Helens); 2, Mr. & Mrs. Underwood (Southport); 3, Mr. & Mrs. Stott (Oldham). Large Cichlids: 1, and 3, Mr. & Mrs. Underwood (Southport); 2, K. Smith (Blackpool). Rift Valley Cichlids: 1, Mrs. Baldwin (Sandgrounders); 2, Mr. & Mrs. Underwood (Southport). Angels: 1, D. Francis (Merseyside); 2, Mr. & Mrs. J. Harvey (Sandgrounders); 3, E. & B. Callon (Bridgewater). Corydoras: 1, and 2, B. W. Carter (St. Helens); 3, Miss Goddard (Macclesfield). A. V. Catfish: 1, Mr. & Mrs. Baldwin (Sandgrounders); 2, Mrs. Baldwin (Sandgrounders); 3, J. K. Reid (Loyne). Loaches & Bettas: 1, B. Sadler (N. Staffs); 2, P. & H. Batchelor (Loyne); 3, T. Mackinnon (Southport). A.O.V. Tropical: 1, and 2, P. & H. Batchelor (Loyne); 3, E. & B. Callon (Bridgewater). Marines: 1, 2, and 3, S. Rhodes (Longridge). Livebearers: 1, Mr. & Mrs. Goddard (Macclesfield); 2, and 3, N. & M. Rimmer (Sandgrounders). Pairs Egglayers: 1, Mr. & Mrs. Underwood (Southport); 2, A. Unsworth (St. Helens); 3, J. Walker (Merseyside). Breeders Livebearers: 1, B. W. Carter (St. Helens); 2, Mr. & Mrs. Goddard (Macclesfield); 3, A. Unsworth (St. Helens). Breeders (Hard): 1, and 2, L. Cuff (Independent). Breeders (Easy): 1, and 3, P. Ridley (Heywood); 2, D. Garstang (Longridge). Junior Av. Livebearers: 1, D. Garstang (Longridge); 2, and 3, D. Harvey (Sandgrounders).

SPEAKING to members of Bristol A.S. on Pond Care in the Autumn, Mr. W. G. Ham emphasised three basic rules. First a thorough brooming of the emptied pond. Second a careful gardening of submerged aquatics and cutting off decayed Water Lily leaves. Third retention of some of the old water to add to the pond when it was being refilled with fresh water. Offices reported briefly on the success of the Open Show held the previous weekend.

THE September meeting of the Mid-Sussex A.S. was chaired by Mr. A. Temple (Vice-Chairman), who thanked the members who took part in the recent Adur Bath Tub race; to Mrs S. Laylor for organising the day at Saldean Beach in August when Native Marines were the subject of attention, and Mrs M. Young for the work put into the organisation of the 50/100 club. On the social side there will be a Disco at Clear Hall, Haywards Heath on the 10th November, with dancing to the Square Circles Disco.

The monthly table show was judged by Mr. J. Burtles and Mr. W. Slade, who awarded the cards as follows: Barba: 1, and 2, W. Slade; 3 and 4, P. Levine. Dwarf Cichlids: 1, P. Levine. Cichlids: 1, B. and T. Tester; 2, B. Perrin; 3, B. Sayers. Further details of the Society may be obtained from the Secretary, Mr. W. Slade, H. Heath 53747.

AT the first meeting in August of the Walthamstow and District A.S. some Club members formed a panel to answer questions on a variety of 'fishy' subjects. Some of the new members asked a large number of questions all of which were answered and were of help to the questioner. At the second meeting Alan Chandler showed some slides of past successes of Furnished Aquaria exhibited by the club members.

A THREE way tournament was held recently at Dow Corning A.S. (Barry) between Port Talbot A.S., Llantwit Major A.S. and Dow

### REWARD

A £500 reward will be paid for information leading to the whereabouts and recovery of the Schmidt-Focke brilliant Turquoise and Turquoise X Red Discus fish, which were stolen on October 16th, 1978, from the premises of The Highgate Aquarist.

Corning A.S. Once again Port Talbot A.S. were the winners in this tournament, and retain the trophy for another season. Results: Port Talbot A.S. 37 points. Llantwit Major A.S. 7 points; Dove Corning A.S. 3 points. Also held recently at Port Talbot A.S. an interclub match against Swansea A.S. Results: Match L.B.1 & 2, Jayson Arnold; 3, Mrs E. Perkins; 4 & 6, R. Perkins; 5, Mr. J. Egan. E.L.: 1, B. Fouracre; 2, J. Egan; 3, Mrs Dore; 4, J. Arnold; 5, E. Leach; 6, R. Elmore. Knock out: L.H.: 1, E. Leach; 2, J. Egan; 3, H. Crombie; 4, R. Perkins. E.L.: 1, J. Egan; 2, B. Fouracre; 3 & 4, J. Arnold. P.T.A.S. 35 pts, Swansea A.S. 7 pts. Meetings are held fortnightly on a Tuesday at 7.30 p.m. at The Talbot County Youth Centre, Margam, Port Talbot. Further details can be obtained from Port Talbot A.S. Tel: Beiton Ferry (0639) 820362.

**OFFICIALS** elected at the Banff and District A.S. A.G.M. were: President—Chairman—Mr. J. M. Davidson, Banff; Vice President—Mr. J. Hardey, Turfiff; Secretary—Mr. K. J. Davidson "Innesville", 4 Gardiners Brae, Banff, Banffshire AB4 1BD. Scotland. Phone Banff 2836. Treasurer—Mr. K. Galloway, Banff; Show Secretary—Mr. K. Revel, Mintlaw. The committee members elected were: 1, Mrs Ried Portsoy; 2, Mr. M. Watt, Fraserburgh; 3, Mr. J. McFattie, Macduff; 4, Mr. R. Clark, Banff; 5, Mr. A. Ford, Banff. Meetings will be held on Friday nights fortnightly in the clubroom Banff. New and old members welcome.

**THERE** were 444 entries for the Huddersfield T.F.S. open show. The results were as follows: Guppy: 1, Mr. & Mrs Kirk (South Humber-side); 2 & 3, Mr. & Mrs Riley (Leeds). Molly: 1 & 3, M. Price (Castleford); 2, A. Firby (Wyke). Swordtail: 1, A. Draper (Alfreton); 2, Mr. & Mrs Riley (Leeds); 3, D. Beumons (Halifax). Platy: 1 & 2, M. Price (Castleford); 3, A. Draper (Alfreton). A.O.V. Livebearer: 1, 2 & 3, T. Busfield (Barnsley). Characins (small): 1, Mr. Brown (Morley); 2, Mr. & Mrs Riley (Leeds); 3, L. Bush (Morley). Characins (Large): 1, J. Sykes (David Brown); 2, Mr. & Mrs Dames (Doncaster); 3, Master R. Briggs (Huddersfield). Barbs (small): 1 & 2, M. Price (Castleford); 3, A. Smart (Alfreton). Barbs (Large): 1, Mr. & Mrs Roberts (Doncaster); 2, Mr. & Mrs Hennor (Doncaster); 3, Mr. & Mrs Snowden (York & District). Danios & Rasboras: 1, A. Simpson (Barnsley); 2, Mr. & Mrs Lake (South Humber-side); 3, Mr. & Mrs Dames (Doncaster). Egg Laying Toothcarps: 1, Mr. Brown (Morley); 2, Master A. Young (Hull); 3, Mr. J. Britten (Morley). Angels: 1 & 2, Mr. & Mrs Jarman (Barnsley); 3, Mr. & Mrs Hill (Barnsley). Cichlids (Dwarf): 1, Mrs L. C. Heap (Keighley); 2, Mr. & Mrs Kirk (South Humber-side); 3, Mr. & Mrs Lake (South Humber-side). Cichlids (Large): 1, M. Price (Castleford); 2, S. Sutton (Barnsley); 3, Mrs L. C. Heap (Keighley). Rift Valley Cichlids: 1 & 2, M. A. Hollingworth (Sherwood); 3, A. Frisby (Wyke). Anabantids (Small): 1, Mrs B. Anderson (Wyke); 2, Mr. & Mrs Riley (Leeds); 3, L. Price (Castleford). Fighters: 1 & 3, Mrs B. Anderson (Wyke); 2, Mr. & Mrs Riley (Leeds). Anabantids (Large): 1, Mr. & Mrs Copley (Doncaster); 2, Mr. K. Luncheon (Doncaster); 3, Mr. A. Draper (Alfreton). Catfish (Goryderas): 1, Mr. & Mrs Copley (Doncaster); 2 & 3, M. Price (Castleford). A.O.V. Catfish: 1, Mr. Hill (Barnsley); 2, T. Stanfield (Towers); 3, Mr. & Mrs Wickham (Sheffield). Loaches: 1, Mr. & Mrs Dames (Doncaster); 2, E. & A. M. Rice (Barnsley); 3, Mr. & Mrs Lake (South Humber-side). Sharks & Foxes: 1, Mr. & Mrs Copley (Doncaster); 2, D. Hill (Huddersfield); 3, L. Bush (Morley). A.O.V. Tropical: 1, A. Frisby (Wyke); 2, M. Price (Castleford); 3, Mr. & Mrs Copley (Doncaster). Breeders, Livebearers A & B: 1, Mr. & Mrs Hopkinson (Darfield); 2 & 3, A. Draper (Alfreton). Breeders, Livebearers C & D: 1, T. Busfield (Barnsley); 2, B. Banks (Thorne); 3, Mr. & Mrs Hopkinson (Darfield). Breeders, Egglayers A & B: 1, D. Barrett (Thorne); 2, D. L. Harrop (Huddersfield); 3, Mr. Gover (Barnsley). Breeders, Egglayers C & D: 1, A. Simpson (Barnsley); 2, B. Banks

(Thorne); 3, Mr. & Mrs Copley (Doncaster). Pairs (Livebearers): Mr. & Mrs Copley (Doncaster); 2, Mr. & Mrs Hill (Barnsley); 3, T. Busfield (Barnsley). Pairs (Egglayers): 1, L. Gatenby (Bradford); 2, Mr. & Mrs Dames (Doncaster); 3, Mr. & Mrs Copley (Doncaster). Common Goldfish & Cornets: 1, 2 & 3, E. & J. Morton (Hull). Fancy Goldfish: 1 & 2, Mr. & Mrs Wilkinson (Halifax); 3, Mr. & Mrs Hopkinson (Darfield). A.O.V. Coldwater: 1, Mr. & Mrs Snowden (York); 2, Mr. & Mrs Riley (Leeds); 3, Mr. & Mrs Roberts (Doncaster). Juniors: 1, Master M. Lake (South Humber-side); 2 & 3, Master M. Town (Huddersfield). Furnished Jar: 1, Mrs V. Lee (Chesterfield); 2 & 3, Mr. & Mrs Kemp (Sheaf Valley). Ladies: 1, Mrs E. Stanfield (Tower); 2, Miss H. Brown (Morley); 3, Mrs B. Jarman (Independent). Marine: 1, K. & A. Aldred (Osram); 2, Mr. J. E. Sheppard (Barnsley). Novelty Class: 1, Mr. & Mrs Copp (David Brown); 2 & 3, Mr. K. Luncheon (Doncaster). NoVICE: 1, G. Mitchell (Huddersfield); 2, K. Davis (Darfield); 3, Master S. Stanfield (Bradford). Best in Show was a Microgobius Parahybae exhibited by Mr. Hill of Barnsley. The Best Exhibit was won by Mr. A. Simpson of Barnsley A.S. The society gaining most points was Doncaster, and the award for the Huddersfield member gaining most points went to Mr. G. Mitchell.

**OPEN** Show results of the Wellingborough and District A.S. held in September were as follows: Class B: 1, Mrs D. Cruickshank; 2, A. & M. Crew; 3 & 4, C. Sykes. Class Ba: 1, A. & M. Crew; 2, P. Lawrence; 3 & 4, W. Axon. Class C: 1 & 4, M. Davies; 2, D. Goss; 3, C. Sykes. Class Ca: 1, K. Swan; 2 & 4, R. Elliott; 3, P. Lawrence. Class Cb: 1, P. Lawrence; 2, D. Goss; 3, D. McAllister; 4, J. Sievwright. Class D: 1, B. Towler; 2, J. & P. Patching; 3, M. Laws; 4, K. Swan. Class Db: 1 & 2, R. Elliott; 3, A. & M. Crew; 4, A. & M. Crew. Class E: 1, W. Axon; 2, D. Goss; 3, P. Rushbrooke; 4, M. & B. Coe; 5, K. Swan. Class F: 1, A. & M. Crew; 2, J. Land; 3, M. Davies; 4, J. Sievwright. Class G: 1, C. Sykes; 2, P. Rushbrooke; 3, C. A. Simper; 4, A. & M. Crew. Class H: 1, 2 & 4, T. Cruickshank; 3, C. Sykes. Class Ha: 1, T. Cruickshank; 2, B. Bow; 3, P. Lawrence; 4, P. Rushbrooke. Class J: 1 & 3, B. Bow; 2, N. Davies; 4, D. Goss. Class K: 1, D. Goss (Best Fish in Show); 2, & 4, R. Elliott; 3, D. Goss. Class L: 1, D. Goss; 2 & 3, K. Beaver. Class M: 1 & 2, A. & M. Crew; 3, R. Wilson; 4, J. Short. Class N (b-m): 1, A. & M. Crew; 2, R. Elliott; 3, P. Rushbrooke; 4, K. Swan. Class N (o-t): 1, B. Bow; 2, M. Davies; 3 & 4, R. Wilson. Class O: 1, D. McAllister; 2 & 3, A. & M. Crew; 4, T. & S. Jones. Class Q: 1, M. Dange sold. Class R: 1, M. & B. Coe; 2, A. Hutt; 3, R. Wilson; 4, Mr. & Mrs Salisbury. Class S: 1, J. & P. Patching; 2, P. Rushbrooke; 3, D. McAllister; 4, A. & M. Crew. Class T: 1 & 2, B. Bow; 3, R. Wilson; 4, Mrs D. Cruickshank. Class V: 1, K. Beaver. Class W: 1, A. & M. Crew; 2 & 4, K. Beaver; 3, J. Sievwright. Class X (b-m): 1 & 2, C. Sykes. Class X (o-t): 1, F. Panther; 2 & 3, M. Davies; 4, R. Wilson.

**THE** quarterly East Anglian Federated Aquarists show was held at Thetford in September. There were 174 entries, and the following societies took part: Diss (D), Bly (B), Great Yarmouth (GY), Ipswich (I), Kings Lynn (KL), Thetford (T) and Thorpe & District (TD). The plaque for Best Fish in Show was awarded to Mr. B. Towler of Kings Lynn for a Haplochromis Ovatus. The results for the classes were as follows: Barbs: 1 & 3, N. Cobb (D); 2, N. Newby (TD); 4, T. Gillman (T). Characins: 1, A. Ross (E); 2, N. Crowson (E); 3, N. Cobb (D); 4, D. Turnbull (I). Cichlids: 1, B. Towler (KL); 2, M. Laws (KL); 3, S. Cowell (E); 4, D. Cooper (RTD). Dwarf Cichlids: 1, K. Appleton (TD); 2, T. Cork (TD). Labyrinth: 1, D. Cooper (TD); 2, K. Appleton (TD); 3, A. Ross (E); 4, N. Newby (TD). Toothcarps: 1 & 4, F. Aulicet (I); 2, S. Cowell (E); 3, A. Ross (E). Catfish: 1, T. Cork (TD); 2, T. Thorpe (GY); 3, N. Cobb (D); 4, N. Crowson (E). Rasboras: 1, A. Ross (E); 2, N.

Newby (TD). Danios: 1 & 3, A. Ross (E); 2, J. Kehoe (T); 4, T. Cork (TD). Loaches: 1, S. Cowell (E); 2 & 4, D. Cooper (TD); 3, N. Newby (TD). Pairs: 1, N. Crowson (E); 2, A. Ross (E); 3, G. Drewry (GY); 4, N. Cobb (D). Guppies: 1, M. Aulicet (I); 2 & 4, D. Turnbull (I); 3, K. Appleton (TD). Swordtails: 1, K. Appleton (TD); 2 & 3, G. Drewry (GY); 4, M. Laws (KL). Platies: 1 & 4, K. Appleton (TD); 2, A. Ross (E); 3, C. Fearnley (TD). Mollies: 1, 3 & 4, N. Cobb (D); 2, B. Towler (KL). A.O.V. Livebearers: 1, T. Cork (TD); 2, N. Newby (TD). A.O.V. Egglayers: 1, T. Gillman (T); 2, N. Newby (TD); 3, B. Towler (KL); 4, N. Crowson (E). Coldwater Single: 1 & 3, A. Wood (T); 2, K. Appleton (TD); 4, H. Brundish (D). Coldwater Double: 1, H. Brundish (D); 2, Mrs Wood (T); 3, V. Wood (T); 4, N. Cobb (D). Coldwater A.O.V.: 1, J. Good (T); 2, H. Brundish (D). Breeders: 1 & 2, N. Newby (TD); 3, K. Appleton (TD); 4, Drewry (GY). Junior: 1, A. Cobb (D); 2, J. Norton (TD); 3, E. Cork (TD); 4, J. Norton (TD).

**AT** the July meeting of The Goldfish Society of Great Britain, about 50 members listened to Mr. Ken Speaks giving a well planned talk, illustrated with many photos and drawings. As Ken is one of the best known breeders of Bubble Eyes in England, he was able to talk an answer question confidently.

Ken spoke about the many problems he had trying to perfect a strain of Calico Bubble Eyes, the problems he had with imported fish. Ken brought along many fine examples of both Calico and Mantala Bubble Eyes which he used to explain the crosses he had carried out to get this strain of fish.

After tea Tony Barnes spoke about the Continuous Water Circulation System he had recently installed in his fish house. With the aid of drawings, Tony gave a step by step explanation of how the work was carried out, including the cutting of 15 mm holes in the front glass of his aquariums to enable plastic pipes to connect them together. Tony finished by telling of the advantages of the system he had noticed during the first few months of operation.

The second table show for the Morris Club trophy was judged during the afternoon by Jim Bundell and Gordon King, both of whom remarked on the high quality of the fish on show. Class winners were Bill Cook—Calico Veiltails, Albert Louvar—Pearl Scales, John Kingsland—Broad Tail Moors, Alan Lawman—Calico Otanda's.

**THE** British Koi Keeper's Society enjoyed a very successful day in September on the occasion of their third National Koi Show. Visitors were able to see a very high standard of Koi, ranging in size from 4 in. to 28 in. in length. 340 fish were exhibited. The Best in Show was a Kohaku 24 in. owned by Mr. R. Hodgson and received two Japanese trophies and the Ashling Salver, 2nd Best in Show, 26 in. Koi-Utsuri owned by Mrs L. Reynolds, 3rd Best in Show 24 in. Kohaku owned by Mr. R. Seal. Results: Size 6, Atkins Cup, Mr. R. Hodgson; Size 5, Scientific Cup, Mr. R. Seal; Size 4, Avon Koi Award, Mr. R. Seal; Size 3, Goode Salver, Mr. R. Seal; Size 2, Hanson Cup, Mr. R. Hodgson; Size 1, London Cup, Mr. B. Ashworth; Kohaku, Reynolds Cup & Aquatic Nurseries Trophy, Mr. R. Hodgson; Taisho-Sanke, Northern Cup, Mr. R. Seal; Showa-Sanke, T.F.H. Trophy, Mr. P. Holgate; Tancho, Brothers' Cup, Mr. R. Hodgson; Utsuri, Birmingham Salver, Mrs. L. Reynolds; Bekko, Wauinsley Bowl, Mr. P. Waddington; Asagi, Davis Cup, Mrs M. New; Shumai, Manchin Plate, Mr. G. Woodward; Hariwake, Thames Cup, Mr. G. Woodward; Ogon, Cook Tankard, Mr. G. Woodward; Ginrin, Kingston Cup, Mr. C. Roe; Kawari-Mono, Cornish Cup, Mr. B. Ashworth; Hikari-Mono, Westex Bowl, Mr. R. Seal; Largest Koi, Jumbo Cup, Mrs L. Reynolds.

**LADIES** night held by Accrington A.S. was a great success. The speaker for the night was Mr. Francis who gave a lecture on white spot. After the lecture was over the members enjoyed a supper laid on by the ladies and all the members

showed their appreciation. There was a large table show of about 35 entries. The Accrington A.S. hold their meetings every first Wednesday in the month. Details from S. Lyne, 12 Thwaites Rd, Oswaldtwistle, Nr Accrington.

**RESULTS of the Scunthorpe & District A.S. mini-open show were as follows:** Guppies: 1 & 3, Mr. & Mrs. P. Smith (Scun/District); 2, S. Jackson (Independent). Platies: Mr. & Mrs. Honnor (Doncaster). Mollies: 1, 2 & 3, Mr. & Mrs. G. Martin (Scun/Dist). Swordtails: S. Mason (Scun Museum); 2, S. Martin (Scun/Dist); 3, P. Matthews (Immingham). A.O.V. Live: 1, 2 & 3, A. Clayton (Immingham). S. Barbs: 1, Mr. & Mrs. P. Smith (Scun/Dist); 2 & 3, P. Matthews (Immingham). L. Barbs: 1, A. Clayton (Immingham); 2, Mr. & Mrs. Honnor (Doncaster). Characins: 1, G. White (Ashby); 2, S. Mason (Scun Museum); 3, Mr. & Mrs. Honnor (Doncaster). Corydoras: 1 & 2, E. Bowles (Scun Museum); 3, Mr. & Mrs. P. Smith (Scun/Dist). A.O.V. Cat: 1, T. Sanderson (Thorne); 2, G. Sanderson (Thorne); 3, Mr. & Mrs. Honnor (Doncaster). A.O.V. Anabantid: 1, P. Matthews (Immingham); 2, & 3, T. Phillips (Hull). Fighters: 1, L. Wilson (Grimsby/Clee); 2, F. Wilson (Grimsby/Clee); 3, P. Matthews (Immingham). S. Cichlid: 1, F. Hodson (Immingham). R.V. Cichlid: 1, B. Banks (Thorne); 2, Mr. & Mrs. P. Smith (Scunthorpe Dist). A.O.V. Cichlid: 1, G. White (Ashby); 2 & 3, E. Bowles (Scunthorpe Museum). RAS Dantini: 1, 2 & 3, E. Bowles (Scunthorpe Museum). Killies: 1, S. Mason (Scunthorpe Museum); 2 & 3, Mr. & Mrs. P. Smith (Scunthorpe Dist). Loaches & Borias: 1, T. Sanderson (Thorne); 2, Mr. & Mrs. Honnor (Doncaster). A.O.V. Trop. Egglayer: 1, E. Bowles (Scunthorpe Museum); 2, T. Sanderson (Thorne); 3, G. White (Ashby). A.O.V. Coldwater: 1, & 2, A. Plant (Independent). Bred Live (A & B): 1, B. Banks (Thorne); 2, Mr. & Mrs. P. Smith (Scunthorpe & Dist). Bred Live (C & D): 1, B. Banks (Thorne). Bred Egg (A & B): 1, B. Banks (Thorne); 2, Mr. & Mrs. P. Smith (Scunthorpe & Dist). Bred Egg (C & D): 1, 2 & 3, B. Banks (Thorne). Best Fish in Show: T. Sanderson (Thorne) (Coolie Loach).

**OVER** the last few months, the David Brown A.S. has been very busy. Most of any spare time that members may have had, has been spent building a Tableau to be entered at the Y.A.F., and B.A.P. shows.

It must be noted at this point, it was pointed out to us that not many Societies of only 2 years standing were willing to attend a show of this size, and that we had done well.

Although no prizes were taken for the Tableau itself, entries within the Tableau were more successful for the members concerned. The following results were attained: Furnished Aquaria (Individual Entry) 3, Mr. John Sykes. Novelty 3, Mrs. J. C. Copp. Characins (Large) 2, Mr. John Sykes. Siamese Fighters 2, Mr. Steve Moorhouse. Egglaying Toothcarps 3, Mr. John Sykes. Having done so well at this show, it is now hoped that we will improve on these results at this year's B.A.F. at Belle Vue.

On the 1st of July, a coach party of 45 members and children set out on a visit to the London Zoo. An enjoyable time was had by all, and all the children and junior members were given 50p to spend at the Zoo.

Any person interested in joining this young but go ahead Society, can get details from the Secretary Mr. Allen Copp, 14 Sutton Avenue, Dalton, Huddersfield, West Yorkshire, HD5 9SY. Telephone (0484) 43396.

**AT** the August meeting Llantwit Major A.S. held their annual competition for the "Best Fish in August Show Trophy". This year's class of A.O.V. Livebearers drew a large number of entries and was judged by Mr. C. J. Turner (FJAS/CNA). Results as follows: 1, 2 & 3, J. Edwards; 4, J. Thomson.

After judging, Mr. Turner explained in detail how every exhibit had been pointed. This was extremely informative and interesting to both new and old members alike.

Meetings are held on the second Monday of each month at the "Red Dragon Club" in St. Athan. Everyone welcome.

**OPEN Show results of the Hounslow & District A.S. were as follows:** Class AG: 1, M. Bird (Tonham); 2, R. S. Hart (Hounslow); 3, P. Rogers (HDAS); B: 1, R. Adams (Salisbury); 2, A. Chaplin (Independent); 3, P. Lawrence (Reading). Class Ba: 1, R. Adams (Salisbury); 2, T. Woolley (Saracens); 3, F. May (Basingstoke). Class C: 1, M. Fox (Harlow); 2, T. Burvill (Independent); 3, A. Feast (Tonbridge). Class Ca: 1, P. Baker (Basingstoke); 2 & 3, A. Feast (Tonbridge). Class D: 1, F. May (Basingstoke); 2, P. Baker (Basingstoke); 3, P. Hampton (Hounslow). Class Db: 1, M. Hollingworth (Sherwood); 2 & 3, S. Pitcher (Salisbury). Dc: 1, M. Hollingworth (Sherwood); 2 & 3, S. Pitcher (Salisbury). Class E: 1, D. Goss (Reading); 2, R. Adams (Salisbury); 3, R. Watkins (Rochampton). Class Ea: 1, R. Adams (Salisbury); 2 & 3, P. Hampton (Hounslow). Class F: 1, M. Alexander (West Salisbury); 2, M. Bird (Tonham); 3, C. Wood (N. Kent). Class Fodf: 1, R. Adams (Salisbury); 2, M. Waller (E. London); 3, T. Woolley (Saracens). Class G: 1 & 3, T. Woolley (Saracens); 2, P. Gregory (Hounslow); 3, A. Gibson (Reading). Class H: 1 & 2, D. Goss (Reading); 3, T. Burvill (Independent). Class K: 1 & 3, D. Goss (Reading); 2, P. Lawrence (Reading). Class L: 1, H. Chaplin (Independent); 2 & 3, A. Gibson (Reading). Class M: 1, A. Gibson (Reading); 2, R. Watkins (Rochampton); 3, I. Lecky (Basingstoke). Class N B-T: 1, J. Carpenter (H.D.A.S.); 2, P. Rogers (MDAS); 3, P. Cripps (Newbury). Class O: 1, P. Cripps (Newbury); 2, A. Hurr (Reading); 3, P. Holding (Reading). Class P: 1 & 3, A. Constantine (HDAS); 2, T. Wilson (HDAS). Class Q: 1, T. Burvill (Independent); 2, M. Robinson (Salisbury); 3, W. West (Salisbury). Class R: 1, M. Robinson (Salisbury); 2, A. Constantine (MDAS); 3, I. Lecky (Basingstoke). 5: 1, I. Lecky (Basingstoke); 2 & 3: T. Woolley (Saracens). Class T: 1, A. Feast (Tonbridge); 2, T. Woolley (Saracens); 3, P. Rogers (MDAS). Class Uab: 1, D. Craft (MDAS); 2, R. S. Hart (MDAS); 3, P. Hampton (MDAS). Ugb: 1, R. S. Hart (MDAS). Class W: 1, R. S. Hart (MADS); 2, F. May (Basingstoke); 3, P. Hampton (HDAS). Class X B-H: 1, T. Waller (E. London); 2, M. Fox (Harlow); 3, T. Woolley (Saracens). X O-T: 1, D. Rogers (HDAS); 2, J. Carpenter (HDAS); 3, T. Waller (E. London). Specialist: 1, J. Carpenter (HDAS); 2, T. Woolley (Saracens); 3, A. Feast (Tonbridge). Best in Show: Mr. D. Goss of Reading with a Dwarf Gourami.

**THERE** were 329 entries for the Long Eaton A.S. open show held in August. Results: Ba: 1, Mr. & Mrs. Honnor (Doncaster); 2, S. Hill (Alfreton); 3, H. Thorpe (Doncaster). B: 1 & 3, Mrs. D. Cruickshank (Ealing); 2, S.M.I.N. (Nuneaton). Ca/Cb: 1, Mr. & Mrs. Lake (South Humberide); 2, J. W. Langford (Wednesbury); 3, Mr. & Mrs. G. Cox (Nuneaton). C: 1, P. Gregory (Sherwood); 2, T. A. Cruickshank (Ealing); 3, S.M.I.N. (Nuneaton). Da: 1, Mr. D. Burton (Long Eaton); 2, Mr. H. Thorpe (Doncaster); 3, Matthew Stevenson (Private). Db: 1, S. Hill (Alfreton); 2, Mr. & Mrs. Lake (South Humberide); 3, Mr. & Mrs. G. Cox (Nuneaton). Dc: 1, Mr. M. A. Hollingworth (Sherwood); 2, B. E. Towler (Kings Lynn); 3, Margaret Henderson (Corby & District). D: 1, M. G. Laws (Kings Lynn); 2, Mr. Cauldwell (Derby Regent); 3, B. E. Towler (Kings Lynn). Eac: 1, & 2, Mrs. B. Anderson (Wyke); 3, Mrs. H. Blades (Bassetlaw). Eb: 1, A. Draper (Alfreton); 2, Mrs. Anderson (Wyke); 3, Mrs. B. Burton (Long Eaton). E: No Entries. F: 1, D. Barrett (Thorne); 2 & 3, S. Hill (Alfreton). G: 1, P. Gregory (Sherwood); 2, Mr. H. Thorpe (Doncaster); 3, B. J. Chapman (Long Eaton). H: 1 & 3, T. A. Cruickshank (Ealing); 2, J. Riley (Leeds). J: 1, S.M.I.N. (Nuneaton); 2, I. Purdy (Loughborough); 3, Mr. & Mrs. Lake (South Humberide). K: 1, T. A. Cruickshank (Ealing); 2, Mr. & Mrs. Lake

(South Humberide); 3, R. West (Long Eaton). L: 1, T. January (Wednesbury); 2, D. Marples (Sherwood); 3, Mr. & Mrs. Honnor (Doncaster). Ms: 1, M. Short (Corby); 2, P. Coxon (North Staffs); 3, B. J. Chapman (Long Eaton). N: B-M: 1, L. Godwin (L.N.P.A.S.); 2, D. Cartwright (Hucknall & Bulwell); 3, D. Marples (Sherwood). N O-T: 1, S.M.I.N. (Nuneaton); 2, Mrs. H. Blades (Bassetlaw); 3, I. Godwin (L.N.P.A.S.); O: 1, Mr. H. Thorpe (Doncaster); 2, Mr. & Mrs. J. Riley (Leeds); 3, A. Draper (Alfreton). Q: 1, L. Godwin (L.N.P.A.S.); 2, A. Draper (Alfreton); 3, E. Rudd (Queen of the Midlands). R: 1, A. Bryan (Sherwood); 2, K. Appleton (Thorpe & District); 3, L. Godwin (L.N.P.A.S.). S: 1, K. Appleton (Thorpe & District); 2, Mrs. D. Cruickshank (Ealing); 3, Mr. & Mrs. Honnor (Doncaster). T: 1, S.M.I.N. (Nuneaton); 2 & 3, Mrs. D. Cruickshank (Ealing). U: M: 1, Turton (Private); 2, Mrs. N. Richardson (Loughborough); 3, Mr. R. Smullen (Long Eaton). V: 1, L. Godwin (L.N.P.A.S.); W: 1, S.M.I.N. (Nuneaton); 2, Mr. & Mrs. J. Riley (Leeds); 3, R. K. Tipping (Private). X: B-M: 1, Mr. & Mrs. G. Cox (Nuneaton); 2 & 3, D. Barrett (Thorne). X O-T: 1, S.M.I.N. (Nuneaton); 2, L. Godwin (L.N.P.A.S.); 3, A. Draper (Alfreton). M: 1, T. A. Cruickshank (Ealing); 2, B. J. Chapman (Long Eaton); 3, T. Jerrick (Queen of the Midlands). Best Fish in Show: M. A. Hollingworth (De) (Haplochromis Fuscotaeniatus).

**WINNERS at the Bridgewater A.S. Open Show were as follows:** Guppies: 1, Mr. & Mrs. Stevenson (Osram); 2, T. Carnet (Bridgewater); 3, K. Thompson (Merseyside). Platies: 1, B. W. Carter (St. Helens); 2, W. T. Squire (Withenshaw); 3, B. & B. Durham (Longridge). Swordtails: 1, M. & J. Bredshaw (Longridge); 2, D. Francis (Merseyside); 3, B. W. Carter (St. Helens). Mollies: 1 & 2, Mr. & Mrs. Iddon (Sandgrounders); 3, P. Kenyon (Sandgrounders). A.O.V. Livebearers: 1 & 2, K. Thompson (Merseyside) (Section winner); 3, D. Francis (Merseyside). Small Anabantids: 1, B. Sadler (North Staffs); 2, Mr. & Mrs. Appinall (Sandgrounders); 3, J. Walker (Merseyside). Large Anabantids: 1, Mr. & Mrs. Baldwin (Sandgrounders); 2 & 3, Mr. & Mrs. Iddon (Sandgrounders). Fighters: 1 & 2, B. W. Carter (St. Helens) (Section winner); 3, J. Haley (Darwen). Small Cichlids: 1, P. Wilson (Skelmersdale); 2, Mr. & Mrs. Standen (Blackburn); 3, D. Mason (Bridgewater). Large Cichlids: 1, Mr. & Mrs. McGillion (Bridgewater); 2, Mr. & Mrs. Widd (Osram); 3, J. Tinsley (Sandgrounders). Angels: 1, K. Buckley (Bridgewater); 2, J. O'Connor (Runcorn); 3, Mr. & Mrs. Stevenson (Osram). Rift Valley: 1, Mr. & Mrs. Iddon (Sandgrounders) (Best in Show); 2, K. & A. Aldred (Osram); 3, D. Mason (Bridgewater). Small Barbs: 1 & 3, Mr. & Mrs. Stevenson (Osram); 2, Mr. & Mrs. Mulla (Merseyside). Large Barbs: 1, B. & B. Durham (Longridge) (Section winner); 2, Mr. & Mrs. Baldwin (Sandgrounders); 3, J. Walker (Merseyside). Small Characins: 1, K. Buckley (Bridgewater) (Section Winner); 2, P. Wilson (Skelmersdale); 3, Mr. & Mrs. Stevenson (Osram). Large Characins: 1, Mr. & Mrs. Stevenson (Osram); 2 & 3, Mr. & Mrs. B. Walsh (Blackburn). Toothcarps: 1 & 2, K. Buckley (Bridgewater); 3, R. & I. Payne (Merseyside). Rasboras: 1, T. & J. Selby (Wythenshawe); 2 & 3, S. Tomlinson (Macclesfield). Danios: 1, B. Steadman (Runcorn); 2, W. Chapman (Bridgewater); 3, J. Haley (Darwen). Minnows: 1, J. Haley (Darwen) (Section winner); 2, Mr. & Mrs. Baldwin (Sandgrounders); 3, P. Kenyon (Sandgrounders). Corydoras & Brochis: 1, J. Haley (Darwen) (Section winner); 2, I. McCathoney (Skelmersdale); 3, Mr. & Mrs. Muckle (Runcorn). Loaches: 1, B. Sadler (North Staffs); 2, Mr. & Mrs. Baldwin (Sandgrounders). A.O.V. Catfish: 1, Mr. & Mrs. Baldwin (Sandgrounders); 2, P. & H. Batchelor (Loynes); 3, K. Thompson (Merseyside). Sharks: 1, Mr. & Mrs. Baldwin (Sandgrounders) (Section winners); 2, D. Beld (Bridgewater); 3, J. & K. Reid (Loynes). Flying Foxes: 1, R. I. Payne (Merseyside); 2, T. & J. Selby (Wythenshawe); 3, Mr. & Mrs. Walsh (Blackburn). Breeders Egglayers (Easy A-B): 1, W. Edwards (Bridgewater) (Section winner); 2, F. Summers

(Skelmersdale); 3, Mr. & Mrs Iddon (Sandgrounders). Breeders Egglayers (Hard C-D); 1 & 2, Mr. & Mrs Iddon (Sandgrounders); 3, P. Summers (Skelmersdale). Breeders Livebearers: 1 & 2, P. Wilson (Skelmersdale); 3, B. & B. Durham (Longridge). Pairs (Egg-layers): 1 & 2, Mr. & Mrs Baldwin (Sandgrounders) (Section winners); 3, B. W. Carter (St. Helens). Pairs (Livebearers): 1, K. Thompson (Merseyside); 2, D. Francis (Merseyside); 3, B. W. Carter (St. Helens). A.O.V. Tropical: 1, Mr. & Mrs Millership (Bridgewater) (Section winners); 2, P. & H. Batchelor (Loynes); 3, Mr. & Mrs Walsh (Blackburn). Juniors Livebearers: 1, Master K. Corbett (Merseyside) (Section winner); 2, M. & J. Bradshaw (Longridge); 3, P. & I. Iddon (Sandgrounders). Juniors Egglayers: 1 & 2, Master K. Corbett (Merseyside); 3, G. Lawless (Leigh). Single Tail Goldfish: 1, Mr. & Mrs Dawson (Heywood); 2, Mr. & Mrs Baldwin (Sandgrounders); 3, Mr. & Mrs Hewitt (Ostram). Double Tail Goldfish: 1, Mr. & Mrs Hewitt (Ostram) (Section winners); 2 & 3, R. Dingley (Heywood). A.O.V. Coldwater: 1, M. Burgoyne (Bridgewater); 2, A. Parker (Warrington); 3, R. Dingley (Heywood). Marine: 1, S. Rhodes (Longridge); 2, R. Holden (Longridge); 3, K. & A. Aldred (Ostram). Mini-Jars: 1 & 2, Mr. & Mrs N. Stevenson (Ostram); 3, J. Walker (Merseyside).

**THE Bexleyheath & District A.S.** held their Second Annual Exhibition at Roberts Hall Bexleyheath in August, and this proved to be a very good show. The Society meet at the A.B.C. Cine/Bowl Broadway, Bexleyheath, alternate Thursdays at 8.00 p.m.

**AT THE September meeting of the Thorpe and District A.S.** the capacity audience were entertained to an illustrated lecture by Dr. David Ford on the "Birth of Aquaria".

David Ford is president of the society and the chairman presented him with an engraved glass bowl to commemorate this position.

Results of the monthly table show were as follows: Killifish: 1, 2 & 3, G. Balls. Mollies: 1 & 2, G. Webster; 3, C. Feanley. Juniors 1, 2 & 3, D. Hurn. Open show results (Long Eaton A.S.): Mollis: 1, K. Appleton. Platis: 2, K. Appleton. Koi: 4, K. Appleton.

The club was also featured on the recently shown Survival film on television entitled Fighters and Archers. Meetings are held on the first Wednesday of each month, at 8 p.m., at the Canary Public House, Heston Estate, Norwich and new members are always welcome.

**DETAILS of the Petersfield A.S. Wythenshawe & District Open Shows** will be published in December issue. The Halifax A.S. particulars will also appear in a later issue.

**AT A well attended August meeting of the Thanet A.S.** Mr. K. Tozzi of the Southern Water Authority, gave a very good talk on the local water supply and how it affects fish-keepers. Table Show results: Barb: 1, Mr. Akhurst; 2 & 3, Mr. Wale. A.O.V. Egg-layers: 1, Mr. Akhurst; 2, Mr. Walsh; 3, Mr. Wale. Club night, third Tuesday in each month, held at the Thanet Aquariums, Palm Bay, Margate. All new members welcome. Secretary: Mrs P. Edwards, 14 Upper Dane Road, Margate.

**SHOW results from Macclesfield A.S.** were: Guppies: 1 & 2, Mr. K. Thompson (ME); J. Corbett (ME). Platis: 1, D. Garstang (LO); 2, B. W. Carter (STH); 3, B. Stedman (RU). Swordtails: 1, D. Francis (ME); 2, D. Garstang (LO); 3, M. & J. Bradshaw (LO). Mollies: 1 & 3, Mr. & Mrs Iddon (SA); 2, Mr. & Mrs Aspinall (SA). A.O.V. Livebearers: 1, 2 & 3, K. Thompson (ME). Small Anabantids (up to 8 cms): 1, Mr. & Mrs Aspinall (SA); 2, P. Kenyon (SA); 3, Mr. & Mrs Baldwin (SA). Large Anabantids (over 8 cms): 1, Mr. & Mrs Baldwin (SA); 2, Mr. & Mrs Iddon (SA); 3, Mr. & Mrs Underwood (SO). Fighters: 1, B. W. Carter (STH); 2, J. Buckley (NO); 3, B.

Sadler (NS). Small Cichlids (up to 10 cms): 1, J. Corbett (ME); 2, J. Walker (ME); 3, Mr. & Mrs Underwood (SO). Large Cichlids (over 10 cms): 1 & 2, Mr. & Mrs Underwood (SO); 3, R. Morton (MA). Angels: 1, Mrs Woolman (Ind); 2, C. McDonald (ME); 3, Mr. & Mrs Harvey (SA). Rift Valley: 1, 2 & 3, Mr. & Mrs Iddon (SA). Small Barbs (up to 7.5 cms): 1, Mr. & Mrs Underwood (SO); 2, T. L. Penny (STH); 3, B. W. Carter (STH). Large Barbs (over 7.5 cms): 1, R. Hodge (SO); 2, Mr. & Mrs Baldwin (SA); 3, J. Walker (ME). Small Characins (up to 7.5 cms): 1, K. Thompson (ME); 2, Mr. & Mrs Underwood (SO); 3, B. W. Carter (STH). Large Characins (over 7.5 cms): 1 & 3, Mr. & Mrs Underwood (SO); 2, L. Groves (SA). Toothcarps: 1, K. Ankers (NS); 2, R. I. Payne (ME); T. Broster (SC). Minnows: 1, Mr. & Mrs Underwood (SO); 2, Mr. & Mrs A. Goddard (MA). Danios: 1, J. Walker (ME); 2 & 3, Mr. Bolan (WY). Rasboras: 1, R. Hodge (SO); 2, S. Tomlinson (MA); 3, J. Corbett (ME). Corydoras and Brochis: 1, Mr. & Mrs Muckle (RU); 2, B. Carter (STH); 3, Mr. & Mrs Underwood (SO). A.O.V. Catfish: 1, K. Thompson (ME); 2, C. McDonald (ME); 3, Mr. & Mrs Baldwin (SA). Loaches: 1, B. Sadler (NS); 2, K. Ankers (NS); 3, D. Hulse (OL). Sharks: 1, Mr. & Mrs Baldwin (SA); 2, Mr. & Mrs Underwood (SO); 3, R. Payne (ME). Flying Foxes: 1, Mr. & Mrs Baldwin (SA); 2, K. Corbett (ME); R. Payne (ME). Breeders Egglayers (Hard 11 to 20): 1, Mr. & Mrs Iddon (SA). Breeders Egg-layers (Easy 1 to 10): 1, Mr. & Mrs Iddon (SA); 2, J. Dean (STH); 3, J. Buckley (NO). Breeders Livebearers: 1, K. Thompson (ME); 2, Mr. & Mrs A. Goddard (MA); 3, A. Unsworth (STH). True Pairs Egg-layers: 1, K. Thompson (ME); 2, K. Ankers (NS); 3, Mr. & Mrs Underwood (SO). True Pairs Livebearers: 1 & 2, K. Thompson (ME); 3, A. Whitaker (MA). A.O.V. (any variety not listed): J. Miceli (NS); 2, J. Buckley (NO); 3, D. Garstang (LO). Juniors (Egg-layers): 1, Master K. Corbett (ME); 2, Master R. Underwood (SO); 3, Miss J. Baldwin (SA). Juniors (Livebearers): Master D. Garstang (LO); 2, Master K. Corbett (ME); 3, Master P. Iddon (SA). Common Goldfish: 1, K. Ankers (NS); 2, Mr. & Mrs Baldwin (SA). Fancy Goldfish: 1, Mr. & Mrs Harvey (SA); 2 & 3, Mr. Downie (SA). A.O.V. Goldwater: 1, A. Whitaker (ME); 2, Mr. & Mrs Underwood (SO); 3, B. Stedman (RU). Marine: 1 & 2, R. S. Holden (LO). Ladies (any variety): 1, Mrs S. Underwood (SA); 2, Mrs R. Muckle (RU); 3, Mrs Aspinall (SA). Mini Jars: 1, 2 & 3, J. Walker (ME). Best in Show Mr. K. Thompson Merseyside A.S. (Brachyrhaphis Rhadapher). The competing societies were Merseyside (ME), Longridge (LO), St. Helens (STH), Runcorn (RU), Sandgrounders (SA), Southport (SO), Northwich (NO), North Staffs (NS), Macclesfield (MA), South Cheshire (SC), Wythenshawe (WY), Oldham (OL), Independent (IND).

#### SOCIETY CLOSING

**The Village Bar A.S.** regret to announce that they have been forced to close due to a dispute amongst members about a proposed 1979 Open Show. Ironically the society has closed after a successful major recruiting campaign.

This year they have had the distinction of providing four "Birmingham Series" Champions including the "Birmingham Champion of Champions", so the closure is a sad day for the hobby in Britain's second city. One member, Mr. Andy Shelley-Fisher built a magnificent exhibition stand which will now not be used. He did more than £300 worth of work for the society and never charged a penny and it is regretted that the whole effort has to go to waste. The Society would like to record their thanks. They would also like to thank their friends in the trade and other societies for all the support given to them.

#### SPECIALIST SOCIETY

A new Specialist Society has been formed, namely the "Southern Livebearers Aquatic Group". The elected officers for the coming year are as follows: Chairman—Dave Ches-

wright; Secretary—Keith Dryden. Address: 24 Flamborough Close, Biggin Hill, Kent. Treasurer—Ivan Dibble. Special Controller—Mervyn Strange. Would any aquarist interested in livebearing fishes and a society who specialise in these fish please contact the secretary.

#### VENUE CHANGE

**The Malvern & District A.S.** now meet on the first Monday in the month at St. Joseph's School Hall, Newtown Road, Malvern.

Activities include talks, slide shows, discount club, table shows and monthly newsletter. Potential members are always welcome and the meeting usually starts at about 7.45 p.m.

#### NEW SOCIETY

**The Throckley A.S.** has recently been formed at Newcastle-on-Tyne. The Committee is as follows: J. English, Chairman; A. Flowers, Vice-chairman; T. N. Gray, Treasurer; M. Gray, Secretary, 78 Ashdale Cres., Chapel House Est., Newcastle-on-Tyne NE5 1AX.

#### OBITUARY

**The Hoylake A.S.** regret to announce the sudden death, on Sunday 10th Sept. of their Vice chairman, Tom Jones. He had given unstinting service to the society, having previously held the positions of committee member and society secretary. He is especially remembered for the generous assistance and advice that he gave to all newcomers to the society who were inexperienced in the hobby.

#### SHOW POSTPONEMENT

**17th September:** Due to circumstances beyond their control the Wyre Forest A.S. open show is postponed until a later date. Nigel Cox (Secretary), 41 Oakfield Road, Kidderminster, West Midlands.

#### SECRETARY CHANGES

**Llantwit Major A.S.:** A. Reynolds, 16 Greys Drive, Llantwit Major.

#### AQUARIST CALENDAR 1978

**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", Gainest, 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.

**12th November:** Walthamstow and District A.S. Open Show to be held at Mission Grove, Annexe, Warner Rd, Walthamstow, E.17. Schedules from the Show Sec. A. Chandler, 34 Lechmere Ave, Chigwell, Essex. Telephone 01-500 2339.

**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. Nijssen and Mr. I. Isbrucker. Tickets £1.50 from Gina Sandford, 5 Victoria Road, Earlswood Redhill, Surrey. Redhill 69399.

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

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



