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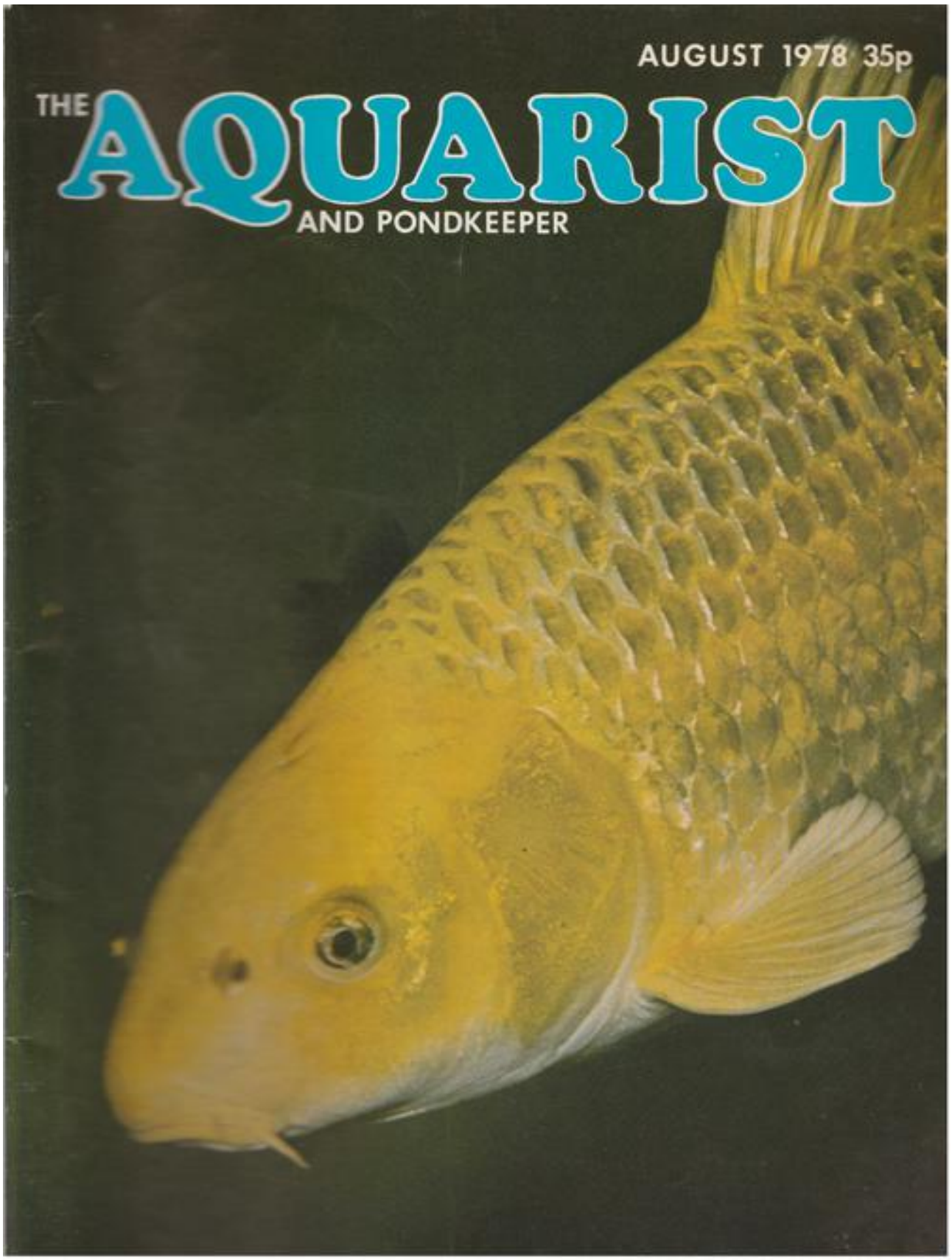
THE AQUARIST AND PONDKEEPER



THE AQUARIST
AND POND KEEPER

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Our Cover:
Golden Tortoiseshell Koi (*Matsubo ohgon*).
(Courtesy of Waterlife Research Industries Ltd.)

PREPARATIONS FOR PLANT COLLECTING

by Vivian De Thabrew

THROUGHOUT THE AGES, travellers and explorers have travelled to remote terrains looking for rare and unusual specimens. These specimens were either botanical, biological or geological ones. The quest for such specimens is increasingly taken up not only by professional naturalists and botanists, but also by genuine enthusiasts.

In collecting aquatic botanical specimens, the enthusiast should be prepared to spend the time searching rivers, ponds, lakes, water holes, marshes and bogs in one or more countries.

In planning a plant-collecting expedition, consideration should be given to the following points.

1. Selected geographical area of the planned expedition.
2. Items of clothing and equipment necessary for the trip.
3. Travel plan, funds and other formalities involved with foreign travel.
4. Information regarding the rules, regulations and other local restrictions concerning collecting plants, bulbs and seeds.

Collecting plants and other specimens in tropical countries can be extremely fascinating and rewarding. The specimens almost always provide the collector with interesting taxonomical and ecological data and form patterns. Studying these specimens in their natural habitat provides the collector with authentic information about their behaviour and many other facts which will be useful when he attempts to cultivate these later in his own home environment.

Geographical area

In collecting specimens from a selected geographical area, careful consideration should be given to its natural terrain and climatic conditions. One must find out beforehand, the dry and the wet and rainy periods. Information as to whether there are rivers, lakes, ponds, bogs, their location and individual characteristics such as whether deep or shallow, slow or fast-flowing, hazardous or not, all these should be ascertained.

One should find out as much information as possible about species which are to be encountered in that area. However, this might not be easy as there is usually very little documentation. The best source is the botanist or the local plant collector. It is not always easy to establish contact with an indigenous botanist, but it will be extremely worthwhile to try to do so with the help of the embassy or consulate of the country to be visited. Usually the embassy should be able to provide some literature and information about the area you want to explore. They will certainly provide you with general information regarding travel, climate, expense costs, government regulations and restrictions in connection with collecting and taking plants out of the country.

Check with the embassy or the consulate of the country of final disembarkation about regulations and restrictions regarding collecting plants and get the official approval. Write well in advance to the Ministry or Board of Agriculture of the country concerned stating your proposed plan and full details of your trip.

Needless to say, the collecting trip should be well planned and the travel routine mapped out in substantial detail. However, the travel plan should also be flexible so as to accommodate any unexpected eventualities. The necessary travel formalities should be completed and the relevant vaccinations taken well in advance.

Travelling light is the best norm, as one would be at a disadvantage with heavy luggage when climbing or

crossing rugged country and wading swamps, streams and rivers. A sturdy pair of waders is essential for exploring boggy terrain. Walking boots are impractical except on dry firm ground. There are situations when walking bare-foot can be convenient, but one should be extremely careful when doing this as many of the areas under exploration may harbour leeches, water-snakes and many other hazardous creatures.

Depending on the prevailing climatic conditions the collector should choose to wear the most comfortable clothing. A good anorak is excellent for hill country climbing and bog-land exploration. In the tropical mid-day sun, a vest or a cool short-sleeved shirt or blouse with a pair of cotton shorts should suffice. Khaki shorts are usually comfortable and practical in tropical forests and jungles. Exploring during mid-day is obviously not recommended.

The following items should be useful in collecting specimens; a small trowel, pen-knife, few polythene bags with rubber bands, some string, filter paper for pressing leaves, flowers, etc., a magnifying glass, few glass phials for collecting minute plants or growths, a shoulder bag for carrying the specimens, notepad and a pencil.

Once specimens are collected they should be placed in the polythene bags and sealed. Ensure that the plants have plenty of moisture. If an on-site study is carried out, then sketching the plant and dissecting various parts of the specimens using the magnifying glass can be carried out.

Gather as much information as possible about the specimens from the local peoples. Even if such information may not be of much botanical value, it may still throw light on some obscure aspect of the specimens. If a local plant or botany expert can be consulted so much the better. Once the required specimens have been collected pack them carefully, label them and take them to the local fumigatorium for inspection and obtaining the Phyto-sanitary certificate which will be required for exporting them from that country.

THE WATER HYACINTH

by Philip Swindells

ALTHOUGH not hardy, the water hyacinth, *Eichornia crassipes major*, is a valuable addition to the outdoor pool during the summer months. A floating aquatic of exceptional beauty, it seldom exceeds a foot in height and causes considerable comment with its glossy spade-shaped inflated leaves. These provide the means by which the plant floats and afford protection to the emerging spikes of attractive lavender blooms with striking peacock 'eyes'. If placed on the pool during late May, when all fear of frosts have passed, they provide a continual show of exotic blooms, together with attractive foliage and a mass of bluish roots that provide an ideal site for the deposition of spawn.

The water hyacinth should be treated as an annual, young plants being purchased during spring or early summer and discarded in the autumn once frosted. However, for those who wish to overwinter a plant or two, this can be done by mixing a loamy compost with sufficient charcoal to keep it 'sweet' and placing in a bowl of water. The small runners that appear in their dozens around adult plants during late summer are the ones to choose for over-wintering, and these are then floated in the bowl. Over a period of several weeks the water level should be gradually lowered until the plants are well rooted in the mud. They will then live quite happily until the spring if kept in a light frost-free place.

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

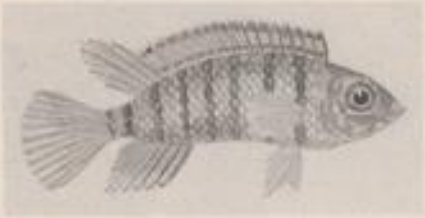
by Jack Hems

How can I sex the butterfly fish (*Pantodon buchholzi*)**?**

In well-developed fish of about the same size the female is the plumper of the two and is possessed of a fan-shaped anal fin with twelve to fourteen rays. That of the male has only nine rays with a deep cleft at the hinder end.

I have introduced a North American catfish called a brown bullhead into my tropical aquarium. Will it mix all right with the other fishes?

The North American catfishes called bullheads are not at all suitable for a tropical aquarium. For one thing, temperate conditions (room temperature) suit them best. For another thing, as they increase in size (they attain about a foot in length) they develop into fin-tearers and persistent molesters of the other occupants of a tank. In short, the North American catfishes of the genus *Ameiurus* should be given a tank to themselves.



Badis badis

What can you tell me about a fish called *Badis badis***?**

B. badis is a 2¾ in. or thereabouts fish from India. It used to be included in the family *Nandidae* but of recent years ichthyologists have referred it to the family *Badidae*. It has been known to tropical aquarium keepers for about seventy years. Although it is commonly called the blue perch (clearly on account of a blue sheen that occasionally mantles the sides and the presence of blue or blue-green colour in the fins) the general coloration is subject to much variation according to the temperature of the water, strength of the light and mood of the fish. Sometimes it assumes a brown, orange or pinkish appearance overlaid with black markings arranged in vertical bars. The sexes are not always easy to tell apart and breeding, when it does occur, will usually take place in a cave fashioned by the aquarist out of slabs of stone, or in a flower pot. The fish does not fight or bully other species but it is rather a slow mover and must be given live food.

Will the blind cave fish from Mexico get on all right in a community tank?

The blind cave characin is a peaceable species and makes no trouble in a community tank.

How can I restore my cracked and peeling plastic-coated-on-metal-framed tank to usefulness?

Chip away the damaged plastic coating and then proceed to remove the rust from the exposed metal with a strong wire brush. After all the dust has been wiped away apply two or three thin coats of best quality polyurethane paint.

Moenkhausia oligolepis

Please give me some information on *Moenkhausia oligolepis*.

This species is quite widespread in Brazil and the north-eastern corner of South America. It attains a length of about 4 in. and, in its smaller sizes, is no trouble at all. Old (large) *M. oligolepis* are apt to become fin-nippers or bullies or both. *M. oligolepis* will accept any live, dried or suitably shredded flesh food and is quite comfortable at a temperature in the seventies to lower eighties (°F).

A few months ago I bought two blue acara, said to be a pair. Much to my disappointment, the fish have shown no interest in raising a family. How can I be certain that I have a male as well as a female or vice versa?

The sexes may be distinguished (in well-grown fish) by the markedly longer and filament-pointed dorsal and anal fins of the male. If the two sexes are present and conditions are right, then spawning will take place when the fish are ready. Plenty of live and flesh food, combined with a rise in the temperature, has aphrodisiacal qualities.

A week or two ago, I installed a 3 ft. aquarium in my lounge. Yesterday I bought two small Jack Dempsey fish to add extra colour and interest to the tank. What other species do you recommend for my tank?

I suggest that you seek the advice of a long-established and reputable dealer. Alternatively read several of the more comprehensive aquarium books; for a community tank to be a success it must be stocked with non-belligerent and well-behaved fishes. The Jack Dempsey cichlid is a fighter. This explains its popular name. It will also reach a length of about 7 in. See if you can trade in your Jack Dempsey fish for some small and inoffensive tetras, barbs or livebearers. These are among the best occupants for a community tank.

Hyphessobrycon eos

Can you supply me with some information on *Hyphessobrycon eos*?

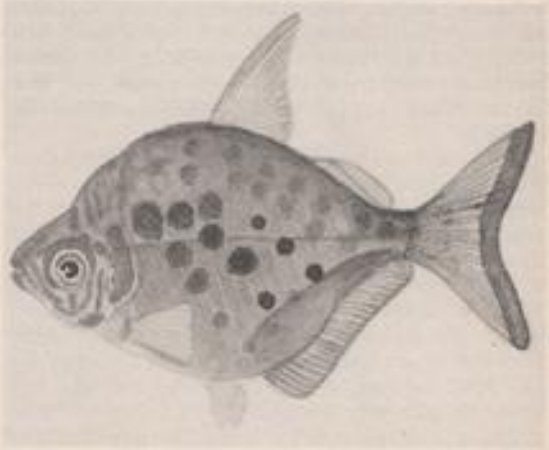
H. eos is commonly called the dawn tetra. It is found in the wild state in Guyana and attains a length of about 1¾ in. It makes a most satisfactory occupant for a community tank because it is inoffensive, active, easy to feed on any small food taken by an omnivorous fish, and is attractively coloured.

Is there a livebearer called a merry widow?

There is and it is found in the natural state in Central America. The technical name for the species is *Phallichthys amates* and the male is distinguished from the female by his smaller size (1 in. against the female's 2 in.), the rod-like shape of his anal fin, and his more colourful appearance. His dorsal fin is particularly attractive, with a dark top edge outlined with white and a similar marking, but not so intense, across the centre. The male sometimes shows some narrow dark vertical bars on the sides.

I have a two-foot tank and should like to know how many gouramies I could keep in it?

You could keep three or four pairs of small or medium-sized gouramies in your tank. It would be necessary, however, to fill it almost to choking with underwater plants to afford shelter for the females. The males can sometimes be great bullies. I think you should confine your purchases to some of the following species: the pearl gourami, the blue gourami, the honey gourami and the dwarf gourami.



Metynnis roosevelti

I should like to know the temperature requirements, preferred food and general behaviour of *Metynnis roosevelti*?

This flashing silver fish flourishes best at a temperature in the middle to upper seventies and is an avid consumer of whiteworms, gnat larvae, flake food and scalded or cooked tender greenstuff such as lettuce, young spinach, young nettles. It will not molest other fishes of about its own size but as it increases in size it develops a passion for the plants and will nibble the lush ones such as Indian fern and vallisneria to shreds.

COLDWATER QUERIES

by Arthur Boarder

I have a garden shed 20 feet by 10 feet and intend to place a liner on the roof to make a fish pond. If I keep Orfe and Koi are they likely to jump out?

I do not know how strong the roof of your shed is, but you would have to make sides which need to be very strong. The minimum depth of water would have to be one foot and there would have to be sides above this. Orfe could jump out and Koi would not be likely to exist in a foot of water in a bad winter. You must realise that a foot of water over the shed would weigh twelve thousand pounds, or over half a ton. I cannot imagine a garden shed being able to hold such a weight. I suggest that you dig a hole in the garden and line it with a good liner instead. You would then have a chance of success.

I have a garden pond 8ft. × 4 ft., with some ordinary goldfish in it. There are plenty of plants and snails but now and again I find a dead fish floating on the surface in a morning. The dead fish shows no signs of disease or injury. I have a fine mesh net over the pond. Can you explain the deaths?

The pond is a small one and you appear to have a large quantity of water plants. This may not be too good for the fish as during the nights there may not be sufficient oxygen in the water. When fish are found dead in the mornings it is almost certain that lack of oxygen is the cause. There may be a lot of decaying matter on the bottom which gives off foul gases and so reduces the amount of oxygen content. One might think that if the water did not contain the adequate amount of oxygen, all the fish would die, but this cannot be taken for granted. Some fish need more oxygen than others and the larger the fish the more oxygen does it need. The water snails do no good in a pond even if they do little harm. If the netting over the pond is a metal one, there could be some danger from rain dripping from it into the water. Galvanising contains zinc which might affect the pond water. Make sure you do not have too many fish in the pond. It could hold about 32 inches of body length of fish. I suggest that it is cleaned out as soon as possible.

I have a tank 36 × 15 × 15 inches, outside in the garden. It has two windows in it and a cover. I have two Koi in it. Would it be better without the cover and do I need a filter and aerator?

You do not state whether the cover is of glass, as otherwise there may not be enough light getting to the plants and fish. The question as to whether to have a filter and aerator will depend on the size of the fish. Your tank will hold about 22 inches of body length of fish with filter or aerator. However, Koi can grow very large and would be better in a garden pond than in your tank. You do not state what precautions you will be taking in the winter to prevent the water from freezing over. As for the most suitable water plants to use, I suggest that as there is no need to make the tank an attractive show piece, you use just one plant only. *Lagarosiphon major*, which was once known as *Elodea crispa*, is a very strong growing plant and a very good oxygenator.

I have been keeping Tropicals for eight months and have four tanks. I also have two coldwater tanks and have noticed that the water temperature of these is a steady 62° F. Are there any tropicals which I could keep in them without having to use a heater?

There are several fishes which are usually classed as Tropicals which could be kept at the temperature you quote. As you wrote in a cool time of the year it is very probable that during the summer the temperature of the tanks would be higher. In any case some of the fish you could keep are: White Cloud Mountain Minnows, (*Tanichthys albonubes*); Guppies, (*Lebistes reticulatus*); Platies, especially *Xiphophorus variatus*; Paradise fish, (*Macropodus opercularis*); and any of the smaller Sun Bass. There are many others which could be gradually introduced to a low temperature but this should be done with care. It will be found that even if such Tropicals do not breed at this lower temperature they may live longer as they are not under the stress of constant feeding and dashing about as they would have been with a higher water temperature.

I am converting from Tropical fishes to coldwater ones. I have a tank, 48 × 15 × 15 inches. Can I use my existing soft water, I have had trouble with White spot? Can I use my 3 inch layer of gravel? What compost do you advise? Which plants shall I use? How many and which varieties of fish do you think I should have?

As you have had disease trouble in your tank I advise you to scrap all the gravel and rocks and give the tank a very good cleansing with household bleach. Then you can use some J. I. potting compost NO. 1, for the back half of the base covered with a couple of inches of coarse sand or fine gravel. For plants choose from *Lagarosiphon major*; *Egeria densa*; *Vallisneria*

spiralis and *Hygrophila polysperma*. Place clumps of the taller plants to hide the back corners of the tank and leave the front half of the tank clear of plants. For fishes I suggest Red fantails, calico fantails, Red-cap orandas, Calico veiltails, fantail moors and Bristol shubunkins. The tank will hold, 30 in. of fish but I suggest that you keep to rather less for a start to allow for growth. The tank will look much more attractive if it is not crowded with fishes. If you have two of each of the varieties mentioned which are not more than two inches long in the body, I feel sure that you will have an attractive tank which should function well for a long time.

I have been offered a male and a female newt. If I put them in my pond will they harm the goldfish I have there?

The newts will not harm your goldfish. They will not remain in the water but once they have bred they leave to spend the summer, autumn and winter on land. They will remain in long grass or under stones until next spring when they will go to a pond again to breed. They may return to your pond but if the pond they came from to you is near, they may go there. Any young newts bred in your pond will probably return to your pond to breed when they are old enough. The one point to remember about them is that they can eat under water and any garden worms or maggots given to your goldfish could be eaten by them.

I have recently been advised by different people about the pH value of the water in my garden pond. The advice differs and I would like your opinion on the importance of it?

In all my years of fishkeeping, both in tanks and ponds I have never taken any notice whatever of the pH value of the water. This is one aspect of coldwater fishkeeping which you can totally ignore. In any case the water in your pond is likely to vary not only from day to day but possibly from hour to hour. Forget all about it and you will have no trouble.

Every time I top up the water in my garden pond I add a little salt. Is this all right for the fishes, which include goldfish and tench?

It is quite wrong to add salt to your pond especially as frequently as you do. This salt is likely to remain in the water as it does not evaporate as the water does. You are likely to get too strong a concentration of salt which could be harmful. It is one thing to add sea salt to the water in a tank containing a sick fish, but quite another matter to keep putting it in your pond.

I have been keeping tropicals for many years and owing to ill health I now propose to reduce my tanks to one of four feet long. If I have some fancy goldfish shall I have to use any heat or aeration?

Your tank will hold about 24 inches of body length of fish and as long as you do not try to keep more than this stocking of fish you will not need any heater nor aeration in your tank. You will also find it much less expensive without the use of electricity. Although I have quoted the maximum stocking for your tank, it will be better if you keep below this rating as the fish will grow better and remain healthier. Also I am sure that any set-up tank will look much more attractive if it is not crowded with fishes. Some fantails, veiltails, orandas and moors should look very well and will be little trouble. I am enclosing an address where you can get the fish you need.

I have lost a few goldfish from my garden pond and do not seem to know what has caused their deaths. The pond is well stocked with fishes and plants and yet the fish all appear sluggish. Can you give any reason for this?

Usually when goldfish become sluggish it is because the water is not to their liking. I suggest that you clean out the pond entirely. It is probable that after some years there is an accumulation of mulm and detritus on the bottom and this can give off foul gases. The water plants may help to purify the water by day, but night time they will not do so and it is at such times that the water can become impure and the fishes get sluggish and even die. So many ponds were frozen over during the winter, even for as much as a week in some areas. During such times any foul gases in the water cannot escape unless the ice has been opened to allow their escape and so that fresh air can enter. All medium and small ponds should be cleaned out every late autumn so that the water has a chance of remaining pure for the winter.

Can you tell me how to breed Bleak? I would like to know how to sex them. I have a tank 36 × 15 × 12 stocked with four 1½ inch Bleak, two 7 inch orandas, two 4 inch Tench, two 2 inch Koi, one 3 inch pearl scale and one 3 inch comet. Is my tank over stocked?

Your tank will hold an inch of fish to each 24 square inches of surface area of water. You will never breed Bleak in a community tank such as yours. Should any fry be hatched they would be eaten by the fishes. Bleak would not be easy to breed as they are a river fish and all these types present more problems than do fish from still waters. Bleak, (*Alburnus alburnus*) can grow to about eight inches in length and are difficult to sex except when they are in breeding condition. They then show the usual Carp-like white tubercles on the gill plates in the male and the female is fatter in the body. To try to breed these fish you would need a tank the size of yours with no other fishes and your fish will have to be a lot older and larger before they are likely to breed.

KOI QUERIES

by Hilda Allen

I constructed a 10 ft. × 5 ft. separate water-filtration plant as per your instructions last year and it appears to be quite satisfactory; however, I am puzzled as to what level the water should be within the filter. At the moment the water level is at about the same level as the outlet pipe into the pond, is this correct?

If the level of water remains as it is, with a good return to the pond, then this is a good indication that all is well within your outside filter. As you use a sprinkler bar (in your diagram) tokeep the whole surface of the gravel bed wet then it can be assumed that you have created good aerobic conditions. It is only when the water level rises within your filter that you need be concerned. That will indicate that your filter is becoming partially blocked and may need cleaning, but at the moment things appear to be quite in order. If you have a bottom drainage plug then it is a good idea to drain off any settled sludge from time to time and washing through the gravel meanwhile with water from a hose-pipe. Much will depend upon what your filter has to cope with, but as I said, until the level of water rises within the gravel, leading to a reduced return to the pond, there is no need to worry.

Having decided to pay what I considered to be a good price for some Koi last autumn I am dismayed to have lost three quite recently for no apparent reason. I would be pleased if you could offer any explanation as to why these Koi died in the spring, having survived the winter.

I am sorry to hear of your losses which I know can be very discouraging, but you are not alone by any means. I am only able to offer suggestions as to why your Koi died but these may provide food for thought for others who have also suffered these mysterious losses.

Most pond-keepers will agree that last winter was an especially difficult one for fish, it was very long with intermittent cold spells well into spring. Fish that did not start the winter in tip-top condition were less able to stand the rigours and I have heard of many losses; Koi that had not previously experienced an English winter outside have been especially prone to trouble. Japanese winters, although cold, are short, with relatively constant temperatures which are much less trying for fish. If your Koi only arrived in this country during the autumn they would need time and good feeding to adjust, even assuming they were healthy when purchased, and then given optimum over-wintering conditions. I am afraid we are a long way from even diagnosing, much less curing, the more obscure diseases affecting Koi. Fish are notoriously difficult to treat successfully and if internal organs are affected there is little evidence of trouble until it may be too late. I have no wish to be a gloomy pessimist but it is impossible to ignore the problems or the mysterious losses. It is my opinion that last winter was responsible for many of the current troubles with Koi. Being aware of the problems should help, it may explain the requirements of deep ponds for protection against colt or fluctuating temperatures and the real need for quarantine facilities for new purchases to protect existing healthy stock.

I apologize for not being able to offer more direct advice or explanation but I would advise you to take care of those Koi you still have, examine your keeping capacity and segregate all new purchases. There is little doubt that you will recover from your experience, most people do and most of us have had similar losses at one time or another.

I would be grateful for your help with respect to a disease which has recently proved fatal to a Koi and a Golden Orfe, both about 6 inches long. The Koi was thickly covered with a dark fungus with some rot in the tail area and other patches of fungus appeared to have a dark place in the middle. The Orfe was similarly affected but some of the patches seemed to be of a jelly-like nature with others of a velvet-like texture. Both the Koi and Orfe were treated but died within two days. My 12 ft. by 6 ft. pond contains a total of 21 various fish, all around 5 inches long.

You have not indicated if any of your remaining fish are in trouble as a result of the slime disease affecting the two that died. If any have patches of fungus then I suggest they are bathed in a salt solution at 2½ ozs.-4 ozs. of cooking or sea-salt per gallon of water for 15-20 minutes. This is a short treatment and the fish must not be left for more than 20 minutes before being returned to plain water.

Alternatively, a long-term treatment is 1 oz. salt per gallon of water for the first day, 2 ozs. per gallon for the second and third days when some improvement may be noticed. On the fourth day the salt may be reduced to 1 oz. per gallon (by removing water and adding fresh, containing no salt) and by the fifth day the water should be plain and salt-free.

It must be understood that fish are weakened by handling, netting, changes of water etc. and are thereby more prone to disease. When the mucous (slime) is impaired, then the fish loses some of its

protective layer and fungus grows rapidly on these damaged spots. It is not too complicated to understand, I hope, in that every care must be taken, because although some people believe fish should be all right if they are kept wet all the time, this really is not enough.

Your pond is well-stocked and no more fish should be added. Keeping fewer strong, healthy fish in plenty of water is far better than a larger number struggling for survival in overcrowded unhealthy conditions. This very basic rule of good husbandry applies equally to fish as to all other forms of life.

I am making a Koi pond, 14 ft. by 14 ft., what depth would you recommend for the deepest part? Also, how can I stop sediment from forming? I have read about gravel filters, would you please describe the construction of one or if there is a suitable commercial product available.

Your pond must be at least four to five feet deep in one area for the protection of Koi during our long, British winters. There is no way to stop sediment forming and the only solution to this problem is to remove it either by syphon, pump or bottom drain.

It is not strictly correct to talk of gravel filters if you mean under-gravel filters within ponds. The system of pipe-work underneath the gravel is most important and this very successful method (and construction) were described in the June 1977 issue of *The Aquarist*.

A description and diagram of an outside-filter for ponds was included in the October 1977 magazine. Both my ponds have under-gravel filters and at the time of writing, late June, the water is very clear.

I am not aware of any filter on the market that could be expected to successfully filter a 14 ft. by 14 ft. Koi-pond. Keeping Koi-ponds clean and healthy usually means removal of the mulm, water-changes and adequate filtration to cope with the special requirements of Koi. For the size of your pond I would advise an under-gravel filter, situated in the shallower part, of not less than sixty feet square.

Having kept Koi for almost two years I am very keen that they should spawn if possible, but I know nothing about this. I would be very grateful for any advice on how I can be successful. The Koi are about 10-12 in. in length and they may not yet be large enough as I have no idea of the size required for spawning.

To see their fish spawning is the dream of most people and it can be taken as a tribute that all is well within their pond. If you have fed your Koi well during the past few months, by this I mean on a good, mixed diet with plenty of earthworms, to build them up after the cold weather, then you can hope for some success sooner or later.

There are no hard and fast rules, much depends upon weather conditions, Koi of both sexes of course, and patience. From late May until late August are the best months for Koi that are kept in outdoor ponds to spawn. Driving or chasing of the females will be noticed first, usually followed by spawning if, and when, other conditions are satisfactory. The Koi decide this, so there is little you can do to either encourage them to spawn or to stop them if they decide to. Nothing short of strict segregation of the two sexes can prevent spawning, and sexing Koi can be quite difficult for amateurs. Your Koi are large enough to spawn and observation should help you to determine which may be males or females.

My own Koi in my smaller pond (shown in the April issue) spawned on 3rd June this year. The usual "driving" had been noticed during the warm days before, but I considered the Koi, all between nine and twelve inches on the small side for spawning. By mid-day, eggs were to be seen everywhere and, before all were eaten by the parent fish, I removed a lily-basket (to which many eggs adhered) to the safety of a separate container filled with pond water (at the same temperature). An air-stone was introduced and the eggs left undisturbed. It was a matter of some interest to me to see if any eggs were fertile from the two females and four males involved. The spawning was completely natural and no extra heat was supplied to the hatching water. Some eggs were infertile and fungused, but the others produced baby Koi (fry) five days later. Without heat, some of the youngsters are now over half an inch long at three weeks old. They are all fed several times a day, and some are growing more than others. This is quite usual and some of the smaller ones will probably be eaten by the larger ones. This is a brief account of an experiment into what can be achieved in terms of hatching and growth-rate without frills or expense. I hope to be able to report again at a later date. I am not expecting to produce a champion but there is a certain satisfaction in seeing fish hatch and watching their development when your own fish are the parents.

My pond contains an assortment of fish, including a few small Koi and all seems to be well at present. I usually net the fish for inspection about once every two or three weeks in order to spot any signs of trouble, but when will it be safe for me to stop doing this?

I do beg you to leave your fish alone, this is the best way of avoiding trouble, I assure you. It is quite wrong to stress fish by unnecessary chasing and netting. In a reasonably clean pond any problems of disease or parasites would be evident, sick fish usually stay on their own in a quiet corner, or by a waterfall.

If your fish are active and feeding with no visible sign of trouble then please leave them well alone.

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 just obtained a marine tank 48 in. × 18 in. × 12 in. on the 6th March, the contents being a small amount of living coral about 1 lb. with 5 lb. of tufa rock plus 4 lb. of assorted coral. The bed of the tank has 72 lb. of coralsand. Four days later I put in 1 Boxing Shrimp (*Stenopus hispidius*) and 1 anemone (*Condylactis passiflora*) and both are feeding very well.

What I would like to know is how long is it before I can add the more delicate fishes such as Angels and Tangs? I have been told by so many different shops from 3 to 6 weeks, but I am only a beginner and do not want to lose the first fish I put in. I have also been told that I must put all the fish which are going in the tank together, is this right?

Could you please tell me if the selection which I am about to give will be in order to live as one commune:—

(2) Blue Damsel: 1 Regal Tang: 1 Common Clown;
(1) Sunburst Butterfly: 1 Copperband Butterfly;
(1) Twinspot Wrasse: 1 Neon Goby;

I intend putting more invertebrates at a later stage. My local marine shop set my tank up for me, the airstones that they put in I changed for wooden diffusers as I read in a book that they were the best. The nitrite test reads between 10 and 15ppm.

The first mistake which you appear to have made is that you have omitted to mature the filter-bed of your aquarium *first*, i.e. before introducing livestock of any description.

I note that your nitrite reading is already between 10 and 15ppm—and since some ten days will have elapsed between writing your letter and your receiving this reply I would expect that at least the Boxing Shrimp would be in trouble by now and possibly also the *Condylactis* anemone.

Do not buy any more Livestock until the nitrite content of your seawater is nil and has been thus for at least seven (7) consecutive days.

If you are lucky enough to mature this aquarium without the loss of either invertebrate animals, you should be grateful for your good fortune, but do *not* push your luck any further than you already have done.

With regard to the stocking of the aquarium with fishes, you would be ill-advised to purchase all the fishes which you list at the same time since you did not mature the filtration system with "SEMATURE" first. Consequently the sudden imposition of such a large biological loading factor as these eight fishes constitute would almost certainly cause a reappearance of toxic nitrite in the seawater.

Accordingly, you would be better advised to purchase the fishes in the following sequence, allowing a 7-day interval between the introduction of each new fish:—

(1) Common clown (*A. percula*)—1 in. and small/med *Stoicactis* anemone.
(2) Neon goby (*E. oceanops*)—1 in.
(3) Copperband butterfly (*C. rostratus*)—2½ in.
(4) Regal Tang (*P. hepatus*)—2 in.
(5) Sunburst Butterfly (*C. kleinii*)—1½ in.
(6) Twinspot wrasse—3 in.
(7) Pr. of Electric-blue Damsels (*P. caeruleus*)—2 in.

You will note that I have added another anemone of a species acceptable to clownfishes. Many clown-

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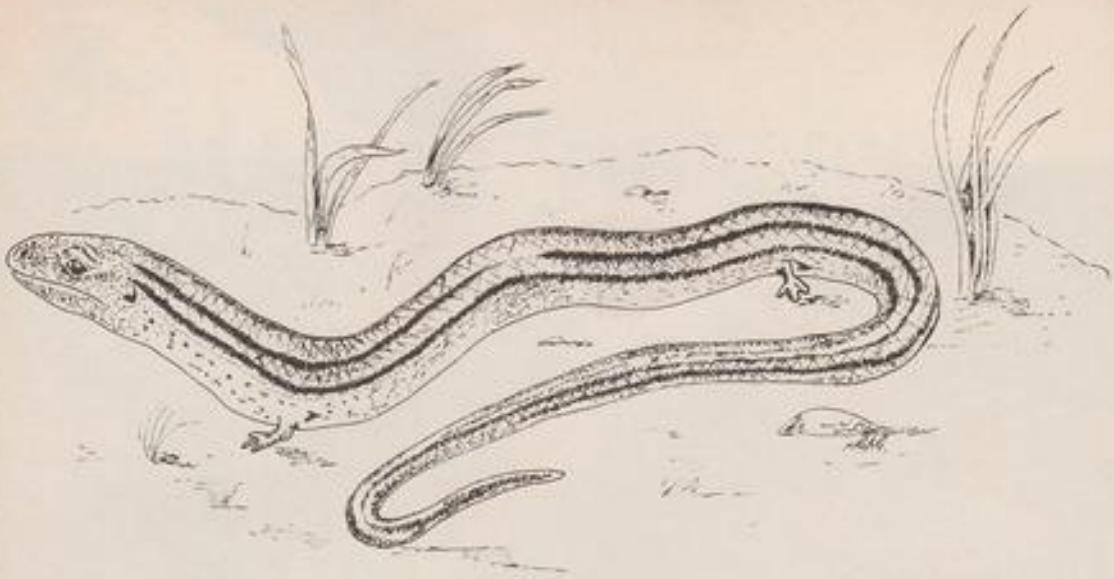

Calcides calcides

by H. G. B. Gilpin

WHILST VISITING a live-stock establishment last April, I was intrigued by a very large, open-topped tank containing scores of Wall Lizards and Sand Skinks (*Calcides calcides*). The latter ranged in overall length from 10 cms. to 30 cms. and had, I was told, been imported from Italy three or four days previously. The majority were basically greyish, greenish olive or brownish in ground colour with two dark edged pale stripes down the back and two dark stripes along the sides. A few, however, were completely devoid of stripes, their cylindrical bodies being a uniform dull bronze. Temperamentally they appeared to be placid and allowed themselves to be picked up without struggling or showing any signs of resentment.

I brought two of the skinks home, each confined in a cellophane bag, well perforated with pin-pricks for ventilation and placed in a cardboard travelling box. This method of transportation minimises discomfort and makes it easy to move them from the travelling box to their permanent quarters without damaging or frightening the animals. It is not, however, infallible if the lizards have reasonably strong jaws. In this case during a brief interval, no more than ten minutes, when they were left in the cellophane bags on a table, one of them gnawed a hole in the confining material, dropped on to the carpet and escaped subsequently to be discovered, after an intensive search, coiled up like a watch spring behind a rack of gramaphone records. Once located, recapturing it presented no difficulties as it allowed itself to be picked up without any attempt to abscond.

Superficially both these Skinks closely resembled a slowworm in general appearance, indeed several not too knowledgeable visitors mistook them for that

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CARE AND BREEDING OF *Corydorus paleatus*

by W. Murray

Corydorus paleatus is a very captivating little catfish which would make an interesting and congruous addition to any tank.

The *Corydorus* species inhabit the muddy bottoms of streams, rivers and ponds of tropical South America. They are also known as the armoured catfish, because of the plates they have, where other fish have scales.

The basic colour of *C. paleatus* is yellowish-white with steely-blue and brown irregular patches overall, changing to a creamy silver on the underside. The length when fully grown, is 2½ inches (6 cm.).

It is a very peaceful aquarium occupant and is never molested by the larger fish in the tank. Being omnivorous and not too choosy of its diet it is much sought after. It does not, as widely supposed, keep the bottom of the tank clean, but scavenges among it for any food left by the other fish (we all tend to overfeed), thus preventing it from lying on the bottom until it decomposes and fouls up the tank. It is good practice to drop food tablets into the tank every night just before the light goes out. This ensures that the catfish get enough to eat.

Periodically feed with *tubifex* worms, chopped earth worm, white worm or *Daphnia* (which are also taken), as these fish feed on small crustaceans, etc., found at the bottom of the waters of their natural habitat.

Armoured catfish should be housed in a fairly large aquarium with a base of "Dorset Peas" as there is less chance of the fish scraping or damaging their sensitive barbels on the rounded surface of the peas than with the sharper gravels.

The peas are covered with a little compost, and the whole planted with a few clumps of *Cryptocoryne* leaving a little more than half the tank bare of plants for the fish to rummage about in. Indian fern is also used as a floating plant. This helps to subdue the light and makes for a more pleasant environment for the fish.

My fish were conditioned for breeding in separate tanks by being fed plenty of *tubifex* worms and earth worm (chopped). This continuing for a month to six weeks. By that time the females should be heavier than the males. This is one method of sexing the fish. Another method of sexing can be done at an earlier stage by observing closely the ventral fins of the fish. You should find that some have pointed ventrals whilst others have decidely rounded ones, the rounded fins belonging to the female, the pointed ones the males. An 18 in. × 9 in. × 9 in. breeding tank was then set up as the tank described previously, with a temperature of 74°F and the pH neutral. The males were introduced into the breeding tank the day before the female. Spawning usually takes place within a week.

If the fish have not spawned by then, half a tray of ice from the refrigerator put into the tank sometimes induces stubborn fish to spawn. (I do not know what action the cubes have on the water, as they don't even lower the temperature of the water much—about 2°F because of the heater, but it has worked for me on more than one occasion).

The spawning behaviour usually begins with the males, seemingly agitated, darting to and fro, then making a dash to the surface of the tank for, I presume gulps of air. While this activity is going on among the males, the female is cleaning a few sites for the eggs. The males then start crowding the female, pushing and jostling her. When she stops swimming around, one of the males touch her with his barbels, starting at her head and down to her tail. He then swims to the front of her and grasps her barbels with his pectoral fins, the pair forming a 'T' shape. The female forms a pocket with her ventral fins into which she deposits two or three eggs. These being fertilised by the male, the female then takes the eggs, cleans them, and pushes them onto one of the previously cleaned sites to which they adhere. This performance continued for over two hours by which

LIMIA:

THE MISSING GENUS

PART I

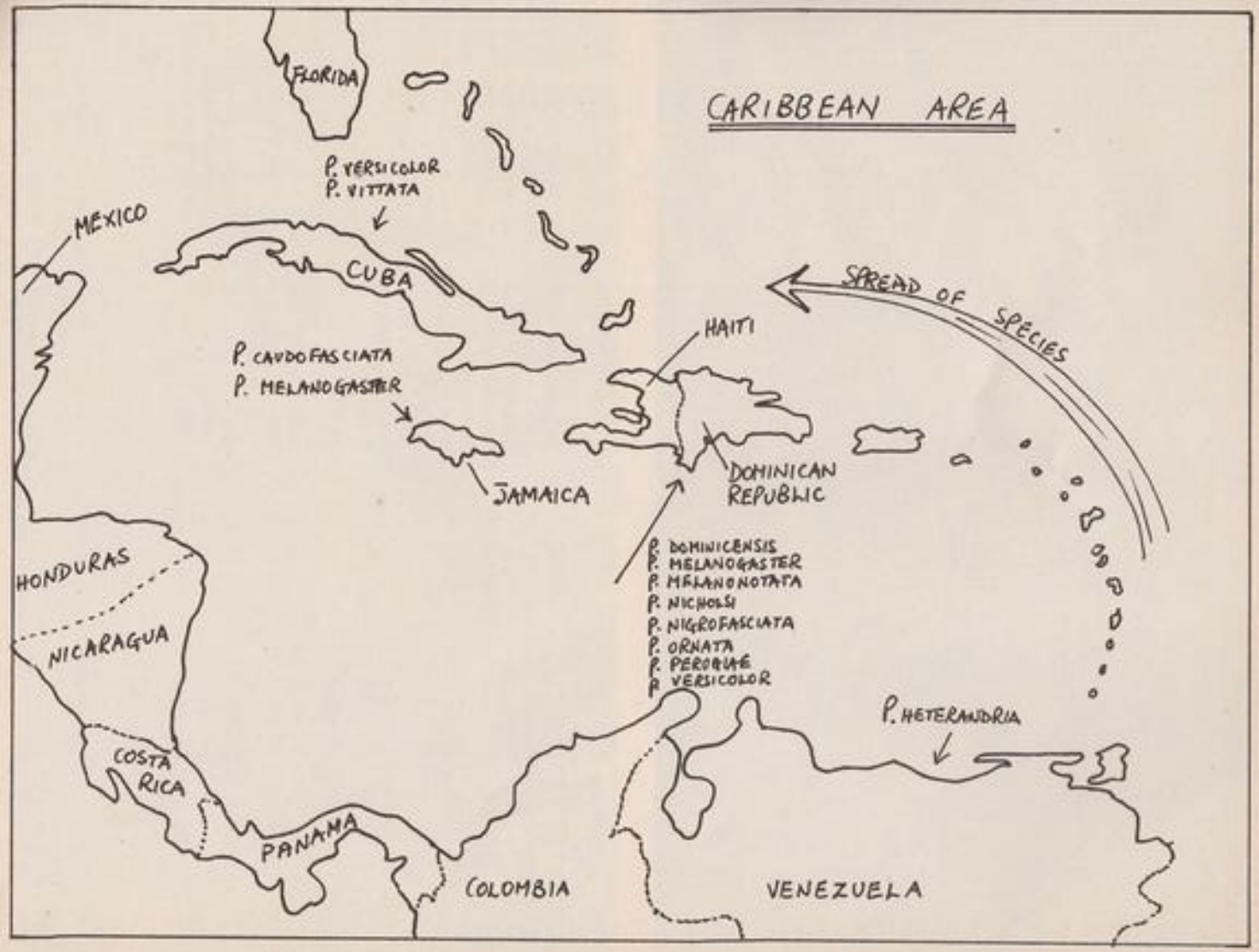
Written & Illustrated by Bob Purdy

DURING THE early part of this century, livebearing tropical fishes were considered to be a great attraction and many different species were imported and kept by aquarists all over Europe. As the years passed by, certain species proved to be more amenable in the production of various strains that differed from the normal wild types, especially in colour and fin shapes. The Swordtail (*Xiphophorus helleri*) and the two species of Platy (*X. maculatus* and *X. variatus*) proved to be very useful when used to develop new types, in particular, when new colour strains were required. Guppies (*Poecilia reticulata*) and Mollies (*P. latipinna, P. velifera, P. sphenops, P. latipunctata* and *P. petensis*) also proved to be suitable material and commercial breeders tended to concentrate on these few species to the exclusion of all the many other livebearing species that were then available.

Because of the pressure of commercial production, the popularity of all other livebearing species took quite a tumble at this time and, despite a recent revival of interest in them, it is unlikely that these livebearers will ever regain the level of aquatic appeal that they once enjoyed. Whilst it is true that a great many of these species are unspectacular, lacking in either colour or pattern, or are predatory and are unsatisfactory as aquarium pets, one group remains that fits neither of these categories and deserves a far better fate than that handed out by today's aquarists. Under the older system of nomenclature, then used when referring to livebearing toothcarps, this group was a discrete genus and was identified by the generic name of *Limia*.

Rosen and Bailey

In 1963, the genus *Poecilia* was somewhat enlarged and altered by Rosen and Bailey when they revised the whole family, Poeciliidae, and published their findings in a paper entitled, "The Poeciliid fishes (Cyprinodontiformes), their structure, zoogeography and systematics" (Bulletin of the American Museum of Natural History, Vol. 126 1966). Rosen and Bailey combined a number of previously discrete genera, including *Lebistes* (the Guppy), *Mollienisia* and *Limia* and placed them into the genus *Poecilia* making that genus the second largest in the family with a new total of thirty two species. As a result of this reclassification, the generic name *Limia* became redundant and ceased to be used by the scientific community. Aquarists, always a conservative group, have, in complete disregard of scientific conventions, retained the name *Limia* and still apply it to the eleven species that used to belong to the now non existent genus. Because no problem of identity is involved in the use of the name *Limia*, it is perhaps, from the point of view of the amateur aquarist, a far better label than is *Poecilia*. Most of the reasons given by Rosen and Bailey for placing Limias within the genus *Poecilia* are of little interest to fishkeepers and table 1, which lists both the scientific and common names, should help to clear up any problems of identity.


CARIBBEAN AREA
FLORIDA
P. VERSICOLOR
P. VITTATA
MEXICO
CUBA
SPREAD OF SPECIES
HAITI
P. CAUDOFASCIATA
P. MELANOGASTER
JAMAICA
DOMINICAN REPUBLIC
P. DOMINICENSIS
P. MELANOGASTER
P. MELANONOTATA
P. NICHOLSI
P. NIGROFASCIATA
P. ORNATA
P. PEROBLUE
P. VERSICOLOR
HONDURAS
NICARAGUA
P. HETERANDRIA
COSTA RICA
PANAMA
COLOMBIA
VENEZUELA

Blue Limia

Poecilia caudofasciata (Regan 1913)		Jamaican Limia.
P.	*dominicensis* (Valenciennes 1846)	Domingo Limia.
P.	*heterandria* (Regan 1913)	Dwarf or Haiti Limia.
P.	*melanogaster* (Gunther 1866)	Blue Limia.
P.	*melanonotata* (Nichols & Myers 1923)	—
P.	*nicholsi* (Myers 1931)	Yellow Limia.
P.	*nigrofasciata* (Regan 1913)	Hump Back Limia.
P.	*ornata* (Regan 1913)	Ornate Limia.
P.	*perugiae* (Everman & Clark 1906)	—
P.	*versicolor* (Gunther 1866)	Olive Limia.
P.	*vittata* (Guichenot 1853)	Cuban Limia.

In table 1 the name in brackets denotes the individual who first described and named the species and not the discoverer of the species as is often thought to be the case. Again, the date in the brackets records the year of description and not the year of discovery. Although the species *P. perugiae* appears to be named in honour of the country, Peru, it hails only from the island of Haiti and for that reason it is not called the Peruvian Limia, as would be expected.

Short-lived

Limias, as a group, are very typical of livebearing toothcarps. All male Limias have developed a gonopodium from a modification of the anal fin and this is used as an instrument of internal fertilization when mating is achieved. Twenty four to thirty days after fertilization, young, fully developed fry are born to the female in broods of anything from six to a hundred individuals. In all the species so far observed, further broods can be sired from stored sperm and up to five broods can be produced in this way before the services of a male are again required. Like most other toothcarps, Limias are not long lived fishes and tend to have an age limit of about twelve to eighteen months. It is interesting to note that during one lifetime, short though this may be by our standards, a female *Limia* is

capable of producing a total number of offspring somewhere in excess of thirty eight thousand (given an average of sixty fry to a brood and a mean time of six months for the fry to mature).

Spread of the Species

The geographical locations of the various species in in this group are all within the expected sphere of influence of the family as a whole. The island of Hispaniola, comprising Haiti and the Dominican Republic, is particularly rich in *Limia* species; *Poecilia melanonotata*, *P. nigrofasciata*, *P. ornata* and *P. perugiae* all seem to be endemic and *P. melanogaster*, *P. dominicensis* and *P. versicolor* are all also found on the island. *Poecilia caudofasciata* is found only on the island of Jamaica in company with the Blue Limia, *P. melanogaster*. The Cuban Limia, *P. vittata* is found only on the island of the same name, *P. versicolor* also being distributed around the same island but not endemic to it. The only species belonging to the group that is found on the mainland of the American continent is *P. heterandria*, the Dwarf Limia, *Poecilia heterandria* is only found in a few areas of the coastal regions of Venezuela which makes its other common name, Haiti Limia, less than suitable in the circumstances.

A quick look at the map of the Carribean area will show an apparent spread of the group, starting in Northern South America and island hopping northwards across the Carribean as far as the island of Cuba. It would be interesting to speculate on the possibility of "undiscovered Limia type species" in the Yucantan Peninsular of Mexico as it seems unlikely that any such species would remain in the state of Florida, even if they ever did exist there.

Although the geographical barriers between some of the species seem to be insurmountable, genetic isolation within the group seems to be quite rare, if it exists at all, and inter-specific hybrids have proved to be viable on more than one occasion. This does not mean that hybrids are easily produced in the aquarium because individual fishes will inevitably seek out members of their own species in preference to members of another species. In a mixed community made up of species from the Limia group, cross fertilizations, between different species, would be extremely unlikely for the above mentioned reason. A more reasonable explanation for unusual offspring occurring in these circumstances would be the possibility of mutations or of recessive genes achieving the homozygous state through excessive inbreeding of small isolated stocks. There are many different methods of producing interspecific hybrids but some of the most reliable of them

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Cuban Limia

Pseudotropheus lombardoi

by R. J. Clements

In recent years, the variety of colourful fish species from the Rift Lakes of Africa imported by dealers in this country has been greatly extended. One of the new species now being imported quite frequently is *Pseudotropheus lombardoi*, previously referred to in the trade as "Liliancinnus," a name subject to many variations of spelling. *Pseudotropheus lombardoi* is one of the rock-frequenting group of cichlids from Lake Malawi, known collectively as 'Mbuna.' In size and form it is similar to *P. zebra*, stockily built, reaching an adult length of about six inches. Adult males are bright primrose yellow in colour, with faint dark bars; females are a shade of light turquoise blue, most intense on the forehead and gill covers, with darker vertical bars. This coloration is the reverse of most 'Mbuna' species, where the male is usually blue, with the female some shade of brown or yellow. Young Lombardoi, in common with most 'Mbuna' species, adopt the female coloration until the males reach about two inches, when the bright blue colour fades to be replaced by the adult yellow colour.

P. lombardoi is best kept in a communal system with other Rift Lake cichlids of similar size. I keep a trio, one male and two females, as this ensures the male's attentions are divided and neither female is too badly treated. While nowhere near as vicious as, say *P. elongatus*, the male Lombardoi will defend his territory, especially just before spawning, and a high density of rockwork and hiding places are necessary to prevent injury to other fishes in the tank. My Lombardoi have shared a thirty gallon tank with three small *Cyphotilapia frontosa* from Lake Tanganyika for almost a year with no mishap other than the usual fin nipping. The tap water in this region is hard, with a mild alkaline reaction, and seems perfectly acceptable to my African fish. *P. lombardoi* is not a fussy feeder, taking all flake foods, pellets, and live and frozen foods offered. In common with most species of 'Mbuna' they are adaptable, hardy fish with a high resistance to most tropical fish diseases.

Given suitable conditions *P. lombardoi* will breed readily, and the numbers of fry produced may soon prove an embarrassment of riches. The male usually chooses the spawning site, a cave or a flat slate being most often used by my fish. Spawning takes about an hour, the female laying quite large (¼ in. diameter), orange coloured eggs, taking them up into her mouth, while the male alternately fertilises the eggs and dashes around scaring off intruders. Provided the female is in good condition, there should be little problem involved in their brooding the eggs. Common practice is to remove the female to a small brooding tank after a few days, though personally I leave the female in the community tank. The fry are normally ejected after twenty-one days, and though most are eaten by other fish in the tank, a number of them usually survive the predations of other fish, by hiding in small cracks in the rockwork.

If one wishes to rear the whole brood of fry, the female may be isolated in a separate tank, or artificially stripped of the fry while they are developing in her mouth. To do this I usually catch the brooding female, about ten to fourteen days after spawning, in a large, fine-mesh net. If gently, but firmly held underwater, the mouth can be prised open with a blunt spatula or similar instrument. The fry will be ejected into the net and, after peering down her throat to ensure that all fry are ejected, the female replaced in the community tank. The advantage of this method is that the female is not weakened by an overlong fast, and that all the fry are reared safely. The net containing the fry is then placed in a small aquarium with an airstone or sponge filter to circulate the water. The fry are freeswimming and feeding after nineteen days at a temperature of 80°F. First food can be brine shrimps or finely-ground flake food; regular and

frequent feeding will ensure a fast early growth rate.

The following table may be found helpful. It shows the intervals between spawning and the number of fry produced by my two female *P. lombardoi* since their purchase as young adult fish a year ago.

Pseudotropheus lombardoi

Female No. 1		*Female No. 2*	
No. Fry	Days since previous spawn	No. Fry	Days since previous spawn
42	—	21	—
46	44	24	52
46	61	50	65
52	52	55	39
50 (approx)	47	60 (approx)	44
50 (approx)	48	60 (approx)	45

The recent figures for numbers of fry are approximate, since these broods were ejected in the community tank, not artificially reared. Though these figures have no scientific veracity, since variables such as temperature, feeding and other outside influences were not strictly controlled, some assumptions can be drawn.

The number of fry produced increased as the fish grew older, (and bigger). The average brood for an adult Lombardoi is between 50-60. (The Female No. 2 ejected a quantity of eggs after a few days, on the first two spawnings, resulting in the abnormally low brood size).

The period between spawns varied between 39-65 days, presumably depending on the condition of the female, and the suitability of the external conditions. Over a year, one female could produce 7-8 spawns, resulting in perhaps 400 fry.

One difference in brooding behaviour was that Female No. 1 would accept food while brooding fry while the other female would steadfastly refuse to eat until the fry were ejected. Oddly enough, this does not seem to have affected the period between spawns, the abstaining female having the lowest recorded period between spawnings.

In conclusion, *Pseudotropheus lombardoi* is an attractive, robust fish which seems certain to become a firm favourite with keepers of African Rift Lake cichlids.

THE WATER HAWTHORN

by Philip Swindells

THE water hawthorn, *Aponogeton distachyus*, is one of the most beautiful aquatic plants for the garden pool. Not only does it remain almost evergreen, but provides a continuous display of bloom from April until the first hard frost of winter.

The individual flowers are forked into two arms and bear a double row of bract-like organs at the base of which are clusters of jet-black stamens. This gives a most striking effect which is further enhanced by its powerful vanilla fragrance. Two dozen or more flowering stems may be borne on a plant at any one time, floating amidst dull green, roughly oval leaves, that are splashed and stained with maroon. Apart from being extremely attractive the flowers are good to eat, and make a tasty if somewhat unusual addition to a salad.

Some gardeners assert that there are red and pink forms and names such as *A. distachyus* '*Rubra*' and *A.d.* '*Rosea*' have been applied to these in years gone by. However, all indications are that a change in flower colour is brought about by growing conditions, frost or cultivation in shallow water creating such an effect. To grow successfully the water hawthorn requires in excess of a foot of water, but then it will flourish, seeding freely and producing splendid colonies of fine young plants.

Hump Back Limia

depend upon the use of artificial insemination, a technique that is, unfortunately, well removed from the scope of the average aquarist. A very useful method, which is more in line with fish-houses than laboratories, is that of isolation.

Hybridization in the Aquarium

Individual fry are separated from all other members of their particular species as soon after birth as possible. Each fry is raised in "specific" isolation until, on reaching maturity, it can be called upon to breed with another previously isolated individual of a different species. During the period of growth it is essential that all contact with other members of the same species are eliminated. This even includes sightings between two different tanks and also any means whereby water used by other members of the species is released into the isolation tanks. Growth in isolation will tend to make females more amenable to the advances made by males from different species and although males often make sexual advances to females of different species, they rarely complete the mating unless they have been in isolation from their own species for most of their immature growth cycle. Hybridization between individuals of different species is not as easy to achieve as most aquarists would believe and even species that are readily hybridized, such as Swordtails (*Xiphophorus helleri*) and Platys (*X. maculatus*), usually need this sort of treatment in order to bring a mating to a positive conclusions.

Hybrids obtained from crosses made between the Hump Back Limia and the Blue Limia are particularly attractive and caused a great deal of confusion some years ago when they were introduced as *Limia tricolour*. Another hybrid was seen around the show benches during 1976 and is a cross between the Blue Limia and the Cuban Limia. (*P. vittata*). In the specimens observed, the main colouring of the Blue Limia was retained and was combined with the size and vigour of the Cuban Limia to make a large, lively and colourful exhibit. Hybridization is a legitimate method for producing new and different strains, it is also useful for confirming certain identifications by providing genetic evidence in the form of karyotipic analysis.

Hybrids should never be passed on as pure stock as this can cause great confusion when identifications are attempted and it will also deplete pure bred stocks if a hybrid is unknowingly used as a breeding partner.

In part two some individual species will be discussed and care and maintenance for the whole group will be the basic subject matter.

LOW VOLTAGE WARNING DEVICES FOR THE FISH HOUSE

by Roger N. Cooper

I WAS very interested in Mr. C. N. Melton's article on "Low Temperature Warning System for Aquaria" in the "Aquarist" of February 1978, for I have built a system for my own fish house with the aim of providing warning when (a) the air supply fails, (b) when the temperature falls too low, (c) when the temperature rises too high, either in the fish house itself, or in the aquaria under surveillance. Although nowhere so elegant a solution to the problem, my set up, being purely electro-mechanical, only uses current when contact is made—i.e., when one of the parameters is exceeded. It is therefore possible to run the equipment from a low voltage source, e.g. a 9v transistor battery, hence the title of this article.

Thesis

Many of us have, at some time, thought how nice it would be to have a fish house with all its advantages of scale, freedom of action and adaptability. These attributes are fine and can, perhaps, once sufficient know-how is obtained, result in the successful breeding of fish, sufficient even to cover the running costs of such a fish house. The one big disadvantage of a fish house is its remoteness. Whether it be the spare bedroom or a custom-built job in the back garden, it *is* remote when compared to a couple of tanks in the living room. What I am trying to get at is this—failures which would not go unnoticed for long under normal domestic supervision could well go undetected for up to nearly 24 hours in fish house conditions.

The most important failures from the "disaster" point of view are failure of the air supply, for whatever reason—pump breakdown, airlines come adrift or power failure, and where installed, failure of the heating system, whether space-heating or individual tank heaters are used. Heating failure may take two forms—either the thermostats may fail to close and the temperatures will get lower, or the thermostat points may fuse, fail to open and the temperature will continue to rise. I have therefore designed and built what I consider to be a cheap and satisfactory means of setting up a warning panel indoors, gathering its information from the "remoteness" of the fish house. As it all works from a low voltage source, it is independent of the public supply. This means that if there is a power failure at night when all are asleep and would not normally be aware of such an occurrence, the warning bell will sound and an alternative source of power can be connected.

All the items I have used are relatively cheap, readily available and need the minimum of technical skill to set up and maintain.

The first priority in my case was to have adequate warning of pressure drop, from whatever cause—pump, power, or air line failure, and I obtained a pressure switch from an old Hoover twin-tub washing machine; this, I found, would make a circuit in either mode, i.e. increase or decrease of pressure, depending upon which terminals were connected. My next requirement was a low voltage electric (D.C.) bell, bought as a result of browsing through a junk stall on a local market. I did have a little difficulty in finding a two-way switch—I could easily buy one which went through "off", but I needed one that switched directly from one circuit to the other, thus avoiding any operator errors. I was lucky eventually, and managed to purchase this item from a garage. The lights proved to be the most difficult, as I had hoped that 12V car accessory warning lights would do the trick; however, I could only get the lights to work and not the bell; the internal resistance of the 12V lamps was such that there was then insufficient voltage to operate the solenoid of the bell, thus breaking the circuit and starting the sequence again.

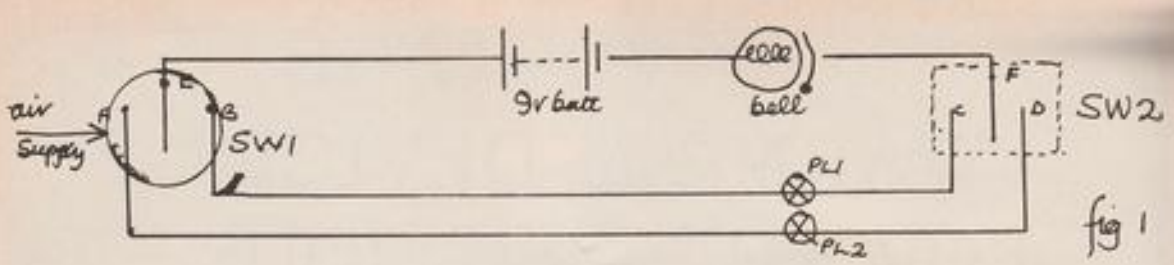


fig 1

The substitution of 4·75V, 0·5A torch bulbs did the trick, and I was able to get both lights and bell to work at one and the same time, powered by a PP9 9V battery. The circuit for this is as shown in fig. 1. SW1 = pressure switch, SW2 = two way switch, PL1, PL2 = pilot lamps.

The sequence of events in the event of a failure takes more time to write and read than it does to operate and is as follows:

Let AE closed and FC closed equal normal conditions, i.e. power on and pressure normal, then:—

Condition	Switch	Result
Power failure	SW1	auto. pressure drops AE → EB, bell rings.
	SW2	manual. FC → FD, bell stops.
Transfer to emergency power	SW1	auto. pressure rises, EB → AE, bell rings.
	SW2	manual FD → FC, bell stops.
Normal power restored disconnect emergency power	SW1	auto. Pressure drops, AE → EB, bell rings.
	SW2	manual. FC → FD, bell stops.
Restore mains power	SW1	auto. Pressure rises, EB → AE, bell rings.
	SW2	manual. FD → FC, bell stops.
Normal conditions prevail		

Thus warning is given at both stages; when power and/or pressure fail, and when both are restored.

The next most important parameter is that of temperature, and it is easy to add a second circuit incorporating a thermostat set slightly lower than the thermostat in the heating circuit. If the latter fails and the contacts fail to close, then when the temperature drops, the contacts on the warning thermostat will close, thus completing the circuit. As it will be a relatively slow job to return temperature conditions to normal, a simple one way on-off switch has been incorporated, and it will be necessary to have some means of reminder to reset the device when conditions return to normal. If space-heating is used, then only one such 'stat will be needed, but if individual tank heaters are used, or different tanks are kept at different temperatures, then a separate 'stat and circuit can be supplied for each tank.

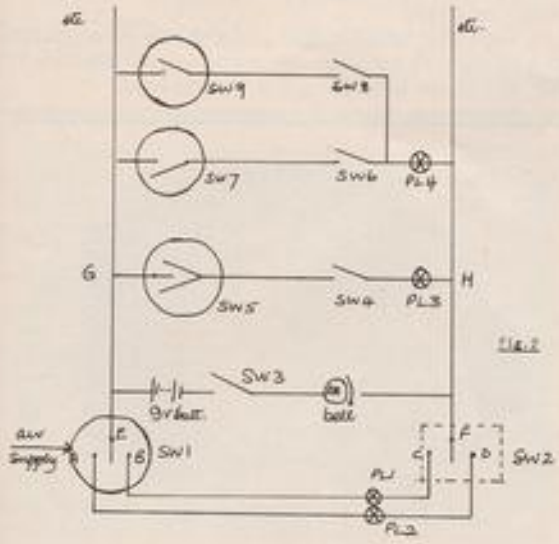
If it is desired to warn of abnormally high temperatures, such as may occur if the 'stat contact points arc and fuse together thus preventing the circuit from being broken, then a "reverse" thermostat, which makes contact when the temperature *rises*, will be needed. I have not seen one of these advertised as being available for aquarium use; I have, however, found that it is a reasonably practical proposition to construct one, using the following method; alternatively something suitable might be obtainable from a firm of scientific suppliers. I must emphasise at the outset the method of construction outlined here is only, in my view, suitable for low voltage applications, and should not be used with mains voltages.

Using a conventional bi-metallic strip thermostat, remove it from the glass tube, then with a soldering iron remove the wires from the contact terminals. Drill out the rivets holding the strip to the plastic mount, and remove the contact point from the strip. Straighten out the strip, and remake the bend to the reverse of the original, including the slight bends at the tip where the magnet is situated. Relocate the contact point on the strip, again on the opposite side to the original, rerivet the bi-metallic strip to the plastic mount, or use small nuts and bolts, and replace the wiring. The bending can only be done once—further bending causes metal fatigue and the strip breaks. The stat can be calibrated using water of the desired temperature. If the bends have been made accurately, the screw adjuster can be used; if not then the strip will have to be gently bent until contact is made at the desired temperature.

Using such a 'stat, a further circuit can be incorporated, or combined with the low temperature warning circuit, with a one way on-off switch. Note the position of the pilot lamp. This circuit will only warn of a fault, and only investigation at source will show whether it is a low or high temperature problem.

If it is desired to separate the two functions, this can easily be done. Fig. 2 shows the air pressure warning system, a high/low temperature warning system in one (G-H); a separate high/low temperature warning system is also shown, although SW6 and SW8

would have to be operated in turn to isolate the fault as PL4 serves both circuits. SW1 – pressure switch; SW2 – two-way switch; SW3 – optional on/off master switch for whole system; SW4, 6, 8 – one-way switches; SW5 – combination of normal and reverse



'stats; SW7, 9 – thermostats at different settings, or separate normal and reverse for low and high temperature warnings; PL1, 2, 3, 4 – 4·75 volt, 0·5 amp. pilot lamps; Batt – 9 volt PP9 or equivalent; Bell – low voltage D.C. bell.

Assembly

I used a metal sandwich box, approximately 8 in. × 5 in. × 3 in., (20 cm. × 12 cm. × 8 cm.), but a similar box of wooden or plastic construction would be equally good. Switches were all auto accessory types requiring a ½ in. (1·25 cm.) mounting hole, and the pilot lamps were the same. As I had already, in all innocence, bought a set of 12v auto accessory warning lamps, these were used, but with the 12v bulbs and holders removed, and the pre-focus bulbs used were sufficiently large to slip in and hold after a small vertical slit had been made in the bulb holder. As an alternative, I would suggest the use of M.E.S. bulb holders and lamps, mounting the lamps in rubber grommets, or simply fixing the lamps into position with epoxy-resin glue. The bulbs can be coloured with clear lacquer. Fig. 3 shows a suitable layout for the control panel of the warning system.

Note that I have placed the optional master switch on the side of the box, rendering it less likely that it will be accidentally switched off.

The line from the control panel to the sensors consisted of three lengths of low voltage bell wire, bound together at 6-9 in. intervals with P.V.C.

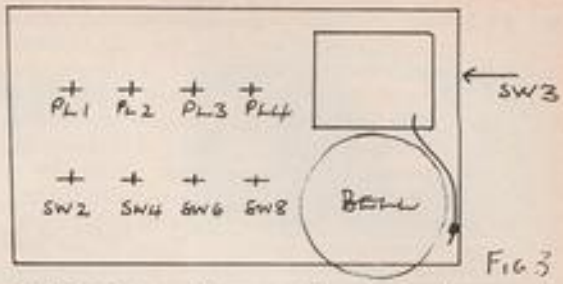


Fig 3

insulating tape. If any great distance is to be covered, I would strongly recommend the use of a catenary wire to support this. Don't forget to bring the wire down and then up at the point of entry to the house and to the fish house; this will prevent water running along and gaining entry. In the fish house, the six strands are divided into their various functions—five to the controls and a common return, via a terminal block. Components inside the control panel were connected to these with tags wherever possible, or simply soldered direct, as they were to the pilot lamps. With the use of a single common return, each additional pair of wires between control panel and fish house can serve a further two control devices, and if necessary, the control panel can be made larger to cater for future needs.

The pressure switch is simply actuated by inserting a T-junction in the air line and connecting a length of air line from this to the inlet on the switch. As its functions in its usual capacity are to switch circuits when certain water levels are reached, it should be possible to utilise a further switch as a depth gauge, to warn of a burst tank, excessive evaporation and the like. As I am only in possession of the one switch at the moment, I have not as yet been able to follow this one up!

As I already had the thermostats on hand at the time, they cost me nothing, and the cost of all the other bits and pieces (including mistakes) came to about £6, the most expensive single item being the bell-wire at 8p a yard. This could have been reduced by mounting the panel in the fish house, and running only the two strands of wire to the bell mounted indoors, but I feel that £6 is a small price to pay for a certain degree of peace of mind concerning the safety of the contents of the fish house. If you have some of the older (pre-"new regulations") thermostats still in use, the construction of this warning system could well be a suitable opportunity to replace them with 'stats to the new standard, whilst the old ones can be put to good use in a lower voltage application.

I have not mentioned lighting failures, as in my case at least, lighting failure would not be a critical factor. It would be quite a simple matter to incorporate a relay into the lighting circuit; if power is lost by the fuse blowing, etc., then the relay would activate

a switch in the low voltage circuit, light the appropriate lamp on the control panel and ring the bell. Follow up action could then be taken.

Maintenance of the system is minimal; to check the battery, I operate SW2, whilst the system is functioning normally. If the bell rings, all is well. I occasionally check the functioning of the pressure switch by a simulated power failure, i.e. I turn the mains electricity off and go through the procedure outlined in the table, using my battery/mains inverter. Thus I test not only the pressure switch in both modes but also the battery and inverter as well! I haven't been able to devise a simple function test for the 'stats as yet, other than a purely visual one just to see that the things "look right", but under low voltage conditions there is little or no danger of the contacts becoming burnt or pitted.

I hope that this article has given you ideas which can be adapted for your own purposes; my installation has served me well for several months now.

THE CHEQUERED ANGELFISH

by Steve Pember

THIS marine angelfish, although not as brilliantly coloured as many of its close relations, is an excellent choice for the recently matured tropical marine aquarium. Temperatures from 72-78 degrees (F) and a specific gravity of 1·020 seem to satisfy this species' requirements.

The main body colour is creamy/white to yellow with a sooty black band passing vertically through the eye. The rear third of the body is also black as are those parts of the dorsal and anal fins within this area. The caudal fin is bright yellow in colour, whilst the edges of the dorsal and anal fins are billiant white and electric blue respectively. The pelvic fins are yellow/green in colour, the first ray of each being pale blue and extending to a filamentous point.

The scales are small, each one consisting of a dark inner sector with a light outer band, giving a chequered appearance as the name suggests. This fish is attractive due to the contrast of its colours rather than the variety of them.

Holocanthus species usually attain a large size in the wild (up to two feet); however, the *H. xanthurus* I own at the present time is about four inches in length and has remained this size during the seven months I have owned it.

One very noticeable feature of this species is the sharp and formidable looking spine attached to the base of each gill cover. Often, at feeding times I have noticed this fish displaying in a threatening manner towards other fish that come too close. The method used by the fish to discourage would-be intruders is to undulate its whole body and at the same time its gills are opened to their fullest extent, which in effect causes the spines to stick out at right angles to the body of the fish whilst being moved from side to side. Needless to say other fish soon learn to keep their distance.

The specimen I have at present is certainly not choosey as regards food and will take anything from flake foods to earthworms. This fish seems to appreciate the addition of a few pieces of living rock to the tank from which it grazes algae and small organisms. A good growth of algae on the back and sides of the aquarium is also appreciated by *H. xanthurus* and provides a valuable supplement to its daily diet.

The Chequered Angelfish originates from the Indian Ocean where it is a reef dweller. It does not appear very often in dealers' tanks; however, this may be due to rarity but it is more likely that more exotic and therefore more expensive species are imported instead.

I would certainly have no hesitation in recommending it both as an interesting and useful inhabitant of the marine aquarium.

WHAT IS YOUR OPINION?

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

Photographs by the Author

I'M TYPING this at 12.15 a.m. on 18th June after a beautiful, sunny day's gardening. Amongst the many things in my greenhouse is a four-gallon bucket full of 'hornwort' and Java moss that I cleared from my tanks almost a week ago. Mr. K. Kelly's home is at 37 Blythendale House, Mansford Street, Bethnal Green, London, E.2; and his s.a.e. and polythene bag were the first to reach me; hence his sample of the two plants are in the post and will, I trust, reach him in good condition.

The removal of the masses of plants has, literally, thrown much more light on most of my tanks: I can now see the remaining fishes—and their numbers have dropped considerably because of old age. The male *Apistogramma borelli*, that a reader from Bangor, County Down, kindly sent me, has passed on—and my ancient, original female survives. Recently my largest, female angel died as a result of old age; indeed, I had her so long that I could not remember when or where I purchased her. Two large, elderly males and a smaller female survive. At the opposite end of the scale, the five guppies that Jeff Hutchings kindly sent me have produced their first four babies. The golden-coloured babies are thriving.

From 1a Midland Road, Rushden, Northants, comes the first of this month's letters. Mr. David K. Pattison says: "Since I wrote my last letter to you—from which I gained several pen-friends—I have made a visit to Denmark. Whilst in Esbjerg I made time to visit the famous Fisheries and Maritime Museum. The Aquarium there is all salt-water and the fish and tanks are in first-class condition. I feel this is one of the finest salt-water aquariums I have seen. The fish are mostly North Sea species—such as cod and whiting.

"One ugly-looking customer was simply called 'Catfish.' He lay on the bottom, on his back, dead to the world; then turned over and swam away. I was told he had been there for six years. Rainbow trout are stripped, the eggs hatched in fresh water, and the fry put into salt water when old enough. There are dogfish which spawn each year: the familiar egg capsules hang on projections in the tank for 11 months before the young fish emerge. Some of the fish have been there for five years.

"I saw aeration in only one tank, the water being circulated through a sand filter then re-circulated after being cooled. Outside is the seal basin, a swimming-pool affair housing ten seals. Unfortunately during my visit the pool was being cleaned. Altogether I spent a wonderful three hours there and can well recommend the Aquarium to anyone. All the best to you and my favourite column."

Mr. Gilbert Moncrieff's address is 52 Queensborough Road, Sheerness, Kent. He wrote me the following letter. "This is the first time I have written to any magazine; I feel I must make some observations regarding killifish. I have heard so many remarks about killifish keepers, the most incorrect one being that it is a closed shop. All I can say about this is that it is a load of rubbish.

"A little while ago I became interested in killies through a fellow aquarist. I got the name of a chap who keeps killies and lived near London. Unfortunately he was not on the telephone; so I just turned up at his house one Saturday afternoon. He was in the middle of some D.I.Y. household chore—so he could well have been pleased that I turned up. Anyway, he spent the best part of Saturday afternoon explaining and showing me different aspects of killie keeping; and the advantages of belonging to the B.K.A.—a thing any aquarist would do, i.e. sing the praises of his club. Anyway, I left with the knowledge that the keeping and breeding of killies are not as demanding as one would suppose; also, I left with my first pair of killies, a lump of Java moss and some peat blocks—all free gifts to get me started. Thank you Mr. Boadle. I was also given the name and address of another killie fan who lived nearer to me. I called with him for a chat—and once again left with a pair of fish. So, closed shop? No way!

"I did gather, though, that their concern is people who make out that they are interested in killies—who get started with free fish, as I did, or certainly cheap fish—only to breed as many fry as possible to sell to pet shops. You must admit this would upset anyone as a lot of killies change hands in the way of swopping different species. I hope I have cleared up that little injustice regarding killies. If anyone wishes to know more I would be pleased to hear from him or her.

"May I also make a few comments about plants and

their growing or not growing—as the case may be? I used to spend endless hours replacing plants as they died off—which was far too frequently. I was then told to try peat, in a stocking, under about 3-4 in. of medium-grade gravel, at the same time changing over to a *warm* white fluorescent tube. I did so and the results were remarkable. Within a month an Amazon sword plant had sent out a runner with seven young plantlets on it; and *Vallisneria torta* started multiplying so fast that they are taking control of the tanks and have to be thinned out regularly to make it possible for the fish to be seen."

Photograph 1 shows an attractive killifish that I kept some years ago. Have you kept this species?

Mr. M. R. Fox resides at 24 Kelvin Close, High Wycombe, Bucks. He writes: "I see from your May

article that you are interested in the spawning of pencilfish. As these fish are my favourites they were the fish I chose to spawn for my first attempt at breeding. I filled a small 12 in. × 8 in. tank with rain water, the base being covered by 1 in. of garden peat held down by 1in. of gravel. The temperature was set at just below 80°F; a clump of Java moss and a few sprigs of *Cabomba* were added; the adult fish, *Nannostomus anomalus*, were taken from the community tank where they had been for over a year; they had no special feeding and their diet had been a well-known brand of British flake food. They spawned the next morning and were returned to their own tank. The eggs were small and light grey in colour. They disappeared in two days and my hopes of a successful spawning fell. Several days later I was going to empty the tank and start again; but my wife said: 'No! Show a little patience for at least a week.'

"After four more days I finally saw a small, transparent splinter; and then another; finally six fry were seen. Once you see one you can pick out the others fairly easily. I gave the fry three daily drops of a liquid fry food and two weeks after hatching I started them on brine shrimps. As soon as they took the brine shrimps they raced away, growing at a fair rate. At six weeks small *Daphnia* were added, together with flake food. A small amount of water in the tank was changed after the fry were three weeks old and the change was repeated weekly.

"The stages of development are very interesting. At first, and up until about five weeks the fry are transparent; a single fish looks like a letter Y in the water, with the top of the Y ending in the eyes and the stem in the vent region. When the fry take brine shrimps their gut becomes very distended and hangs below like a ball, bright orange from the food inside. The first fins to be seen with the naked eyes are the pectoral fins, which can be seen from above. The young fish often hang head down in the water. The first ray of the caudal fin is separate and curls up until about the sixth week—at about which time the fry become small fish quite like the adults except for the colours which take a fair time to show up. The markings are completely different in the young fish. A small, black dot on the caudal peduncle gradually becomes a semi-circle of dots in the caudal fin and then the fin goes clear as its early, rounded shape changes into the adult, slightly-forked shape.

"These young fish have been entered in two open shows in the breeders' class and have gained a second and a first prize; so I am well pleased with my first attempt at breeding pencils. For my second attempt I tried *N. trifasciatus;* but I think all six fish I own

are males because despite pairing any two from the six, nothing happened; so rather than waste the setting up of the breeding tank I placed a pair of *N. anomalus* in it. The tank had been set up slightly differently to the original in that the peat under the gravel had been removed and some peat sandwiched between filter wool in a simple, box filter. Also, the plants were *Riccia* (floating) and *Ambulia*. The *N. anomalus* didn't spawn until the late afternoon of the second day and in the last hour of spawning—which lasted three hours altogether—laid 41 eggs, of which 30 reached the gravel without being eaten by the parents. With my now-trained eye I spotted the fry as soon as they hatched—which they did in 24 hours—and saw them hanging by the sticky gland on the back of their heads for a further three days before becoming free-swimming.

"I keep *N. eques*, *N. unifasciatus*, *N. marginatus* as well as the *N. anomalus* and *N. trifasciatus* but haven't yet tried to spawn them. One last note. I have another *Nannostomus* species in my tank but can't identify it because none of the usual books describe or illustrate it. If you or your readers could help I should be happy. It is slender, like *N. trifasciatus*, but has only two lines; also the anal fin is a milky white; on some examples it is twice the length of the normal pencilifish's anal fin. It swims horizontally, not at an angle like the *N. unifasciatus* or *N. eques*. The colours are green/brown on top; there are two black lines, the upper one of which is less dark and does not continue into the caudal fin. The dorsal and caudal fins are blushed with pink/red. P.S. You did better with the killifish than I did; mine didn't even hatch. P.P.S. I still require *N. espi*, *N. harrisonii* and *N. diagrammas* if anyone has any to swop or sell."

I'm continuing my feature at 11.30 p.m. on 19th June and note that my Preston-bred guppies have produced a few more babies. My Scottish terrier, Corra, had a bonanza this morning when the postman landed eight more requests for Java moss and/or 'hornwort'—complete with envelopes and polythene bags—through the letter-box. Two came from Liverpool, one from Chelsea, Nottingham, Ormskirk, Canterbury, Lincoln and one from my own home town. It took me quite some time this evening to sort out and pack samples from my bucket; but the bags are packed and the envelopes ready for posting in the morning. My local post-box, like many others in N. Ireland, is still fitted with an anti-terrorist device that prevents the posting of bulky envelopes; indeed one is able to post only small, standard envelopes or postcards; larger items have to be handed over the counter in my nearest post office.

More requests for plants have reached me—from: Redditch, Northampton, Sheffield, Kettering, Leeds Clwyd, Newcastle-Upon-Tyne, Norwich and Exmouth. My stocks are diminishing quite quicky.

The following letter, written by Mr. R. E. Pittaway, reached me after its long journey from Lagos, Nigeria. Mr. Pittaway is at present working in Nigeria; but his home address is 15 Beech Hall Road, Highams Park, London, E.4. He writes: ". . .I kept a number of monos (*M. argenteus*) in Britain, for some years, and found them to be attractive, intelligent and lively. The only trouble is that as the optimum conditions a fish requires are the conditions found in the wild, it is difficult to maintain monos for any length of time successfully as they require to be in a shoal and in sea water. Apparently they move down river from where they hatch, i.e. from fresh or brackish water, to the sea, on reaching a certain size.

"My first mono was bought when about 1 in. long; and in less than a year it grew to about 3½ in. long—including the tail. It lived in a 24 in. × 12 in. × 15 in. community tank with the usual fish. The water was acidic—pH 6·0-6·5—and hard, i.e. London tap water which had turned acidic due to the introduction of fish and a vigorous Amazon sword plant in a flowerpot. The mono lived quite happily with the other fish, eating dried food and *Daphnia* and any other live food I could catch in the various ponds near my home. As it grew bigger it started to eat cardinals at night when the lights were out and I realised it was getting too big for the tank; so it went back to the shop.

"Some time later I purchased three for the same tank; they were about 2 in. long and I found that in a confined space one fish turned out to be the dominant one and chased the others into a corner and kept them there—especially at feeding time. This was the case even when more than adequate food was provided. To achieve peace only one was left in the tank; and it also went back to the shop when it became larger. This all reinforces my views that monos are not suitable as aquarium fish and will be seen at their best only in extremely large aquaria, in a shoal, in sea water —as is (or was?) the case in London's Regent's Park Zoo Aquarium.

"If it is of interest to anyone, I have seen mudskippers in large numbers in the swamp areas around Lagos (West Africa). This is at variance with the distribution pattern mentioned in a good reference book I have here which states that they occur from East Africa eastwards. I cannot say what distribution patterns other books give because I have only the book mentioned above."

Mr. Alan Barnes resides at 4 Mountbatten Grove, Gedling, Notts., and he wonders if gouramies are really all as peaceful as some people think. He says: ". . .I have two male 3 spots in a community tank of barbs, tetras, guppies and a very placid pair of dwarf gouramies. The larger of the two 3 spots has always been a bit of a bully; but last night it surpassed itself and savagely mutilated a fine Siamese fighting fish. When I rose this morning all that was

left of my fighter was a body with one eye. The other eye and all the fin plumage had been torn from the body and eaten.

"The Siamese fighting fish was introduced into the 30 in. × 12 in. × 15 in. tank several days ago and seemed to get along quite well with the other tenants. Any explanations, please, as to why such a sudden, savage attack? By the way, the fighter and the 3 spot were of similar stature."

Mr. John A. Craggs, whose address I shan't publish for reasons that will become obvious, sent me the following letter: "Thank you for publishing my letter and producing yet another excellent article. One snag, however, is that I have been inundated with requests for plants. I have supplied as many as possible from my supply—and from friends'—but the requests still roll in. I thought I would send this batch to you and then return all following ones.

places listed—and it will take me some time to pack the remaining plants; hence, if you sent a request and did not receive any plants, you'll understand why.

Mrs. K. A. Ryder lives at 5 Wellerley Avenue, Norwich, Norfolk, and suffers as the wife of an aquarist. "I read my husband's *Aquarist* magazine and wish, through your columns, to let Mrs. C. Wilkins know that she is not unique. I, too, supply baby cereal for the micro worms, cooking salt for the wounded fish, Tupperware containers for floating ill fish in; and I also bake my husband's filter carbon in my oven. Occasionally the bath is used for pond fish whilst the ponds are being cleaned or treated. I moan—but usually end up hunting small fry or changing the water and filters. We have two 36 in. tanks in our living-room which make an interesting and relaxing addition to the furniture; and our house wouldn't be the same without them or the paraphernalia that goes with them."

"My own Java moss is growing more slowly now as I keep one half of the tank covered in frogbit as the discus seem happier that way. The 'hornwort,' although attractive, I have had to part with because it impeded the movement of the discus and they seemed troubled by it. Hope you have a good holiday."

I know how Mr. Craggs feels: this morning the postwoman delivered three envelopes from the offices of *The Aquarist*. They contained Mr. Craggs' letter, the letter that follows, and plant requests from: Portsmouth, Yarnton, Colchester, Edinburgh, Plymouth, Houghton-le-Spring, Leatherhead, Sheffield, Birmingham, Middlesborough, Marton Middlesborough, Brinkley, Chesterfield, Dundee, Mapperley, Sheffield, Bristol, Bottesford and Huntingdon. I doubt if I'll have enough plants left to send to all the

Martin Searle, Esq., sent me a few lines from his home at 38 Aysgarth Road, Yarnton, Oxon. ". . .I would be pleased to take a piece of the 'hornwort' to Oxford University Botanical Gardens here as the Director is a friend of mine—and if anyone can identify it, I am sure he can." (I've sent Mr. Searle his requested samples and should certainly be delighted if the Director of the Botanical Gardens, at Oxford University, would identify the species for me. To date no one has suggested its botanical name. Thank you, Mr. Searle, for your kind offer. Please convey my thanks to your friend if he has time to examine the 'hornwort'. B.W.)

Photograph 2 is of a powder-blue surgeonfish, *Acanthurus leucosternon*. Please send me a few lines

about your experiences with marine fishes.

No. 1 Brent Terrace, Stonebridge Park, London, N.W.10, is the home of 15-years-old John O'Brien. John says that as well as having some freshwater tanks he also has a marine tank. Once the nitrate level dropped to zero John bought a copperband butterfly from a local aquarist. John writes: "Even though this fish is supposed to be one of the easiest butterflies to keep it is by no means that easy. After slowly putting it in the tank I left the light off for the rest of the night. I then opened the curtains so that next day the light of dawn would wake the fish, letting it relax more. No matter what I did during the next ten days the butterfly would not eat.

"I then bought a regal tang (*P. hepatus*). I used the same technique to introduce and relax the fish. The very next morning the fish started to eat; my poor old butterfly did not like this and by the afternoon feed he was fighting among the other fish (three damsels of different sorts, and the regal tang) and getting first to the food. I feel that this shows that a fish of the family sometimes called 'the impossibles' can be made to eat. I think two main rules for buying these fish are: (1) see that the fish in question do eat; and (2) see what food the fish like eating and which they dislike. After this always feed the fish on what it likes until it is eating well (in my case *Mysis* shrimps), then vary the food, e.g. spinach, flaked foods and various non-fatty meats."

Mr. David S. Allen lives at 30 Maypole Road, Oldbury, Warley, West Midlands. He has formed his opinions about synthetic suckers. ". . .I have to say, after keeping tropicals for only about a month, that the suckers I have used have been absolute rubbish. When first set up, my tank contained two synthetic suckers holding the heater/thermostat; one was positioned on the heater part and the other on the thermostat. Both turned brown and had begun to melt around the edges, the one nearer the heater being the worse. The lower one broke so I had to move the other one down; but no doubt that will soon deteriorate as well." (Is there any way to soften a synthetic sucker that has hardened?)

Mr. T. Buckley's letter reached me from 19 Ellerncroft Road, Wotton-under-Edge, Glos. He has a 36 in. × 18 in. × 18 in. community tank. "About three weeks ago I noticed some light green particles on the gravel bed. They were about the size of a pinhead and smaller. I was puzzled by these objects for a number of days and came to the conclusion that they were a form of algal growth. I then examined the heater/thermostat holder—and found to my astonishment that the suckers were crumbling and giving off small green particles. The mystery was solved. I siphoned off all the rubber particles and removed the holder—which I replaced; but is this the standard we are to expect of aquarium appliances?

"I should like to discuss the treatment of fin and tail rot. About six months ago I purchased seven beacon fish. I thought they would add a bit of life and contrast to my community tank. One of the beacons was nearly 1½ in. long, while the others were about ¾ in.-1 in. After about a week the large beacon developed a small fungal growth on its tail. I didn't think much of it at first; but within five days the fungus had covered most of the tail. I decided to do something about it because I didn't want to lose the best beacon fish I'd seen in years. I washed my hands to remove any bacteria and rinsed them half-a-dozen times in warm water to remove any detergent. I boiled a saucepan of water and placed an unused razor blade in it; I waited for the water to cool. I netted the beacon fish out of the tank. I know this next part may seem a bit brutal but it saved the fish's life!

"I proceeded to cut the tail just 1 mm. from its base. I amputated the tail just below the infected part. I then placed the beacon back in its tank so that he could rejoin the shoal. His swimming was not impeded at all by the loss of his tail. Within a month the tail had grown back to its normal state. The fish was none the worse for its operation; in fact, he even grew a little larger on a diet of dried foods and *Daphnia*. Unfortunately I lost the whole shoal through cotton-wool disease.

"I think the above is an ideal cure for fin and tail rot if the owner of fish is bothered about the use of chemicals. However, I think this operation should be carried out only on the hardier species of fish."

Over a week ago I thought I was going to lose my three coldwater fish. They developed some horrible disease that caused the tails to distintegrate; and the body and eyes were covered in a white growth that virtually blinded the fish. Patches of fungus developed here and there. I decided on a kill-or-cure mission as there seemed to be little hope for the three fish. I added a couple of doses of a German cure that contained silver nitrate (why can't British manufacturers state, on containers, the chemicals they include in their cures!). The bottle was then empty and I was unable to obtain any more; so I resorted to a British mixture that appeared to contain malachite green. I added a dose every night—on top of the previous doses, including the silver nitrate. The concentration must have been very high after a couple of days—but the almost-blind fish started to show signs of recovery and gobbled away at the water surface trying to find the food that they could not see. The disease began to clear up and, at the end of the week, I changed three-quarters of the water for fresh water straight from the tap. The fish are now completely clear, the fins and tail have healed up and the fish look as lively and healthy as I have ever seen them. One would never guess that, a week ago, I had almost given them up for lost. One benefit

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From a Naturalist's Notebook

by Eric Hardy

THE GREAT TADPOLE of the Mexican tiger salamander is best known in aquaria as the axolotl, the Peter Pan of water life which may never grow up. It is amongst one's earliest memories of visiting a public aquarium. Few pet-keepers seem aware that so common as is the axolotl in captivity, it is extremely rare in the wild. The development of Mexico City threatens to reduce its only known wild haunt, Lake Xochimilco. A further danger is possibly the introduction of new freshwater fish into this lake.

It is among threatened species which are often more numerous in captivity than wild, and whose salvation may depend upon breeding stocks in zoos and aquaria. Belfast Zoo is one of the few to have bred the South American boa-constrictor. Chester Zoo also has a notable reptile collection and Bristol Zoo is noted for its giant tortoises and plans to build a new £350,000 reptile house and aquarium in the next few years.

How high does the common toad range? In Snowdonia it is usually an occupant of lowland waters, rarely found on high land, nor does it range so high as the frog in Lakeland. In Scotland this spring I was therefore interested to come upon one at over 900-1,000 ft. on Rannoch Moor, where common lizards are fairly numerous. There is plenty of cover there and maybe the range of small animals in high country depends not only upon altitude but presence or absence of cover, and its microclimate at higher levels.

In Lakeland in May, I was interested to find that despite the controversial distribution of grass-snakes there, these reptiles still occur in the interesting Fleswick Bay area of the coast at St. Bees, where freshwater runs into a cleft in the cliffs and reaches the shores amidst a flora of primroses. Common lizards occur of course, and I was interested to find that natterjack toads still occur in the old Workington coal-mine pools a little further along the coast. Adders, of course, have several haunts on the fells. In 6 weeks drought the becks ran dry and we were able to penetrate to the heart of the great bog of reed and rush at the top of Bassenthwaite, the haunt of the freshwater herring-like whitefish, the vendace which feeds on small crustaceans. Only clumps of early flowering glaucous sedge, which usually marks more limestone districts, flourished freshly green. Young salmon from the River Derwent were trapped in the dried-up tributaries in shoals, easy prey for the herons from Lingholme, the 15-nest heronry on the banks of Derwentwater above Keswick's Portinscale.

In Scotland in May, masses of caterpillars of the marsh-fritillary butterfly were on the scabious plants around Loch Avich, in Interliever Forest on the north side of Loch Awe. This corner of the Argyle Highlands and the north coastal area of Kintyre are the chief Scottish haunts of this semi-aquatic butterfly which does not appear again through the lowlands until the English Lakeland.

Among more aquatic insects, bright blue emperor dragonflies, largest of our native dragonflies, probably extend further north than has recently been mapped in the literature, for in recent years there have been sight records from Lancashire's Fylde (Marton Mere) and the Southport (Woodvale) dunes, after southerly winds. Nearly three and a half inches long with a 4¼ ins wing-span, its brilliant blue, green and yellow colours are enhanced by the sunshine. The male usually has a bluish abdomen to its green head and thorax, the female, unless old, a greener browner body. Of course it has still to be proved breeding north of Lincolnshire.

A lot of the conservation efforts by job creation schemes have not all been to the advantage of waterlife ecology. The brashing of undergrowth has, in many places, resulted in a complete dearth of shading bankside vegetation and a resultant reduction in waterside insects as well as of birdlife. A stretch of the Shropshire Union Canal along the Montgomeryshire/Shropshire border, between Welshpool and Berriew is a case in point. A naturalist friend has been visiting this area annually in recent years. This year, with its bordering hedgerows cut down, its bankside alders cut right back, it revealed a radical change in its ecology. Between Welshpool and Newtown he found 4 pairs of mute swans in this year's national swan census, where 4 years ago, before brashing, he would have found 20 pairs. He saw one kingfisher in 9 days residence where several were the normal sighting. There were few coots and only 12 families of moorhens. Dragonflies, and other semi-aquatic insects requiring vegetation for roosting, were also reduced. One would expect an ecologist to be appointed to supervise such work.

After the aquatic, fishing red-breasted merganser's colonising of most Welsh estuaries and lower river-reaches as a nesting bird, its equally aquatic relative, the goosander, is slowly colonising the reservoirs. It now breeds on five of these, from the Elan Valley to Vyrnwy, though neither of these sawbills is welcome to anglers. Ten pairs of goosander nest from Montgomeryshire and Powys to Radnor and Gwent. They

began breeding at Lakeland's Haweswater and other lakes several years ago.

Kingfishers have now recovered most of the numbers they lost in the big 1962-3 frost, and are a much more regular sight nesting along rivers, even the Douglas at Gathurst near Wigan as well as the Alyn near Caergwrle and other parts of North Wales. Fishing ospreys too continue to increase in Scotland, nesting within 25 miles of Glasgow, and at the top of Loch Fleet, as well as recently using the Inverleiver and fish-hatchery end of Loch Awe, without bringing much pleasure by visiting the hatchery. We found another fishing bird, the black-throated diver, nesting again on Loch Ba within a short walk across Rannoch Moor from the main road near Glencoe, as well as many other waters. Goosanders always nest in Glen Orchy not far away, and there are divers at the Inverleiver end of Loch Awe.

Loch Maree, in Wester Ross, is probably the best of all diver haunts for there the great northern diver has also bred occasionally. I don't know of any detailed work done on their effect upon fish stocks. Such birds are understood to have a beneficial effect in catching mainly the weaker, slower fish and thus by natural selection maintaining a healthier stock. But all fish-eating birds from divers to herons and bitterns, are natural hosts in the life cycles of several fish parasites.

A curious incident happened at the huge new Brennig reservoir on the Denbighshire Moors this spring. When the angling season opened with great expectations for unusually large specimen rainbow trout, which usually follows a new water stocked with fish, they were found to be mostly infected with white fungus, often dying around the banks. Indeed, after the great build-up of the prospective angling catches it was a bit of a flop. Dead and dying rainbows marked white with fungus littered the banks in May; but it was not the more serious white spot parasite well known to fish-keepers. A late stock of rainbows were kept overcrowded at a local fish-hatchery and these delayed spawning until introduced to the lake in late spring. Trout don't normally spawn in a hatchery. Normal deaths often come to big fish after spawning, and some infected fish must have infected the rest with fungus very rapidly in their crowded confinement. Anyway, it was expected to clear up in a couple of months after weeding out infected specimens. I noticed this white fungus on some salmon pass isolated by the spring drought in pools on Lakeland's River Derwent, but very little. Fish up to 5 or 6 lb were caught at Brennig. How different are these crystal clear waters compared with Mersey's tidelines of tar and Coco cola-coloured creeks!

The white toad tadpoles I mentioned recently turned darker as they grew and pigmented. This seems to have happened with some previous records.

WHAT IS YOUR OPINION?

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of treating the fish in their planted tank was that the cures killed off whatever bacteria or fungus spores caused the out-break; so both fish, plants, gravel and tank should now be disease-free. One query remains: from where did the disease(s) come? I haven't added to or subtracted from the tank for many months.

Today's post brought only two requests for plants—from Lymm, Cheshire, and Cumbernauld, Scotland. I used up the last excess pieces of Java moss and 'hornwort' completing the final twenty-one requests and, hence, I shall be unable to supply any more for some months. I hope the plant samples—large or small—will thrive for the thirty-eight people who will receive them. I should be pleased to hear of their successes—or failures. Two concluding comments: (a) I didn't know polythene bags came in so many varieties; and (b) when writing a name and address on an envelope it's useful to begin the writing about half-way down the envelope; if one begins too near the top, part of the writing may be obscured by the Post Office when the stamp on the envelope is cancelled; or when the envelope is franked.

I'll conclude this month's feature with a short letter I received, some months ago, from Mrs. Sue Whittenham, whose home is at 37 Crofton Road, North End, Portsmouth, Hants. I asked if readers thought that live foods were necessary for the majority of aquarium fishes. Mrs. Whittenham says: ". . .I don't think so, provided one offers a good variety of dried foods. My tetras, guppies, platies and *Corydoras* catfish are fed from well over a dozen different tubs of flake and dried foods and they're thriving; in fact the only reason I give them live *Daphnia* once a week is that I like to watch the colours of my fish as they dart about the tank trying to catch their meal."

Readers are reminded that I accept no responsibility for the opinions expressed by contributors to this feature; and that I do not necessarily agree with the opinions expressed.

For a future feature please send me your opinions—to Mr. B. Whiteside, c/o *The Aquarist & Pondkeeper*, The Butts, Half Acre, Brentford, Middlesex—on the following: (a) public aquariums you visited during your holiday; (b) plants that grow well in your cold-water aquarium; (c) aquarium shows that you visited recently; (d) breeding species of *Corydoras;* (e) the advantages (if any) and disadvantages of having snails in an aquarium; (f) treating diseases of aquarium and pond fish; (g) cultivating *Cryptocoryne* species; and (h) breeding gouramies. I look forward to hearing from you.

PLANTS IN THE AQUARIUM

By Dr. Christopher Andrews, Technical Consultant, TetraMin (U.K.) Ltd.

Plants are both useful and extremely important in the aquarium for several reasons. They use up such potentially toxic waste products as carbon dioxide and various nitrogenous waste compounds, at the same time as releasing valuable oxygen. Actively growing plants also compete with (and help control) troublesome algae, provide shelter and concealment for the fish, and add to the natural decor of the tank. lastly, plants provide an additional food source for some fish. Nonetheless, many aquarists have difficulty in successfully growing aquarium plants. The following hints should help hobbyists to overcome some of the early pitfalls.

First of all check your water quality and chemistry. Tropical aquarium plants require a constant temperature between 72-80°C, though coldwater plants will naturally tolerate cooler conditions. For the majority of plants the water hardness should be about 6-8° dH (or 110-145 ppm $CaCO_3$, and the pH around 6·0-7·0. If the water in your area is harder and/or more alkaline than this, your local aquarium dealer can advise you how to lower the pH and hardness. Blackwater Tonic may be used to promote good conditions for the health and growth of most tropical aquarium fish and plants. Some plants (e.g. *Elodea*, *Vallisneria*, *Hygrophila*, some *Echinodorus*) will tolerate harder, more alkaline water.

One of the keys to growing plants in the aquarium, is the balance between the number of plants and the duration and intensity of the lighting. An algal problem may develop in a well lit tank that has too few plants. On the other hand, if insufficient light is provided the plants will go pale and refuse to grow. Light may be supplied from standard tungsten light bulbs or fluorescent tubes. The former are perfectly adequate, though they may supply additional heat especially to coldwater tanks. The surface leaves of some plants may become scorched by the heat from tungsten bulbs. The total wattage and daily duration *must* be varied to suit the needs of each tank. A heavily planted aquarium will require more light than a sparsely planted aquarium. As a *rough* guide, a three foot tank will need two or three 40 watt light bulbs or 30-40 watts of fluorescent tubes. These should be left on for about 8-10 hours per day. Always be ready to vary the amount of time that the lights are left on to suit the needs of *your* tank, remembering that a relatively short exposure to strong light is better than much longer exposure to weaker, subdued light. The artificial light that is supplied to the tank may be supplemented by natural daylight, so long as the tank is not situated where it will receive the full rays of the sun.

Coincident with poor plant growth, there may be an algal problem. By using up available nutrients and light energy, higher plants help to control algae. Whilst there are several excellent algal control remedies on the market, it is always prudent to give some thought to the *cause* of the problem. Increasing the number of plants, or decreasing the amount of light by an hour or two, may help. Overfeeding the fish is another contributing factor to algal problems in aquaria.

What about the planting medium and the method of filtration? For healthy plant growth it is important to have a depth of planting medium of at least three inches. A good depth of substrate appears particularly important if under-gravel filtration is used. I personally prefer to use corner or outside filters on most tanks, and would recommend that aquarists new to the hobby did likewise. This type of filtration, along with regular (small scale) water changes will help to keep an aquarium in excellent condition. Plants may be grown in a medium of gravel or coarse sand, though the addition of one of the proprietory brands of plant fertilizer then becomes important to promote healthy growth. Aquarium plants probably do best if there is a substrate of two-three inches of gravel, beneath which is a layer of aquarium peat mixed with clay or fine sand. The plants undoubtably benefit from this rich compost, though the occasional use of a plant fertilizer is recommended.

Plants require careful planting! Forked planting sticks have to be used with care and precision, since some plants are easily damaged. Take extra care to

avoid squashing or breaking long, delicate roots. Such roots are often better trimmed before planting, rather than folding and forcing them into the planting medium.

Plants for the aquarium may be divided into those for the foreground, those for the middle-rear regions of the tank, and those for the tank sides and back. In addition, certain plants may be used to form an impressive centre-piece to a set up tank.

In the foreground, relatively short plants are required to form a border along the tank bottom. There are several small, hardy species of sword (*Echinodorus*) that are well suited to this position, along with several smaller species of *Vallisneria* and *Cryptocoryne nevilli*. For the middle-rear regions of the tank, plants such as *Myriophyllum* and *Hygrophila* are suitable, and are best planted in clumps for the best effects. These plants send out long shoots, and trimming will provide an additional supply of plants. The long-leaved varieties of *Vallisneria* and *Sagittaria* look particularly attractive along the back and sides of the aquarium. In preference to menacing plastic divers and air-driven opening oyster shells, a large plant or two in the centre of the tank looks both natural and very attractive. Any of the large Amazon swords (*Echinodorus*), or the large varieties of *Cryptocoryne* are suitable, though the maximum size that each plant is likely to reach is best determined before planting. Some varieties grow very large! There are some very realistic plastic plants that can be successfully used in this position in the aquarium. As a final note, floating plants are unnecessary in most tanks, and may spread to such an extent that they become a problem by reducing the amount of light reaching the rest of the plants.

THE SKUNK CABBAGE

by Philip Swindells

THE SKUNK CABBAGES are invaluable plants for enhancing the poolside in spring and early summer. With arum-like spathes of yellow or white they provoke startled looks from visitors encountering them for the first time, for their glossy blooms are produced in advance of their foliage. The leaves when they arrive are large and leathery with a waxy surface around which water globules bob and bounce like quick-silver.

The American skunk cabbage, *Lysichitum americanum*, is the most frequently grown and has spathes of purest gold, a splendid companion for the slightly smaller white flowering Japanese species *L. camtschatcense*. A hybrid between the two with creamy white spathes can be seen in Savill Gardens, Windsor, but as far as I know is not in general cultivation. Both of the natural species set seed readily. When this has ripened and become a jelly-like mass it can be sown in trays of damp soil where it will germinate freely. Established plants can be divided during early spring with a sharp knife, but take a full season to recover, while those raised from seed take up to four years to flower.

Not all skunk cabbages are of the genus Lysichitum, for the plant to which this unfortunate common name really alludes is the North American *Symplocarpus foetidus*. Every spring without fail it produces clumps of dark purple hooded spathes of indescribable odour, succeeded by upright broadly heart-shaped leaves of a pleasant green hue. Like the Lysichitum it is an adaptable plant growing in just moist ground or several inches of water.

OUR READERS WRITE

I thought you might be interested to hear of a presentation of Koi to Cambridge University, jointly by Mr. Kamihata and me.

These Koi, which were sent over from Japan last year, had wintered in my own ponds and were released into the small lake set in the grounds of the New Cavendish Laboratory. At this laboratory most of the fundamental science teaching and research for Cambridge University takes place, under the directorship of Professor Sir Brian Pippard.

On the morning of Thursday, 11th May 1978, Mr. Naoji Takanashi, who represented Mr. Kamihata, and I attended the ceremony when more than 30 Japanese Koi were placed in the lake. In addition, a Japanese lantern was presented for placing on the small island in the centre of the lake. As a token of their respect, it has been proposed that the island be called the Kamihata Island in future and a suitable plaque is to be erected confirming this.

Also present at the ceremony were many members of the Cambridge University, together with their Director, Professor Sir Brian Pippard. Following the the ceremony, all members were invited to a champagne reception where the health and good fortune of both Mr. Takanashi and Mr. Kamihata were toasted. After this, Mr. Takanashi was given a guided tour of all the science laboratories and then attended a choir meeting in King's College Chapel.

I am enclosing a photograph showing the release of some of the Koi and I hope you will find this of interest.

Yours sincerely,
(Dr.) Paul D. Cook,
78 Bollo Bridge Road,
Acton, London W3 8AU.

Loricaria Parva

"I've got a pair of whiptails for you".

That was Derek, a dealer friend of mine.

Off I went to see them and sure enough there was a pair of Parva, the female full of eggs and obviously ready to spawn, installed in a naked tank with a group of Angels.

"How much?" said I in a sort of disinterested way, my voice controlled till £5 was mentioned and they were mine.

Back home some neons which I was coaxing in soft mature water were rehoused and the temperature lowered to 68°F, a 3 inch clay pipe introduced followed by the fish which settled immediately.

Five days later, in the pipe there was a blanket of eggs with the male in attendance, fanning and gently sucking at the mass and absolutely immovable.

I was tickled pink, but the female didn't seem to be.

The 9 day wait for results was interminable but at 8.30 a.m. 20th MAY I saw the male suck an egg and the young one shoot out and attach itself to the male, who promptly ate the spent egg and moved on to the next.

Leaving well alone I controlled myself until late evening and observed in the top of the pipe a moving feather-like shape, made up of a large number of small ½ inch bodies and tails, the male still on guard.

Now, 6 days later, all the young have vacated the pipe, and the female is spring cleaning. Perhaps I'm going to be an uncle again. I hope so.

David F. A. Spence,
33 Neath Road,
Whitehall,
Bristol
BS5 9AP.

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fishes will not develop a relationship with *Condylactis* anemones.

All the fishes listed above should coexist quite amicably in an aquarium as large as yours. However, I think it would be timely at this stage to remind you of the "golden rules" affecting the stocking of beginner's marine aquaria, as follows:—

"*For the first six months do not exceed 1 in. of fish to each four gallons of seawater—thereafter this ratio may be safely doubled to 1 in. of fish to each two gallons of seawater.*"

Now, the gross capacity of your aquarium is 37½ Imperial gallons, but making due allowance for water displaced by the filterbed, tufa and corals, you probably have no more than 30 gallons of actual seawater. Thus it would be unwise to add more than 7 in.-8 in. of fishes between now and September. By the Autumn this year you will have acquired a considerable amount of skills in sea aquarium management and could safely add the last three fishes.

I have got a marine tank set up with just fish in at present. I wondered if it would be all right to set another tank up in the same way, both to have anemones as well or to do the natural way with live rocks, etc. Which do you advise? Can undergravel filters be used with the natural way or not? Is there a special food that the rocks and anemones feed on? I am looking for a book at the moment which has anemones and fish combined, do you know of such a book? Also I wondered which are the fish you can have with anemones and which are those you can't. Do you think it would be advisable to join the B.M.A.A., if so how can I join?

Please allow me to answer your questions in the order posed:—

1. *Establishing a complete sea aquarium* (i.e. a living community of coralfishes, invertebrates and marine algae). Proceed exactly as you did with your fish only marine aquarium. That is to say that you establish a good-sized (i.e. larger than 20 gallons) all-glass aquarium, having a deep cockle-shell (1 in. thick) and oolitic coral-sand (5 in.) filter-bed over a well perforated plastic base plate having *at least* two (2) ¾ in. diameter airlifts, so as to give a potential turnover rate of 30 minutes. You will then mature this filter-bed bacterially using "Seamature" or a similar preparation until the nitrite reading falls to 5 ppm (=mgs/litre) at which stage you should buy all the "living-rock" which you need. After a maximum of another 3-4 days the nitrite reading will have collapsed to zero and you can now begin to add all the invertebrates and algaes which you require.

At this stage, *please remember* the golden rule for the illumination of complete sea aquaria as follows:—

> *For tanks up to 18 in. invertical depth use 2½. ft. of fluorescent tube per each square foot of surface area of water. For tanks from 18 in.-24 in. deep use 3 ft. of tube/sq. ft.* Without lighting of at least this level of intensity you will *not* succeed with invertebrates, algae and living rock.

After the invertebrates have had 4-6 weeks to settle down, you can begin buying the fishes. Anemones are *gross feeding*, i.e. use small chunks of squid etc.

The Natural System eschews the usage of *all* filtration aids, relying solely on aeration of the seawater. If you attempt this method *do not exceed a stocking ratio of 1 in. of fish per 8 gallons of seawater.*

I know of no book which deals solely with anemones and coralfishes.

B.M.A.A. I strongly advise that you become a member of the *British Marine Aquarists Association*—even if only to passively receive the splendid periodical publication—"MARINEWS" which is full of practical hints and tips written by practising marine aquarists—not "armchair experts".

The Secretary's name and address is:—

R. Edwards Esq.,
B.M.A.A.,
43 Hurst Road,
Hurst Hill,
Coseley,
West Midlands.

News from AQUARISTS' SOCIETIES

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

We regret that owing to pressure on space a number of Show reports have been held over until September issue. These include those for Corby and District A.S., St. Helens A.S. and F.G.A. N.W. Lancs. Man.

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ENTRIES for the fifth annual Open Show of the **Nailsea and District A.S.** totalled 461. From 21 visiting Clubs, the results of the Show were:

Guppies—Male: 1, B. Gale (Torbay); 2, S. Richards (SAS); 3, D. and R. Clark (Whiteway); 4, N. Wallage (SAS). Guppies—Female: 1, A. Fisher (Newbury); 2, S. Richards (SAS); 3, J. Lusty (—); 4, S. Richards (SAS). Platies: 1, D. Kenwood (Nailsea); 2, A. Fisher (Newbury); 3, J. Menhennet (New Forest); 4, I. Lecky (Basingstoke). Swordtails: 1, P. Fitchett (Nailsea); 2, T. Burvill (—); 3, W. Holland (Nailsea); 4, K. Hillier (Newbury). Mollies: 1 and 2, R. Canning (Newbury); 3, N. Wallage (SAS); 4, A. Chaplin (—). A.O.V. Livebearers: 1 and 2, I. Dibble (Nailsea); 3, C. Howe (Newbury); 4, K. Hillier (Newbury). Barbs—Barbodes: 1, T. Burvill (—); 2, D. Kenwood (Nailsea); 3, Mr. and Mrs. Pake (Port Talbot); 4, F. Cripps (Newbury). Barbs—Capoeta and Puntius: 1, M. Bowles (Rhondda); 2, P. Willis (Merthyr); 3, J. Lusty (—); 4, R. Bailey (Taunton). Hemmigrammus and Hyphessobrycon: 1 and 2, A. Chaplin (—); 3, S. Dyer (Newbury); 4, S. Jones (Taunton). A.O.V. Characin: 1, R. Elliot (Taunton); 2, S. Dyer (Newbury); 3, A. Chaplin (—); 4, N. Clifford (Merthyr). Siamese Fighters: 1, A. Fisher (Newbury); 2, R. Howe (Newbury); 3, C. Davies (Aberdare); 4, C. Gale (Torbay). A.O.S. Anabantid: 1, N. Wallage (SAS); 2, P. and V. Watts (Greenfly); 3, R. Collier (North Wilts.); 4, C. Gale (Torbay). Catfish—Corydoras and Brochias: 1, R. Canning (Newbury); 2, M. Nethersell (Riverside); 3, D. Kenwood (Nailsea); 4, M. Nethersell (Riverside). A.O.S. Catfish: 1, C. Lane (—); 2, P. Taylor (North Wilts.); 3, A. Howard (Kidderminster); 4, Mr. and Mrs. Williams (Llanrwst Major). Botias and True Loaches: 1, A. Chaplin (—); 2, R. Canning (Newbury); 3, M. Ellick (Nailsea); 4, I. Lecky (Basingstoke). Rasboras: 1, T. Burvill (—); 2, R. Hollings (Basingstoke); 3, R. Elliot (Taunton); 4, M. Ellick (Nailsea). Danios and Minnows: 1 and 2, C. Billinger (Nailsea); 3, I. Sullivan (SAS); 4, R. Bailey (Taunton). Labeos, Sharks, Epalzeorhynchus and Osteocheilus: 1, R. Canning (Newbury); 2, R. Collier (North Wilts.); 3, M. Nethersell (Riverside); 4, Mr. and Mrs. Williams (SAS). Dwarf Cichlids—Nannacara, Nanocaromis and Apistogramma: 1, T. Sullivan (SAS); 2, Mr. and Mrs. Price (Port Talbot); 3, R. Canning (Newbury); 4, R. Newcombe (Bristol). Angels and Discus: 1, F. Cripps (Newbury); 2 and 3, Mr. and Mrs. Cotton (Port Talbot); 4, T. Sullivan (SAS). Rift Valley Cichlids: 1, M. Thomas (NGLS); 2, R. Canning (Newbury); 3 and 4, P. and V. Watts (Greenfly). A.O.S. Cichlid: 1, P. Fitchett (Nailsea); 2, R. Townsend (Newbury); 3, C. Morrison (Port Talbot); 4, R. Canning (Newbury). Toothcarps: 1 and 4, C. Morrison (Port Talbot); 2, G. Leonard (—); 3, M. Ellick (Nailsea). A.V. Pairs—Livebearer: 1, M Howe (Newbury); 2, I. Dibble (Nailsea); 3, A. Howard (Kidderminster); 4, R. Elliot/A. Howard (Taunton/Kidderminster). A.V. Pairs—Egglayers: 1, R. Sullivan (SAS); 2, R. Elliot (Taunton); 3, A. Chaplin (—); 4, P. and V. Watts (Greenfly). Breeders—Livebearers: 1, 2 and 4, I. Dibble (Nailsea); 3, D. Kenwood (Nailsea). Breeders—Egglayers: 1, F. Cripps (Newbury); 2, R. Canning (Newbury); 3 M. Thomas (NGLS); 4, B. Young (Newbury). A.V. Fish—Juniors: 1, F. Cripps (Newbury); 2, R. Canning (Newbury); 3, M. Thomas (NGLS); 4, B. Young (Newbury). Shubunkins: 1 and 2, P. Scott (Bristol A.S.); 3, L. Menhennet (New Forest); 4, H. Stephens (—). Single Tailed Goldfish: 1, 2 and 3, L. Menhennet (New Forest); 4, M. Greed (Taunton). Twin Tailed Goldfish: 1, C. Curtis (North Wilts.); 2, K. Hillier (Newbury); 3, P. Scott (Bristol A.S.); 4, M. Greed (Taunton). A.V. Pond or River Fish: 1, Mr. and Mrs. Brown (North Wilts.); 2 and 3, N. Wallage (SAS); 4, R. Canning (Newbury). A.O.S. Tropical Fish: 1, T. Sullivan (SAS); 2, N. Wallage (SAS); 3 and 4, A. Wing (Trowbridge). Best Fish in Show: I. Dibble (Nailsea). Highest Pointed Individual: R. Canning (Newbury). Highest Pointed Nailsea Member: I. Dibble. Highest Pointed Visiting Club: Newbury A.S.

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CHANGES in officials of the **North Staffs. A.S.** are as follow: Chairman, K. Ankers; Secretary, Mrs. B. Van-Bakel, 150 Oxford Street, Penkhull, Stoke-on-Trent, Staffs. Tel. No. 47892; Show Secretary, T. Bloor, 75 St. Edmunds Avenue, Porthill, Stoke-on-Trent, Staffs.

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THE monthly meeting results of the **Daw Corning A.S.** were: Knockout: 1 and 3, D. Potter; 2, C. Webb. Specified: 1, F. Marques; 2, C. Webb; 3, E. Rice. Coldwater: 1, A. Parker; 2, E. Rice; 3, C. Barnsley. While the judging was taking place there was a discussion on the forthcoming Open Show.

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RESULTS of **Castleford A.S.** Mini Show: Guppies: 1, Mr. Muzyka (Morley); 2, T. Stansfield (Castleford); 3, Mr. Wright (Barnsley). A.O.V. Live: 1, T. Busfield (Barnsley); 2, Mr. and Mrs. Chadwick (Castleford); 3, T. Standfield (Castleford). Characins: 1, Mr. and Mrs. Chadwick (Castleford); 2, M. Price (Castlefoed); 3, M. Church (Morley). Barbs: 1, M. Price (Castlefoed); 2 and 3, Mr. and Mrs. Kemp (Sheaf Valley). Cichlids: 1, L. Hattersley (Sheaf Valley); 2 and 3, Mrs. Anderson (Wyke). A.V. Cats.: 1, M. Price (Castleford); 2, T. Stansfield (Castleford); 3, Mr. K. Richardson (Wyke). Fighters: 1, Mrs. Anderson (Wyke); 2, Miss S. Gray (Wyke); 3, C. Bradbrook (Tower, Dewsbury). Anabantids: 1, Mr. B. Watson (Wyke); 2, Mr. and Mrs. Kemp (Sheaf Valley); 3, Mr. and Mrs. R. Shaw (Ind.). Loaches—Botia: 1, P. Camfield (Castleford); 2, L. Hattersley (Sheaf Valley); 3, V. Pogson (South Leeds). Pairs Egg: 1, L. Bush (Morley); 2, E. Rice (Barnsley); 3, I. Grey (Wyke). Pairs Live: 1, T. Stansfield (Castleford); 2, T. Busfield (Barnsley); 3, Mr. and Mrs. Chadwick (Castlefoed). Breeders Live: 1, T. Busfield (Barnsley). Breeders Egg: 1, S. Furness (Castleford). Ran., Dan. Min.: 1, J. Muzyka (Morley); 2, E. Rice (Barnsley); 3, A. Frisby (Wyke). Sharks and Foxes: 1 and 2, T. Stansfield (Castlefoed); 3, P. Camfield (Castleford). A.O.V. Tropical: 1, T. Busfield (Barnsley); 2, Mr. and Mrs. Kemp (Sheaf Valley); 3, L. Barrett (Castlefoed). A.V. Coldwater: 1, Mrs. M. Grey (Wyke); 2, Mr. Wright (Barnsley).

THE **Loyne Aquarists (Lancaster)** held their Eighth Open Show in May, and there were 405 entries. Best Fish in Show was won by P. & H. Batchelor of Loyne. Results: Section A: Class 1: 1 and 3, Mr. and Mrs. Holroyd (Morecambe Bay); 2, Mr. and Mrs. Baldwin (Sandgrounders). Class 2: 1, Mr. Downey (Sandgrounders); 2, Mr. and Mrs. Holroyd (Morecambe Bay); 3, Mr. and Mrs. Hewitt (Osram). Class 3: 1 and 3, Mr. and Mrs. Hewitt (Osram); 2, Mr. and Mrs. Holroyd (Morecambe Bay). Class 4: 1, Mr. and Mrs. Harvey (Sandgrounders); 2, Mr. and Mrs. Holroyd (Morecambe Bay); 3, Mr. and Mrs. Hewitt (Osram). Class 5: 1, Mr. and Mrs. Harvey (Sandgrounders); 2, Mr. and Mrs. Underwood (Southport). Section B: Class 6: 1, J. D. Haley (Darwen); 2, Mr. and Mrs. Ham (Lytham); 3, J. and B. McCarthney (St. Helens). Section C: Class 8: 1, D. Conway (Darwen); 2, D. Garstang (Longridge); 3, Mr. and Mrs. Hignett (Lytham). Class 9: 1, D. Garstang (Longridge); 2, J. and B. McCarthney (St. Helens); 3, N. M. Rimmer (Sandgrounders). Class 10: 1, Mr. and Mrs. Underwood (Southport); 2, Mr. and Mrs. Iddon (Sandgrounders); 3, B. W. Carter (St. Helens). Class 11: J. and V. North (Morecambe Bay); 2, Mr. and Mrs. Aldred (Hyde); 3, D. Conway (Darwen). Class 12: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, K. Thompson (Merseyside); 3, N. Wallbank (Morecambe Bay). Section D: Class 13: 1, G. and C. Berry (Blackburn); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, J. and V. North (Morecambe Bay). Class 14: 1, Mr. and Mrs. Stephenson (Osram); 2, P. Kenyon (Sandgrounders); 3, Mr. and Mrs. Underwood (Southport). Section E: Class 15: 1, Mr. and Mrs. Ryan (Sandgrounders); 2, B. Wilson (Skelmersdale); 3, J. Corbett (Merseyside). Class 16: 1, K. Smith (Blackpool); 2, Mr. and Mrs. Aspinall (Sandgrounders); 3, P. and H. Batchelor (Loyne). Class 17: 1, Mr. and Mrs. Stephenson (Osram); 2, J. and T. Calvert (Loyne); 3, Mr. and Mrs. Aspinall (Sandgrounders). Class 18: 1 and 3, Carl and Merl (Sandgrounders); 2, Mr. and Mrs. Iddon (Sandgrounders). Section F: Class 19: 1, B. Wilson (Skelmersdale); 2, Mr. and Mrs. Underwood (Southport); 3, R. and A. Johnson (Hyde). Class 20: 1, T. MacKinnon (Southport); 2, J. and T. Calvert (Loyne); 3, Mr. and Mrs. Baldwin (Sandgrounders). Section G: Class 21: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, J. Corbett (Merseyside); 3, A. Hawthoenthwaite (Ind). Class 22: 1, Mr. and Mrs. Underwood (Southport); 2, J. D. Haley (Darwen); 3, Mr. and Mrs. Baldwin (Sandgrounders). Class 23: 1, J. D. Haley (Darwen); 2, Mr. and Mrs. Stephenson (Osram); 3, I. McCarthney (Skelmersdale). Class 24: 1, N. and M. Rimmer (Sandgrounders); 2, R. I. Payne (Merseyside); 3, M. and I. Bradshaw (Longridge). Section H: Class 25: 1 and 2, Mr. and Mrs. Aspinall (Sandgrounders); 3, W. Hayes (Loyne). Class 26: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Iddon (Sandgrounders); 3, J. and B. McCarthney (St. Helens). Section I: Class 27: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, P. and H. Batchelor (Loyne); 3, Mr. and Mrs. Hodge (Southport). Class 28: 1, Mr. and Mrs. Ham (Lytham); 2, Mr. and Mrs. Hodge (Southport); 3, Mr. and Mrs. Stephenson (Osram). Section J: Class 29: 1, L. Groves (Sandgrounders); 2, Mr. and Mrs. Burgoyne (Bridgewater); 3, K. Thompson (Merseyside). Class 30: 1, K. Thompson (Merseyside); 2, B. W. Carter (St. Helens); 3, A. Cook (Blackpool). Section K: Class 31: 1, G. and C. Berry (Blackburn); 2, D. Harvey (Sandgrounders); 3, Mr. B. W. Carter (St. Helens). Class 32: 1, Carl and Merl (Sand-

grounders); 2, R. I. Payne (Merseyside); 3, F. S. and A. Hopwood (Blackburn). Class 33: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, M. and J. Bradshaw (Longridge). Section L: Class 34: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Hodge (Southport); 3, Mr. and Mrs. Underwood (Southport). Class 35: 1, I. McCarthney (Skelmersdale); 2, P. Waterhouse (Morecambe Bay); 3, J. V. McCarthney (St. Helens). Section M: Class 36: 1, P. and H. Batcheloe (Loyne); 2, P. Waterhouse (Morecambe Bay); 3, J. Reid (Loyne). Section N: Class 37: 1 and 2, Mr. and Mrs. Ham (Lytham); 3, I. McCarthney (Skelmersdale). Section O: Class 38: 1 and 3, Mrs. Underwood (Southport); 2, Mrs. Baldwin (Sandgrounders). Section P: Class 39: 1, D. Garstang (Longridge); 2, P. and I. Iddon (Sandgrounders); 3, M. Rimmer (Sandgrounders). Class 40: 1, K. Corbett (Merseyside); 2, A. Hopwood (Blackburn); 3, Master Burgoyne Bridgewater).

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THE **Redcar A.S.** show results were: Barbs (Large): 1, D. Orton; 2 and 4, Mr. and Mrs. Embleton; 3, W. Smith. Barbs (Small): 1, L. Hunt; 2 and 4, Master D. McClurg; 3, Mr. and Mrs. Duffill. Ca: 1, Mr. and Mrs. D. Forbes; 2 and 3, J. Aylesbury; 4, B. Harker. Cb: 1, Mrs. D. McClurg; 2 and 3, J. English; 4, Mr. and Mrs. Embleton. Characins: 1, L. Hunt; 2, S. Burgess; 3, Mr. and Mrs. Duffill; 4, J. Bunn. Angels: 1 and 3, Mr. and Mrs. Embleton; 2, Mr. McQuade; 4, Mr. and Mrs. Duffill. Dwarf Cichlids: 1 and 4, Mrs. D. McClurg; 2 and 3, Mr. Gledhill. Rift Valley: 1 and 3, H. Garthwaite; 2, R. Atherton; 4, Mrs. A. Frame. Cichlids: 1, H. Garthwaite; 2, Mrs. P. A. Taylor; 3, Mr. and Mrs. Archbold; 4, D. Readman. Bettas: 1, Mr. and Mrs. Embleton; 2, Mr. Farnaby; 3, Mr. and Mrs. Archbold; 4, J. Orton. Labyrinths: 1, J. Geldart; 2, S. Bradshaw; 3, J. Aylesbury; 4, Mrs. P. A. Taylor. E: 1, L. Hunt; 2, Ralphs; 3, P. and M. Wright; 4, J. King. Fa-c: 1, A. Howgate; 2, J. Geldart; 3, K. Stolting; 4, Mr. Harrison. F: 1, A. Howgate. Tropical Cat.: 1, L. Hunt; 2, S. Smith; 3, J. Aithwaite; 4, P. and S. Taylor. Cory and Brochis.: 1, Mr. and Mrs. Embleton; 2, Mr. and Mrs. Liddle; 3, Mrs. P. A. Taylor; 4, Mr. and Mrs. D. Forbes. Rasbora: 1, Mrs. S. Jackson; 2, Mr. and Mrs. Embleton; 3, A. Howgate; 4, K. Dodd. Danio and W.C.M.M.: 1, Mrs. S. Jackson; 2, Mr. and Mrs. Embleton; 3, J. Bunn; 4, B. A. Shackcloth. Loach: 1, P. and M. Wright; 2, L. Hunt; 3, J. English; 4, K. Atkinson. Labeo: 1, Mr. McCartney; 2, B. Garret; 3, P. Porter; 4, Master P. Jackson. M: 1, D. Orton; 2, Mr. and Mrs. Liddle; 3, J. Westwick; 4, Mr. and Mrs. Duffill. NS-M: 1, J. English; 2, J. King; 3, J. Wright; 4, B. Brown. N.O.T.: 1, Mr. and Mrs. Johnston; 2, Mr. and Mrs. K. Smith; 3, S. Smith; 4, R. Kirkup. Guppy (Male): 1, K. Dodd; 2, P. and M. Wright; 3, S. Burgess; 4, J. King. Guppy (Female): 1, Mr. Weedy; 2, J. English; 3, Mr. and Mrs. Archbold; 4, B. A. Shackcloth. Swords: 1, Mr. and Mrs. Duffill; 2, 3 and 4: R. Gledhill. Platys: 1, Mr. S. Bradshaw; 2, Mr. and Mrs. Embleton; 3, S. Burgess; 4, J. King. Mollys: 1, Mr. Weedy; 2 and 4, R. Kirkup; 3, J. King. T: 1, J. English; 2, P. and M. Wright; 3, R. Gledhill; 4, D. Dixon. U: 1, Master D. McClurg; 2, Mr. and Mrs. Duffill; 3, J. Coates; 4, W. Smith. V: 1, Master McDermont. W: 1 and 2, Mr. and Mrs. Embleton. Breeders Egg: 1, K. Stolting; 2, J. English; 3, A. McCartney. Breeders—Guppy: 1, Mr. and Mrs. Embleton; 2, A. McCartney; 3, Mr. and Mrs. James. Breeders—Live: 1 and 3, R. Kirkup; 2, D. Dixon. Best Fish in Show: H. Garthwaite.

THE June meeting of the **King's Lynn A.S.** was well attended to hear Mr. Donald Cooks' lecture on the Discus. His talk was supplemented with coloured slides, and the main theme of the talk was concerned with the natural habitat of the discus. There was also a bench show for cichlids, which was divided into two sections, Rift Valley and Others, the results of which were: Rift Valley: 1 and 2, G. Osler; 3 and 4, C. Simper. Others: 1 and 4, E. Cannon; 2 and 3, R. Warner.

Meetings are held the second Thursday each month, at the North Star Public House, North Lynn, King's Lynn, at 7.45 p.m. All are welcome and further details can be had from the secretary, Sue George, by ringing King's Lynn 671610.

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AT the June meeting of the **Mid-Sussex A.S.** Mr. J. Burdes gave a talk on the Structure and Design of the Sea Creatures. The table show was judged by T. Ramshaw of Brighton and Southern A.S., and cards were awarded as follows: Characins: 1 and 3, E. and T. Tester; 2 and 4, P. Levine. Corydoras: 1, A. Temple; 2 and 4, E. and T. Tester; 3, J. Smith. Catfish: 1, E. and T. Tester. Plants: 1, 2 and 3, B. Slade.

Anyone interested in the hobby is welcome to attend meetings which are held on the second Thursday of each month at 8 p.m. at the Fox and Hounds, Haywards Heath, which is now the new meeting place. Further information from the Secretary, B. Slade, phone: H. Heath 53747.

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THE results of the quarterly **East Anglian Federated Aquarists** show held in June were: Barbs: 1, S. Cowell (E); 2 and 4, G. Osler (KL); 3, B. Ellingford (D). Characins: 1, J. Ellingford (D); 2, W. Turnbull (I); 3, A. Ross (E); 4, G. Osler (KL). Cichlids: 1 and 3, M. Laws (KL); 2 and 4, G. Osler (KL). Dwarf Cichlids: 1, B. Bysouth (I). Labyrinths: 1, J. Harmer (N); 2, H. Lowe (N); 3, P. Courridge (D); 4, G. Drewry (GY). Toothcarps: 1, S. Cowell (E); 2, M. Auffret (I); 3 and 4, S. Payne (E). Catfish: 1 and 2, P. Courridge (D); 3, G. Osler (KL); 4, G. Drewry (GY). Rasboras: 1, J. Harmer (N); 2, N. Crowson (E); 3, B. Ellingford (D). Danios: 1, 2 and 3, B. Bysouth (I); 4, C. Burrows (I). Loaches: 1, S. Cowell (E); 2, R. Woollard (I). Pairs: 1, G. Drewry (GY); 2, B. Bysouth (I); 3, B. Ellingford (D); 4, S. Cowell (E). Guppies: 1, M. Auffret (I); 2 and 3, A. Ross (E); 4, W. Turnbull (I). Swordtails: 1, D. Harmer (N); 2, W. Turnbull (I); 3 and 4, Mrs. Drewry (GY). Platies: 1 and 2, B. Bysouth (I). Mollies: 1, S. Payne (E); 2, B. Bysouth (I); 3, W. Turnbull (I); 4, D. Harmer (N). AOV Livebearers: 1, G. Osler (KL); 2 and 3 D. Harmer (N). Coldwater—Single: 1, G. Drewry (GY). Coldwater Twin: 1, A. Ford (KL). Breeders: 1, A.Ford (KL); 2, B. Ellingford (D); 3, M. Auffret (I); 4, R. Warner (KL). Junior: 1 and 2, D. Thorpe (GY); 3, N. Ellingford (D); 4, A. Cobb (D).

The following societies took part: Ely (E), Ipswich (I), King's Lynn (KL), Diss (D), Norwich (N) and Great Yarmouth (GY).

The plaque for Best Fish in Show was awarded to Mr. M. Laws of King's Lynn for his excellent Piranha.

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TOTAL entries were 520 for the **Sudbury A.S.** open show. Best in show, Doris Winder of E. Dulwich. Results: Class B: 1, B. Johnson (Uxbridge); 2, M. Strange (Basingstoke); 3, C. and J. Richards (Sudbury); 4, D. McKay (Kingston). Class C: 1, J. Miles (Basingstoke); 2, T. Wooley (Saracens); 3, Mr. Dore (Reading); 4, M. West (Kingston). Class Ca: 1, Mr. Farmer (Rochampton); 2, P. Moye (Sudbury); 3, I. Lecky (Basingstoke); 4, C. Osborne (Selas). Class Cb: 1, Mr. Dore (Reading); 2, C. and D. Finnis (Strood); 3, B. Barford (Saracens); 4, G. Stallwood (Newbury). Class D: 1, C. Osborne (Selas); 2 and 4, W. Knight (Gosport); 3, M. Nethersell (Riverside). Class Da: 1, C. and D. Finnis (Strood); 2, J. Jackson (Basingstoke); 3, D. Lambert (Kingston); 4, J. Miles (Basingstoke). Class Db: 1, Doris Winder (E. Dul); 2, C. and J. Richards (Sudbury); 3, Mr. and Mrs. Brook (Selas); 4, A. Fuller (Kingston). Class E: 1, C. and D. Finnis (Strood); 2, T. Liston (Selas); 3, P. Moye (Sudbury); 4, L. J. Brazier (Sudbury). Class Ea: 1, C. and D. Finnis (Strood); 2, B. Barford (Saracens); 3, A. P. Taylor (Sudbury); 4, C. and J. Richards (Sudbury). Class F: 1 and 3, C. Chewwright (Sladas); 2, B. Winteridge (Sudbury); 4, J. Miles (Basingstoke). Class G: 1, T. Wooley (Saracens); 2, G. Lasser (Saracens); 3, C. and J. Richards (Sudbury); 4, P. Moye (Sudbury). Class H: 1 and 2, J. Mann (Sudbury); 3, P. Moye (Sudbury); 4, J. Carpenter (Hounslow). Class J: 1 and 4, Doris Winder (E. Dulwich); 3, B. Hall (Sudbury); 2, David Winder (E. Dulwich). Class K: 1, D. McKay (Kingston); 2, C. McKay; 3, S. Webb (Elapa); 4, T. Fraser (Basingstoke). Class L: 1, D. Winder (E. Dulwich); 2, C. and D. Finnis (Strood); 3, P. Coyle (Walthamstow); 4, C. and J. Richards (Sudbury). Class M: 1, R. Moye (Sudbury); 2, M. Nethersell (Riverside); 3, C. and D. Finnis (Strood); 4, J. Miles (Basingstoke). Class Nbm: 1, A. Campion (Reading); 2, C. and J. Richards (Sudbury); 3, P. Moye (Sudbury); 4, C. and D. Finnis (Strood). Class Not: 1, B. Bow (Selecsrve); 2, B. Barford (Saracens); 3, A. P. Taylor (Sudbury); 4, D. Chewwright (Sladas). Class O: 1 and 2, C. and D. Finnis (Strood); 3 and 4, F. J. Holding (Walthamstow). Class P: 1, J. Randell; 2 and 3, C. and D. Finnis (Strood); 4, B. Winteridge (Sudbury). Class Q: 1, R. Walsh (Sudbury); 2, 3 and 4, C. and D. Finnis (Strood). Class R: 1 and 2, N. Wallage (Selective); 3, T. Wooley (Saracens); 4, C. and D. Finnis (Strood). Class S: 1, I. Lecky (Basingstoke); 2, N. Wallage (Selective); 3, P. Edwards (Thanet); 4, C. and D. Finnis (Strood). Class T: 1, B. Bow (Select); 2, B. Barford (Saracens); 3, M. Davies (Select); 4, D. Chewwright (Sladas). Class Xbm: 1, J. Jackson (Basingstoke); 2, 3 and 4, S. Webb. Class Yot: 1, M. Davies (Select); 2, D. Chewwright (Sladas); 3, Mr. and Mrs. Andrews (Strood); 4, C. and D. Finnis (Strood). H.P. Society (Strood).

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MEMBERS meeting of the **Norwich & District A.S.**, enjoyed a lecture with slides by Ian C. Sellick of the British Cichlid Association. Mr. Sellick lectured on the behaviour and evolution of Cichlid fishes and concentrated mainly on South American species.

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THE open show results of the **South Park Aquatic (Study) Society** were as follow: Veiltail: 1, W. G. Cook; 2, T. Longstaff; 3, B. Cock; 4, T. Longstaff. Bristol Type Shubunkin: 1, G. King; 2, R. M. Whittington; 3, W. G. Cook; 4, B. Cook. Bramble Head: 1, S. Herman; 2, J. Pollard. Bubble Eye: 1 and 3, H. Berger; 2, S. Herman; 4, E. Binstead. Celestial: 1 and 2, H. Berger. Pompon: 1, Mrs. P. Whittington; 2 and 3, H. Berger; 4, J. Pollard. Pearlscale: 1, Mrs. P. Whittington; 2 and 3, T. Longstaff; 4, Mrs. P. Lambert. Common Goldfish: 1, D. J. Mackay; 2, S. R. Lewis; 3, T. Longstaff; 4, D. Lambert. London Shubunkin: 1, 3 and 4, Mrs. P. Whittington; 2, J. Pollard. Oranda: 1 and 3, H. Berger; 2, J. Webster. Broadtail Moor: 1, 2 and 3, J. Kingsland; 4, L. B. Clapp. Fantail: 1 and 2, J. Kingsland; 3, S. R. Lewis; 4, J. Pollard. Comet: 1, D. J. Mackay. Gold Fish Breeders: 1, J. Kingsland; 2, G. King; 3, T. Longstaff; 4, B. Cook. Native and Foreign: 1, D. Lambert; 2 and 3, R. Trim; 4, E. Binstead. Centrar Chidae: 1, T. Longstaff; 2, E. Binstead. Koi: 1, Mr. and Mrs. Brown; 2, 3 and 4, D. Herman. Best Basic Variety: 1, G. King. Best Fish in Show: J. Kingsland.

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THE results of the **Llantwit Major A.S.** 'Silver Jubilee' Open Show were as follows: Best Fish in Show: J. Edwards, Class Ba (Llantwit Major). Class Ba: 1, J. Edwards (Llantwit Major); 2 and 3, C. and J. Richards (Sudbury); 4, Mr. and Mrs. M. Price (Port Talbot). Class Bz: 1, P. Willis (Merthyr Tydfil); 2, A. Hillman (Llantwit Major); 3, C. and J. Richards (Sudbury); 4, P. Burton (Aberdare). Class Ca: 1, C. and J. Richards

(Sudbury); 2, K. V. Wheller; 3, J. J. Edwards (Llantwit Major); 4, T. Sullivan (Selective A.S.). Class Cz: 1, J. J. Edwards (Llantwit Major); 2, D. Haggerty (Merthyr); 3, J. Dunn (Port Talbot); 4, Mr. and Mrs. M. Price (Port Talbot). Class D: 1 and 3, P. Y. Watts (Greenfly A.S.); 2, P. Willis (Merthyr); 4, J. Egan (Port Talbot). Class Da: 1 and 3, A. E. B. Fouracre (Port Talbot); 2, Mrs. A. Martin (Llantwit Major); 4, T. Sullivan (Selective A.S.). Class Db: 1, A. V. Reed (Aberdare); 2, C. and J. Richards (Sudbury); 3, D. Potter (Dow Corning); 4, Mr. and Mrs. M. Price (Port Talbot). Class E: 1, T. Sullivan (Selective A.S.); 2, N. Wallace (Selective A.S.); 3, R. Brown (Blaenau Gwent); 4, A. V. Reed (Aberdare). Class Ea: 1, W. Burton (Trowbridge); 2, Mrs. M. V. Thomas (Rhondda); 3, S. A. Jenkins (Dow Corning); 4, C. and J. Richards (Sudbury). Class F: 1, C. E. Morrison (Port Talbot); 2 and 3, M. Addicott (B.K.A. Severnside); 4, D. Potter (Dow Corning). Class G: 1, C. Davies (Port Talbot); 2, P. Burton (Aberdare); 3, C. and J. Richards (Sudbury); 4, R. and Y. Watts (Greenfly). Class H: 1, C. and J. Richards (Sudbury); 2, J. Egan (Port Talbot); 3 and 4, M. Williams (Llantwit Major). Class By-Sy (Excl. N): 1, 2 and 3, Neil Wallace (Selective); 4, Jayson Arnold (Port Talbot). Class J: 1, T. Sullivan (Selective); 2 and 4, J. Egan (Port Talbot); 3, D. Potter (Dow Corning). Class K: 1, T. Sullivan (Selective); 2, A. V. Reed (Aberdare); 3, D. Haggerty (Merthyr); 4, S. A. Jenkins (Dow Corning). Class L: 1, 2 and 4, C. and J. Richards (Sudbury); 3, C. Davies (Port Talbot). Class M: 1 and 2, C. and J. Richards (Sudbury); 3, J. J. Edwards (Llantwit Major); 4, M. Williams (Llantwit Major). Class N: 1, Mr. and Mrs. R. Thomas (Presell); 2, R. and Y. Watts (Greenfly); 3, A. V. Reed (Aberdare); 4, T. Sullivan (Selective). Class O: 1 and Highest Pointed Guppy Cup: C. and J. Richards (Sudbury); 2, R. D. Perkins (Presell); 3, P. Willis (Merthyr); 4, Mrs. E. Jones (Port Talbot). Class P: 1, A. V. Reed (Aberdare); 2 and 4, S. Richards (Selective); 3, K. V. Wheller. Class Q: 1, P. Willis (Merthyr); 2, R. Mayhew (Thornton A.S.); 3, R. Brown (Blaenau Gwent); 4, P. Buckingham (Thornton A.S.). Class R: 1 and 2, R. Perkins (Port Talbot); 3, R. Mayhew (Thornton A.S.); 4, A. Ibbertson (Llantwit Major). Class S: 1, P. Burton (Aberdare); 2, J. Thomson (Llantwit Major); 3 and 4, D. Williams (Llantwit Major). Class T: 1, J. Dunn (Port Talbot); 2, B. Thomas (Rhondda); 3, R. Brown (Blaenau Gwent); 4, M. Thomas (Rhondda). Class Xb-m: 1 and 3, A. Ibbertson (Llantwit Major); 2, P. Burton (Aberdare); 4, A. Hillman (Llantwit Major). Class Xo-t: 1, M. Thomas (Rhondda); 2, J. J. Edwards (Llantwit Major); 3, A. Ibbertson (Llantwit Major); 4, A. K. Duffey (Trowbridge). Class U and Ua: 1 and 2, A. E. B. Fouracre (Port Talbot); 3 and 4, C. Rupert (Port Talbot). Class V: 1, 2, 3: C. Rupert (Port Talbot); 4, M. J. Almadi (Trowbridge). Class W: 1, C. E. Morrison (Port Talbot); 2 and 4, R. and Y. Watts (Greenfly); 3, C. Rupert (Port Talbot). Class Ag: 1, A. Thomson; 2, Miss D. Lewis; 3, Mrs. C. Thomson; 4, Mr. J. Thomson (Llantwit Major). Total number of entries 426.

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THE first of **Portsmouth A.S.'s** May meetings was devoted to an excellent lecture on aquarium topics given by Mr. R. Mills of London. The members present enjoyed the light-hearted manner in which he conducted his talk and the high quality of his slides, some of which illustrated fishes seldom seen.

A Portsmouth member, D. Bambury, held the floor for the second May meeting with a talk on freshwater angling which he illustrated with slides. Despite the obvious difficulties a table show was held in the same room. After a race with the lights, as it were, J. Stillwell managed to judge the characins and cichlids on the show bench. The results were as follows: Characins: 1 and 2, D. Forse; 3, D. Bambury; 4, M. Quayle. Cichlids: 1 and 2, G. Hardy; 3, E. Binstead; 4, K. Underwood Dwarf Cichlids: 1, D. Bambury. The best fish in show was a serpae tetra owned by D. Forse.

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A VERY instructive talk and practical demonstration on "Fish Anatomy" was given by Beryl Ryan, B.Sc., of Panday Aquaria at the June meeting of the **Evesham Fishkeeper's Society.** The third round of the "Fish of the Year" contest was held, also a table show featuring Danios and Minnows. Mrs. Ryan kindly acted as judge with results as follows: 1, E. Thornton; 2, G. Johns; 3, C. Thornton. Danios and Minnows: 1, P. Green; 2, G. Johns; 3, Mrs. J. Hessel; 4, Mrs. L. Wright.

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

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OFFICERS elected at the **Billingham Half Moon A.S.** annual general meeting were: Chairman, M. Moreland; Secretary, K. Greenley, 50 Edward Street, Stockton, Cleveland. Tel: Stockton 68627; Treasurer: D. Jolly; Show Secretary: C. W. Buck, 22 Danby Grove, Thornaby, Cleveland. Tel: Stockton 65284. Committee members: J. Page, Mr. and Mrs. Foulger, K. Atkinson, J. Bunn, Carol Atkinson and B. Shackcloth. Meetings are held fortnightly at the Oxbridge Hotel, Stockton, new and old members most welcome.

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RESULTS of the open show of the **Collingham Group of the British Killifish Association** were: Aphyosemion: 1, I. Sainthouse (BKA8); 2, A. Howgate (BKA236); 3, B. Wiggins (BKA182). Aphyosemion pairs: 1, W. Matthew (BKA9); 2, G. Wood (BKA12); 3, A. Gabbutt (BKA445). A.O.V. Top Spawners: 1, J. Roberts (BKA249); 2, A. Brown (BKA3); 3, K. Smith (BKA304). A.O.V. Top Spawners pairs: no exhibit. Bottom Spawners: 1, A. Howgate (BKA236); 2, A. Gabbutt (BKA445); 3, Mr. and Mrs. Tindall (BKA212). Bottom Spawners pairs: 1, H. Cowan (BKA199). Breeders Top Spawners: 1, A. Howgate (BKA236); 2, H. Cowan (BKA199); 3, J. Moyes (BKA332). Breeders Bottom Spawners: 1, H. Cowan (BKA199). Best in Show was N. Rachovii exhibited by A. Howgate and there was a total of 52 entries.

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ENTRIES at the open show of the **Loughborough and District A.S.** showed an increase over last year and the standard of fish was high. There was also a good response to the coldwater classes.

Results: Male Fighters: 1, R. Elliott; 2, M. and B. Cox; 3, I. Fuller. Small Characins: 1, Pat Lambourne; 2, Mr. and Mrs. Lee; 3, C. J. Sykes and P. Snooks. Small Cichlids: 1, Mr. and Mrs. Maxfield; 2 and 3, R. Elliot. Rift Valley Cichlids: 1, M. G. Laws; 2, M. A. Hollingsworth; 3, H. F. Campbell. Small Barbs: 1, C. T. Sykes and P. Snooks; 2, Mrs. D. Cruickshanks; 3, A. and M. Crew. Corydoras and Brochis: 1, I. Fuller; 2, S.M.I.N.; 3, C. T. Sykes and P. Snooks. Rasboras: 1, G. Nesbit; 2, I. Fuller; 3, S.M.I.N. A.O.V. Anabantids: 1, Mr. and Mrs. Godwin; 2, P. Crumpton; 3, N. Cox. A.O.V. Characin: 1, C. J. Sykes and P. Snooks; 2, T. A. Cruickshanks; 3, R. Elliott. Angel Fish: 1, D. Hutchison. A.O.V. Cichlids: 1, N. J. Cox; 2, L. Godwin; 3, M. G. Laws. A.O.V. Barbs: 1, A. and M. Crew; 2, R. Elliott; 3, G. Nesbit. A.O.V. Catfish: 1, D. J. Brine; 2, P. S. Gregory; 3, C. J. Sykes and P. Snooks. A.V. Loach: 1, J. Booth; 2 and 3, J. T. and F. Mayle. A.V. Egglaying Toothcarps: 1, 2 and 3, J. Sutcliffe. A.V. Swordtail: 1, I. Fuller; 2 and 3, L. Godwin. A. V. Molly: 1, A. and M. Crew; 2, J. T. and F. Mayle; 3, J. and P. Patching. A.O.V. Livebearer: 1, Mrs. D. Cruickshanks; 2 and 3, J. T. and F. Mayle. Livebearer Pairs: 1, A. Howard; 2, J. T. and F. Mayle; 3, Mrs. Cruickshank. A.V. Platy: 1, N. Cox; 2, T. Redfern; 3, J. T. and F. Mayle. A.V. Guppy: 1, G. Nesbit; 2, A. and M. Crew; 3, R. Wilson. Egglayer Pairs: 1, A. and M. Crew; 2, J. T. and F. Mayle; 3, C. T. Sykes and P. Snooks. Egglayer Broods: 1, T. Redfern; 2, A. and B. Lane. Livebearer Broods: 1 and 2, S.M.I.N.; 3, J. T. and F. Mayle. Best Tropical Fish: M. G. Laws (Rift Valley Cichlid). Society with most entries: Leicester New Parks. Total entries 389.

Coldwater Section: Bristol Shubunkins: 1, 2 and 3, J. Amos. A.O.V. Twintail Goldfish: 1, J. Moore; 2, Mr. and Mrs. Rule. Dorsalless Types: 1, 2 and 3, F. Orme. Single Tail Goldfish: 1, D. Hutchison. Common and Comet Goldfish: 1 and 2, Mr. and Mrs. Waller; 3, S. Twynham. Fantails: 1, 2 and 3, J. Amos. Veiltail Types: 1, 2 and 3, A. Roberts. A.O.V. Pond or River Fish: 1, S.M.I.N.; 2, J. Moore; 3, P. Hand. Best Coldwater and Best in Show: A. E. Roberts with an Oranda.

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SPEAKER at the June meeting of **Bristol A.S.** was Mr. Ron. King of Torbay. He was able to show a fascinating collection of slides of Bitterling, Orfe, Rudd and Veiltails. These together with his experiences of breeding and raising fish provided members with a most enjoyable last meeting at the old headquarters.

All future meetings will be on the second Tuesday of the month at St. Ambrose Church Hall, Stretford Road, Whitehall, Bristol, 5.

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THE results of the **South Shields A.S.** annual show for which there were 448 entries were as follows: Class Ba: 1, D. Orton (Blyth); 2 and 3, Mr. and Mrs. Embleton (Novos); 4, Smith Family (Killingworth). Class B: 1, M. Strange (B.A.D.A.S.); 2, L. Hunt (Half Moon); 3, P. Drewett (Novos); 4, Mr. and Mrs. Knibbs (Stockton). Class Ca: 1, Mr. and Mrs. Hall (Novos); 2, M. Brown (Blyth); 3, I. Illiott (Caer Urfa); 4, J. Gallagher (Caer Urfa). Class Cb: 1, J. English (Throckley); 2, Mr. and Mrs. Knibbs (Stockton); 3, W. Howgate (Stanley); 4, A. Blake (B.A.D.A.S.). Class C: 1, K. Alder (Hartlepool); 2, Mr. and Mrs. Hall (Novos); 3, A. Duncanson (Priory); 4, P. Newton (Hartlepool). Class Da: 1 and 2, Mr. and Mrs. Embleton (Novos); 3, N. McQuade (Independent); 4, A. Spencer (Caer Urfa). Class Db: 1 and 2, D. McClurg (Stockton Jnr.); 3, Mr. and Mrs. McClurg (Stockton); 4, H. Lake (Stanley). Class Dc: 1 and 3, C. Enright (S.S.A.S.); 2, M. Moreland (Half Moon); 4, J. King (Redcar). Class D: 1, J. Mead (S.S.A.S.); 2, P. Newton (Hartlepool); 3, W. Phinn (Independant); 4, Mr. and Mrs. Archibold (Sunderland). Class Ea: 1, Mr. and Mrs. Embleton (Novos); 2, G. Alsopp (Independant); 3, J. Middlemast (Independant); 4, R. Finkell (S.S.A.S.). Class E: 1, A. Watkins (S.S.A.S.); 2, M. Moreland (Half Moon); 3, Mr. and Mrs. Embleton (Novos); 4, C. Mitchell (S.S.A.S.). Class Fc: 1 and 4, I. Blyth (S.S.A.S.); 2, H. Lake (Stanley); 3, A. Stevens (Middlesbrough). Class F: 1, J. Thompson (M.P.A.S.); 2, P. Riley (Stockton). Class G/Ga: 1 and 2, P. Wright (Sunderland); 3, A. and G. King (S.S.A.S.); 4, S. D. Smith (Hartlepool). Class H: 1, Mr. and Mrs. Embleton (Novos); 2, A. Spencer (Caer Urfa); 3, A. Duncanson (Priory); 4, Mr. and Mrs. Knibbs (Stockton). Class J: 1, Mr. and Mrs. Embleton (Novos); 2, J. English (Throckley); 3, J. Middlemast (Independant); 4, M. Brown (Blyth). Class K: 1 and 3, Mr. and Mrs. Ralphs (Half Moon); 2, G. Quantrill (Priory); 4, D. Renwick (Throckley). Class L: 1, P. Wright (Sunderland); 2, T. Chamberlain (B.A.D.A.S.); 3, K. Debbie (Priory); 4, I. Thompson (M.P.A.S.). Class Ma: 1, A. Duncanson (Priory); 2, H. Forster (Independant); 3, I. Gray (S.S.A.S.); 4, S. Riley (Stanley). Class M: 1, F. Napier (S.S.A.S.); 2, J. and P. Duffill (Redcar); 3, M. Moreland (Half Moon); 4, W. I. Grant (Priory). Class Nbm: 1, J. Middlemast (Independant); 2, J. King (Redcar); 3, Mr.

and Mrs. Embleton (Novos); 4, J. English (Throckley). Class Not: 1, M. Wright (Sunderland); 2, A. Clegg (Novos); 3, D. Dickson (Stanley); 4, B. A. Shacklote (Half Moon). Class Oa-Ob: 1, A. Clegg (F.G.A.) 2, Mr. and Mrs. Hill (F.G.A.); 3, P. Fry (Caer Urfa); 4, G. Alsopp (Independant). Class Oj-Or: 1, Jnt 3 and 4, Mr. and Mrs. James (N. Allerton); 2, K. Dodd (B' Auckland); Jnt. 3, M. Wright (Sunderland). Class P: 1, P. Fry (Caer Urfa); 2, J. English (Throckley); 3, M. Wright (Sunderland); 4, Mr. and Mrs. Archibold (Sunderland). Class Q: 1, J. and P. Duffill (Redcar); 2 and 3, A. Walton (Priory); 4, A. Duncansen (Priory). Class R: 1, A. and G. King (S.S.A.S.); 2, Mr. and Mrs. Wright (Caer Urfa); 3, Mr. and Mrs. Embleton (Novos); 4, A. Clegg (Novos). Class S: 1, D. Hopkinson (Independant); 2, P. Fry (Caer Urfa); 3, A. Campbell (M.P.A.S.); 4, R. D. Kirkup (M.P.A.S.). Class T: 1, A. Clegg (Novos); 2, T. Fraser (B.A.D.A.S.); 3, J. English (Throckley); 4, M. Strange (B.A.D.A.S.). Class U: 1, P. Fry (Caer Urfa); 2, J. Meade (S.S.A.S.); 3, D. McClurg (Stockton Jnt); 4, L. Askew (S.S.A.S.). Class V: 1, 2 and 3, R. Rich (B.A.D.A.S.). Class W: 1, J. Gallagher (Caer Urfa); 2, A. Duncansen (Priory); 3, Mr. and Mrs. Embleton (Novos); 4, A. and G. King (S.S.A.S.). Class Xop: 1 and 3, Mr. and Mrs. Hill (Sunderland); 2, W. Howgate (Stanley). Class Xbm: 1, Mr. and Mrs. Laydon (Sunderland); 2 and 4, C. Enright (S.S.A.S.); 3, J. English (Throckley). Class Xot: 1, 2 and 4, R. D. Kirkup (M.P.A.S.); 3, Smith Family (Killingworth).

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OPEN SHOW results of the **Swillington A.S.** were: Guppies: 1, S. Harrison (Grimsby & Cleethorpes); 2, T. Stansfield (Castleford); 3, Mrs. M. Websdale (Rothwell). Platies: 1, M. Price (Castleford); 2, Mr. and Mrs. Jarman (Barnsley); 3, P. Jenkins (Sheffield). Mollies: 1, M. Price (Castleford); 2, D. W. Jordan (South Humberside); 3, Mr. and Mrs. D. Willey (Scarboro.). Swordtails: 1 and 3, P. Smith (Aireborough); 2, Mrs. J. Harrison (Grimsby and Cleethorpes). A.O.V. Livebearer: 1, Mr. and Mrs. Hill (Barnsley); 2, T. Busfield (Barnsley); 3, D. W. Jordan (South Humberside). Small Barbs: 1, M. Price (Castleford); 2 and 3: D. W. Jordan (South Humberside). Large Barbs: 1, Mr. and Mrs. Roberts (Doncaster); 2, Mr. and Mrs. Hardy (David Browns); 3, Mr. and Mrs. Chadwick (Castleford). Small Characins: 1, I. Duncan (Hull); 2, J. D. Haley (Darwen); 3, Mr. Russen (Ind.). Large Characin: 1, Mister A. Shaw (York and Dist.); 2, Mr. and Mrs. Willey (Scarboro.); 3, Mr. and Mrs. Chadwick (Castleford). Small Cichlids: 1 and 2, Mr. and Mrs. Bradbrook Tower (Dewsbury); 3, Mrs. L. C. Heap (Keighley). Large Cichlids: 1, Mr. and Mrs. Hardy (David Browns); 2, S. Sutton (Barnsley); 3, Mr. and Mrs. Tindall (York and Dist.). Rift Valley Cichlids: 1 and 2, M. Price (Castleford); 3, Mr. and Mrs. James (North Allerton). Angels: 1, A. and P. Barker (York and Dist.); 2 and 3, Mr. and Mrs. Jarman (Barnsley). Corydoras and Brochis: 1, M. Price (Castleford); 2, T. Stansfield (Castleford); 3, Mrs. L. C. Heap (Keighley). A.O.V. Catfish: 1, T. Stansfield (Castleford); 2, Mr. and Mrs. Riley (Leeds G.P.O.); 3, P. J. Harwood (Darwen). Loach and Botia: 1, Mr. and Mrs. Riley (Leeds G.P.O.); 2, Mr. and Mrs. Kirk (Castleford); 3, Mr. Lunn (Ind.). Fighters: 1, Mrs. Anderson (Wyke); 2, Mr. and Mrs. Kirk (Castleford); 3, J. D. Haley (Darwen). Small Anabantids: 1, Mr. Leighton (Billingham); 2, Mister A. Shaw (York and Dist.); 3, Mr. and Mrs. Littler (Sheffield). Large Anabantids: 1, Mr. and Mrs. Copley (Doncaster); 2, A. and P. Barker (York and Dist.); 3, Mr. and Mrs. Hardey (David Browns). Sharks and Foxes: 1, A. Piggott (Grimsby and Cleethorpes); 2, Mister A. Shaw (York and Dist.); 3, Mr. and Mrs. Roberts (Doncaster). Rasboras, Danios and Minnows: 1 and 3, A. Piggott (Grimsby and Cleethorpes); 2, Mr. and Mrs. Daines (Doncaster). Egglaying Toothcarps: 1, J. Sykes (David Browns); 2, R. Renson (Grimsby and Cleethorpes); 3, R. Brown (Morley). Pairs—Livebearers: 1, Mr. and Mrs. Kirk (Castleford); 2, T. Stansfield (Castleford); 3, Mr. and Mrs. Hill (Barnsley). Pairs—Egglayers: 1, Mr. and Mrs. Daines (Doncaster); 2, Mr. Gray (Wyke); 3, J. E. Shellard (Barnsley). Breeders—Egg (A and B): 1, Mr. Stobing (York); 2, N. C. Farrand (Goole); 3, S. Smalley (Grimsby and Cleethorpes). (C and D): 1, Mr. and Mrs. Copley (Doncaster); 2, N. C. Farrand (Goole). Breeders—Live: (A and B): 1, Mr. and Mrs. Littler (Sheffield); 2, Mr. and Mrs. Copley (Doncaster); 3, Mr. and Mrs. Barlow (Sheaf Valley). (C and D): 1 and 2, T. Busfield (Barnsley); 3, Mr. and Mrs. Hill (Barnsley). A.O.V. Tropical: 1, Mr. and Mrs. D. Kirk (Castleford); 2, Mr. A. Frisby (Wyke); 3, S. H. Harrison (Grimsby and Cleethorpes). Juniors A.V.: 1, Masters D. and C. Kirk (Castleford); 2, Mrs. Atkinson (Ind.); 3, Master J. Chadwick (Castleford). Novice A.V.: 1, S. Parish (Ind.); 2, B. A. Mitchell (York and Dist.); 3, Mrs. E. Stansfield (Castleford). Common Goldfish: 1, Mrs. Grey (Wyke); 2, C. and J. Haigh (David Browns). Fancy Goldfish: 1 and 3, Mr. and Mrs. England (Barnsley); 2, Miss L. Carter (David Browns). A.O.V. Coldwater: 1, Mr. and Mrs. Snowdon (York and Dist.); 2, K. and M. Wood (Bridlington); 3, Mr. and Mrs. Tindall (York and Dist.). Best in Show was T. Stansfield with an A.O.V. Catfish. Best in Exhibit excluding single fish was Mr. and Mrs. Kirk with a pair of Mollies. Best Society was Castleford with 24 points.

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DESPITE the fact that the attendance was reduced owing to annual holidays, the **New Forest A.S.** held a successful June meeting. The main item was a colour slide, lecture, from F.B.A.S. entitled—"Beachcombing" by Cliff Harrison in which he described his trips to the seaside near Brighton in search of suitable native marines to keep in his aquariums. Table show results: Gourami: 1 and 3, B. Menhennet; 2 and 4, T. Mythews. Guppy: 1 and 2, B. Menhennet; 3, R. Travers. Catfish: 1, T. Mythews. Bristol Shubunkins: L. Menhennet. London Shubunkins: 1, 2 and 3, R. Travers.

Meetings are held on the third Monday of every month at 8 p.m. in the "Community Centre," New Street, Lymington, Hants. and the Secretary will be pleased to welcome new members.

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THE total number of entries for the **Northwich and District A.S.** open show was 399. Results: Guppies: 1, N. Stevenson (Osram); 2, B. W. Carter (St. Helens); 3, N. and M. Rimmer (Sandgrounders). Swordtails: 1, S. Farrell (Merseyside); 2, N. and M. Rimmer (Sandgrounders); 3, B. W. Carter (St. Helens). Mollies: 1, B. Steadman (Runcorn); 2, L. Penny (St. Helens); 3, P. Kenyon (Sandgrounders). Platies: 1, G. Kent (Wrexham); 2 and 3, J. and B. McCartaney (St. Helens). A.O.V. Livebearers: 1 and 2, K. Thompson (Merseyside); 3, Mr. and Mrs. Underwood (Southport). Barbs (small): 1, R. and A. Johnson (Hyde); 2, P. Kenyon (Sandgrounders); 3, H. Carr (No Society). Barbs (large): 1, Mr. and Mrs. Underwood (Southport); 2, R. Boardman (St. Helens); 3, Mr. and Mrs. Baldwin (Sandgrounders). Characins (small): 1, B. W. Carter (St. Helens); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, G. Lawless (Leigh). Characins (large): 1, R. and A. Johnson (Hyde); 2 and 3, Mr. and Mrs. Underwood (Southport). Characins (large): 1 and 2, Mr. and Mrs. Underwood (Southport); 3, G. Lawless (Leigh). Fighters: 1 and 2, B. W. Carter (St. Helens); 3, J. and B. McCartaney (St. Helens). Anabantids (small): 1, Miss S. Goddard (Macclesfield); 2, C. and K. Davies (Northwich); 3, J. and B. McCartaney (St. Helens). Anabantids A.O.V.: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, H. Buckley (Northwich); 3, Miss C. Armour (Independant). Angels: 1, J. O'Connor (Runcorn); 2, B. Newport (Runcorn); 3, Mr. and Mrs. Powell (South Cheshire). Cichlids (dwarf): 1, J. Marshall (No Society); 2, J. Corbett (Merseyside); 3, Mr. Ryan (Sandgrounders). Cichlids (large): 1, 2 and 3, Mr. and Mrs. Underwood (Southport). Cichlids Rift Valley: 1, Mr. and Mrs. Iddon (Sandgrounders) 2, Mr. and Mrs. Orchard (Wrexham); 3, Mr. and Mrs. Underwood (Southport). Danios and Minnows: 1, Mr. and Mrs. Underwood (Southport); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, S. Farrell (Merseyside). Rasboras: 1, P. J. Yates (Vale Royal); 2, E. Jones (Wrexham); 3, Mr. and Mrs. Tomlinson (Macclesfield). Sharks: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. Boyle (Merseyside); 3, R. I. Payne (Merseyside). Flying Foxes: 1, N. Stevenson (Osram); 2, R. I. Payne (Merseyside); 3, Mr. and Mrs. Baldwin (Sandgrounders). Catfish Corydoras Brochis: 1 and 2, B. W. Carter (St. Helens); 3, Mr. and Mrs. Underwood (Southport). Catfish A.O.V.: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, J. Wesson (Runcorn); 3, H. Carr (No Society). Loach and Botia: 1, Mr. and Mrs. Williams (Wrexham); 2 and 3, Mr. and Mrs. Baldwin (Sandgrounders). Toothcarps: 1, Mr. and Mrs. Mathers (Northwich); 2, R. and I. Payne (Merseyside); 3, T. Bronze (South Cheshire). A.O.V. Tropical: 1 and 3, Miss D. Armour (Independant); 2, C. and K. Davies (Northwich). Pairs Livebearers: 1, J. and B. McCartaney (St. Helens); 2, Mr. and Mrs. A. Goddard (Macclesfield); 3, B. Steadman (Runcorn). Pairs Egglayers: 1, K. Thompson (Merseyside); 2, Mr. and Mrs. Underwood (Southport); 3, B. W. Carter (St. Helens). Breeders Livebearers 1-20: 1 and 2, Mr. and Mrs. A. Goddard (Macclesfield); 3, Mr. and Mrs. Tomlinson (Macclesfield). Breeders Egglayers 1-10: 1 and 3, Mr. and Mrs. Iddon (Sandgrounders); 2, E. Jones (St. Helens). Breeders Egglayers 11-20: 1, Mr. and Mrs. Baldwin (Sandgrounders). Common Goldfish: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. Dingley (Heywood); 3, N. Stevenson (Osram). Fancy Goldfish: 1, Mr. and Mrs. Harvey (Sandgrounders); 2, R. Dingley (Heywood); 3, B. Newport (Runcorn). A.O.V. Coldwater: 1, L. and D. Thorne (Northwich); 2, Master M. Allinson (Sandgrounders); 3, E. Jones (St. Helens). Junior Livebearers: 1, P. and I. Iddon (Sandgrounders); 2, Angels Walker (Runcorn); 3, S. Tomlinson (Macclesfield). Junior Egglayers: 1, K. Corbett (Merseyside); 2, Miss J. Baldwin (Sandgrounders); 3, M. (Rimmer (Sandgrounders). Mixed Jars: 1, and 2, L. and D. Thorne (Northwich); 3, N. Stevenson (Osram). The best fish in show award was won by K. Thompson (Merseyside).

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NEW SOCIETY

A New Society has been formed in Ellesmere Port, Wirral. Anyone interested please contact Mr. E. Bangay, 21 Warkworth Court, Ellesmere Port. Tel: 051 355 7895.

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SECRETARY CHANGES

Reigate and Redhill A.S.: M. Sandford, 5 Victoria Road, Redhill, Surrey. Redhill 69339.

North Staffs. A.S.: Mrs. B. Van-Bakel, 150 Oxford Street, Penkhull, Stoke-on-Trent, Staffs.

North Staffs. A.S.: Show Secretary, T. Bloor, 75 St. Edmunds Road, Porthill, Stoke-on-Trent, Staffs.

Eboracum A.S.: R. Lonsdale, 10 Moor Way, Huntington, York, Yorkshire YO3 9QF.

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MEETING DATE CHANGE

Commencing 19th July, the **Wolverhampton A.S.** will meet on the first and third Wednesday of each month. The venue is unchanged, being the New Hampton, Riches Street, Wolverhampton.

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SHOW DATE CHANGE

The **Darwen A.S.** have decided to change the date for their open show which was to be held on the 15th October to the 29th October, and it is being held at the Darwen Tower Room.

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AQUARIST CALENDAR 1978

6th August: Blackpool and Fylde A.S. Open Show at St. Kentigerns School, Newton Drive, Devonshire Square, Blackpool. Schedules from show secretary, Doreen Moseley, Flat 80,

Foreshaw Avenue, Grange Park, Blackpool. Tel: Blackpool 36456.

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

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

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

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

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

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

27th August: Sunday Bank Holiday Redditch Third Open Fish and Reptile Show at the Abbey Sports Stadium, Birmingham Road, Redditch, Worcs. Organized by Delson Aquatic Society and Abel Morrel Aquatic Society incorporating International Herpetological Society. "Gold Pin," Trades Stands, all day Bar and refreshments, M.A.A.S. and I.H.S. Show Rules. Information Mr. P. J. Binsley, 612 Evesham Road, Crabbs Cross, Redditch, Worcs. or phone Redditch 42205 Evenings only.

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

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

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

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

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

3rd September: Bethnal Green A.S. Open Show to be held Bethnal Green Institute, 229 Bethnal Green Road, E.2. Schedules available from the Show Secretary: Mr. W. R. Dale, 14 Rutland Road, Wanstead, London E11 2OY. Tel: 01-989 9015.

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

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

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

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

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

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

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

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

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

10th September: Leamington and D.A.S. Open Show at Trinity Hall, Trinity Street, Leamington Spa. Schedules from Mr. H. Burridge, 36 Warwick New Road, Leamington Spa, Warwickshire.

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

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

16th September: Merthyr A.S. Third Annual Open Show will be held at St. David's Church Hall, Church Street, Merthyr Tydfil under F.B.A.S./C.N.A.A. rules, with plaques and cards for the first four places in each class. Schedules can be obtained from Show Secretary: Mr. E. Morgan, 27 Ty Gwyn Street, Penydarren, Merthyr Tydfil.

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

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

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

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

17th September: Priory A.S. Tynemouth open show Schedules from W. J. Walton 23 Rutherford St., High Howdon, Wallsend, Tyne and Wear NE28 0AW.

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

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

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

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

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

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

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

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

1st October: Midland Aquarist League Open Show, Loughborough. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.

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

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

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

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

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

21st-22nd October: British Aquarists' Festival, Belle Vue, Manchester.

29th October: Darwen A.S. Open Show at the Darwen Tower Room (Town Centre). Details from Mr. M. Jones, 16 Eaton Street, Darwen, Lancs BB3 3JS.

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

29th October: Doncaster and D.A.S. Open Show. Venue: Don Valley High School, Jossey Lane, Scawthorpe, Nr. Doncaster. Details from Show Secretary, Mr. B. Honnor, 87 Carr View Avenue, Balby, Doncaster.

5th November: Halifax A.S. Open Show at The Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Thirteen livebearer classes, plus eleven coldwater. Furnished aquaria, plants, etc. Schedules sent only on request. S.A.E. to: D. Shields, "Cobblestones," 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.

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 69339.

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

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