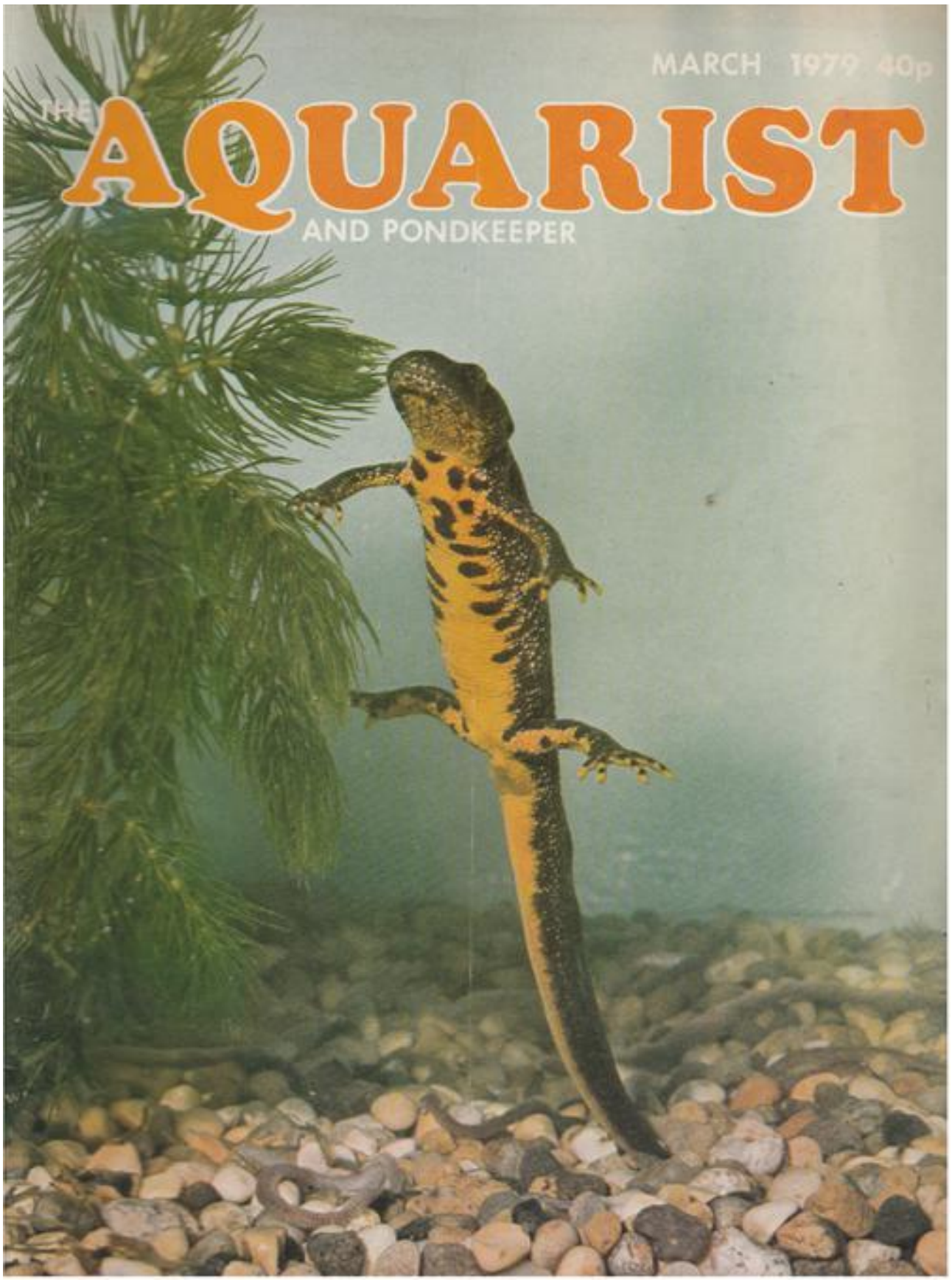
MARCH 1979 40p
THE
AQUARIST
AND PONDKEEPER

THE AQUARIST AND PONDKEEPER

The Aquatic Magazine with the Largest Circulation in Great Britain

Published Monthly 40p

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

Subscription Rates:
The Aquarist will be sent by post for one year to any address for £6·50. Airmail quoted on request.

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

Founded 1924
as "The Amateur Aquarist"
Vol. XLIII No. 12, 1979

Editor: Laurence E. Perkins
Advertisement Manager:
J. E. Young

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'Coldwater Issue'

IN APRIL

special articles by new contributors plus all your usual features

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Our Cover: Great Crested or Warty Newt (*Triturus cristatus*)

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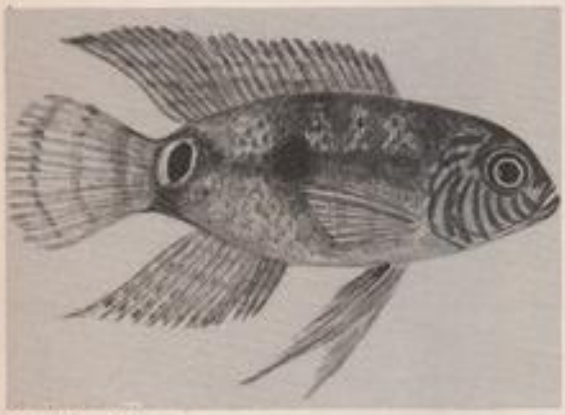
TROPICAL QUERIES

by Jack Hems



Aequidens tetramerus

What are the general requirements of the saddle cichlid and would a pair make suitable occupants for a community tank?

This cichlid, known to science as *Aequidens tetramerus*, attains a length of about 8 in. and is about as bossy and anti-social (when full-grown) as *Cichlasoma nigrofasciatum* or *Cichlasoma octofasciatum*. All in all, then, a community tank is no place for the saddle cichlid. For the rest, the species flourishes well at a range of temperature in the seventies (°F), will keep well-nourished on a mixed diet of live and meaty foods and breeds freely if given a spacious tank to call its own. The tank should be furnished with a deepish layer of fine grit or sharp white sand, some stones to afford shelter, and thickets of plants to back them up.

I should like to have some information about a fish mentioned in the more comprehensive aquarium books under the scientific names of *Brycinus* **or** *Alestes nurse?*

This characin is widely distributed across Africa within the tropics. It grows to a length of about 9 in. and as it is a lively fish it deserves a large aquarium. It is of a yellowish cast reflecting brassy tints on the flanks. The underparts are white. A black blotch is present a little to the rear of the gill-covers and a more pronounced blotch adorns the caudal peduncle. This African characin eats anything and young specimens are all right in a community tank. Commonsense, however, demands that larger specimens should be placed with fishes of about their own size. Curiously enough this fish, even in days gone by, seldom appeared on the market. Is it around now?

Synodontis decorus

Can you tell me something about *Synodontis decorus?*

S. decorus is native to the Congo basin and grows to a length of about 10 in. The ground colour is creamy white adorned with numerous black blotches. The fins, excepting the pectorals, are not without markings too. Here, however, they take the form of narrow black bands. In mature fish the anterior ray of the dorsal fin is prolonged into a whip-like extension. *S. decorus* is an omnivore but flourishes best if it is provided with generous helpings of chopped or small earthworms and finely minced red raw meat. A temperature in the middle to upper seventies (°F) is required.

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I have just bought a pair of *Aplocheilus panchax*. Can you give me some information about its maximum size, where it is found in the wild, its breeding habits and preferred food?

This species, commonly called the blue panchax, attains a length of about 3 in. It is found in the wild state in the still and moving waters of India, Thailand and beyond including the Malay peninsula and Indonesia generally. The basic colour ranges from light olive-brown to a reddish olive-green. Rows of blue spots adorn the sides. The fins are olive to yellow, or orange, with blue or red margins. According to J. J. Hoedeman, a Dutch aquarist of some renown, the colours of specimens collected in different localities may be particularly brilliant or variable. The eggs laid by the female, distinguished from the male by her paler colours and sturdier build, are deposited in plants, high or low in the water, with finely divided or ferny foliage. Egg-laying is not all over in one hectic chase or go but may take place daily over a period of several days. The eggs incubate in about a fortnight, and the fry are large enough to take such things as Grindal worms, micro eels, brine shrimps, and the like, from the start. Adult fish are avid eaters of worms, white or pink, tiny pieces of raw red meat, gnat larvae and unwanted livebearer fry.

Is *Tilapia nilotica* a suitable inmate for a tank housing a collection of other cichlids?

Not unless your tank extends to about half the length of the average sitting room; for *T. nilotica* reaches a length of about 20 in. Young fish are quite attractive, with dark bars on a grey or greeny grey ground. Medium to large fish may be anything from a muddy grey to a sort of leaden white with or without shadowy bars. The fins of young and old fish are often suffused with bright pink to red. *T. nilotica* is quite a peaceable fish; but as mentioned above it does call for a tank sufficiently roomy to allow it to grow well and move around to work up a healthy appetite for meat, worms, and small strips of uncooked white fish.

Polypterus weeksi

I should appreciate some information on the total length and general requirements of *Polypterus weeksi*?

This species, of the family *Polypteridae*, is full grown at about 16 in. and is best given a spacious tank to itself where it can be expected to [illegible] on a mixed diet of earthworms, swallowable [illegible] raw red meat, mealworms and so on. A temperature in the neighbourhood of 75°F (24°C) is suitable. It is not particular about the quality of the water provided it is clean and matured. Neutral to slightly acid conditions suit it best. With regard to furnishings, deepish sand or a fine grit on the bottom, with some non-calcareous stones and thickets of plants to afford hiding places, are obligatory if this fish is to settle down and do well.

I had a really good growth of plants in my aquarium until I introduced pairs of angel fish, festive cichlids and blue gouramies into the tank largely given over to giant danios, a spiny eel and Australian rainbow fish. Can you name the culprit responsible for spoiling the leaves of Indian fern and vallisneria?

I think you will find the festive cichlid is the culprit.

Barbus titteya

I have two pairs of *Barbus titteya* and would very much like to know how best to keep and breed this colourful little species.

The cherry barb or *B. titteya* from Sri Lanka is best kept in neutral to acid water well-stocked with fine-foliaged plants such as *Vesicularia dubyana*, pygmy types of utricularia or fine-leaved willow moss. The most likely foods to bring it into breeding condition are gnat larvae, brine shrimp, whiteworms, live *Daphnia* from a clean (non-rubbish-tip) pond, and a protein-rich fine-grained dried food. A male in spawning garb shows plenty of red colour in body and fins; the female is not so brightly coloured but her sides show a distinct bulge. Egg-laying takes place soon after the male starts driving the female into or around the plants. A few score to a few hundred slightly adhesive eggs are released by the female every so often over the period of the chase. The eggs hatch in about 18 hours and the parent fish should be removed from the spawning tank or separated from the eggs (which amounts to the same thing) as soon as the couple start to slow down or stop chasing altogether.

Please give me the maximum size, range of temperature and suitable food for a catfish

called the hassar.

The hassar or *Callichthys callichthys* attains a length of about 7 in. It has a range of temperature from about the middle sixties to the middle eighties (°F). It eats anything suitable for a non-faddy fish but thrives best on worms, shredded raw red meat and tiny pieces of uncooked white fish. The larger the catfish, the larger the size of the food, within reason of course.

Please tell me something about spiny eels.

Spiny eels belong to the family *Mastacembelidae*. They are not particular about the quality of their aquarium water provided it is clean and well-oxygenated. About a teaspoonful of salt (kitchen salt and not specially processed table salt) to every gallon of water in the tank may or may not make some species feel more at home than others, but salt is not essential to their well-being. None of the spiny eels commonly kept in the aquarium is predatory in the accepted sense of the word. Yet they will soon starve to death without live food: small creatures such as whiteworms, *tubifex*, gnat larvae, tiny livebearer fry, and the like. I have never known a spiny eel (and I have kept many different species over the years) take shredded meat or dried food. They burrow into the bottom covering for their food or snap at it as it passes them. They sort of sip it in, as Sterba says, with a jerking motion of the head. Spiny eels spend a lot of time buried up to their snouts in the sand. But they do emerge every so often to look for food. They are particularly active at night and after dark. It is a good plan to introduce food for them a few moments before all the lights are switched off at night. Spiny eels should not be placed in a tank housing aggressive or too curious (worrying) fishes. Given peaceable companions spiny eels usually live for several years and become very knowing. They are adept at getting out of a tank so always keep it well covered to prevent escape. Mastacembelids are not eels or even related to eels: they merely bear some resemblance to eels in their body shape. They are distributed over most of the southern half of Africa and a large part of south-east Asia.

I wish to rid my aquarium of snails. How should I set about it?

Paradise fishes and puffer fishes eat them or worry them to death. Most cichlids do the same. The snag is that the introduction of the above mentioned fishes into a community tank is asking for trouble. By and large they will attack the peaceable fishes. A proprietary snail eradicator will do the trick. You must use it exactly as the manufacturers label indicates and take out the dead snails without delay.

I am experiencing enormous trouble in keeping fish alive in my newly set up aquarium. It is 48 in. by 15 in. by 12 in. and is well-carpeted with washed shingle, some large sea shells, rocks, about three dozen different plants and a famous name under-gravel filter. Within days of introducing such species as neon tetras, harlequin fish and various barbs, I find them dead on the bottom. In the first instance, I filled my tank with water drawn from the hot water system. Later I was informed by a dealer that this water is highly toxic to fish. He seems unable, however, to solve my other problems. Can you?

Water stored for any length of time in a zinc-coated or copper tank is certain to kill fish. Always use mains water heated up to the correct temperature and then allowed to stand for a day or two to mature before introducing any fish. My next piece of advice is to throw out all sea shells. These are probably leaching out (a) chemical substances used in preparing them for the market or (b) an excess of lime. Remove all 'rocks' too unless they are free of lime. It you must have 'rocks' in a tank choose well-scrubbed pieces of granite or slate. Cleck up on your plants. See that they are suitable for growing in the submerged state. Some plants start to die after a few weeks under water. Their disintegration results in noxious gases and pollution. Send to this office for a copy of *A Beginner's Guide to Fishkeeping*. For 50p. you will receive a copy post paid.

I have a 24 in. by 12 in. by 12 in. aquarium given over to guppies. They are breeding well among a thick growth of *Ceratopteris thalictroides*. Now I would like to try my hand at raising mollies in a slightly larger tank. Please tell me the best type of water for keeping and breeding mollies and other basic requirements.

Mollies—all mollies—live longest and best in water a little on the hard side and slightly alkaline. Another thing they like is some non-iodized salt in their water. A teaspoonful to every gallon is about right. And this amount will not injure plants such as *Ceratopteris thalictroides*, *Cryptocoryne ciliata* or, say, *Vallisneria spiralis*. Give the tank a strong overhead light to promote the growth of mossy green algae; for mollies are great eaters of greenstuff. If algae is slow in growing, give the mollies boiled spinach, boiled turnip tops, boiled young nettles, scaled lettuce. Just a tiny blob of this greenstuff a few times a day. Supplment this green diet with witeworms, gnat larvae, powdered wheat germ or a high quality flake food. If the temperature fluctuates make certain the rise and fall is very gradual. A range of temperature from about 75 to 78°F (24° to 26°C) is quite all right. Rather shallow water suits mollies best.

COLDWATER QUERIES

by Arthur Boarder

Which plant do you think is the best one for oxygenating pond or tank?

I consider that the best water plant for either the pond or tank is *Lagarosiphon major*. It used to be known under the name of *Elodea crispa*, and may still be bought under that name. It is better than *Elodea densa*, now known as *Egeria densa*, as it is a stronger grower and has tougher leaves which are less likely to be eaten by fishes. *L. major* can make shoots several feet long in one season under good conditions. However, it is as well to shorten the shoots so that they branch out well and so make a denser clump. Without this pruning it is possible for the plant to continue growing in length and not making any side shoots. The stems of this plant are densely covered with recurving leaves and not only is it a good oxygenator but it makes a very good receptacle for fishes' eggs. There is no need to plant it in a container but a plastic net bag without any soil will do. A heavy stone should be included to keep it from floating to the surface. Roots will be sent out through the bag and these will attract the mulm etc., in the pond which will firm as nourishment.

I have a coldwater tank containing goldfish; Koi; Tench; Roach and Golden Orfe. I would like to add some Bream; Golden Tench and Crucian Carp. Where can I get these please?

I will include an address where you should be able to get the Tench and Carp but I am not sure about the Bream. This fish is rarely kept in stock by dealers as it is not a suitable fish for pond or tank. It is rather dull in colour and as it is a bottom feeder it is not likely to be seen in pond and in a tank it is not as bright as Roach or Rudd. Your mixture of fishes in your tank is not a very good one as the Koi and Orfe can soon grow too large and will be better in a pond. Instead of trying to get Bream I think that you will do better with Rudd as they are a much more colourful fish and are even better than Roach which many find are prone to Fungus disease.

We have a coldwater tank with Fantails; Shubunkins and an Orfe. Recently we have noticed that the fish cannot swim on an even keel and turn on their sides or upside down. We noticed this after the water temperature had dropped considerably. What is the trouble please?

It seems that the fishes are suffering from swim-bladder trouble. This is often brought on by a sudden drop in the temperature of the water. The Orfe is less likely to suffer from cold water but no fishes can stand a sudden drop in temperature. The cure is to increase the temperature of the water. It is also a help if the depth of the water is decreased. Fishes affected by this trouble seem to soon recover in shallow water which is about 65°-70°F. Do not feed at first whilst the fish are under treatment and when you do start, soak the dried food before offering it to the fishes. Any type of dried food such as pellets or granules are harder to digest than softer foods such as flake or most live foods.

The fish in my coldwater tank have become sluggish and do not appear to feed as well as they did. Why do you think this is?

It is probably because the water has cooled down and so the fish eat much less. Once the temperature drops the fish need very little food and any they eat will take them longer to digest than when the water was warmer. Once the temperature in the tank drops below 50°F, the fish need very little food and if too much is given it can remain uneaten and so pollute the water.

I feed my goldfish in a tank on ants' eggs. Is this a good food for them or which type is better?

Ants' "eggs" are not a good food for goldfish. They are the dried pupae and have tough skins and these are often spat out and tend to pollute the water. There are very many types of goldfish foods on the market nowadays, so that you should have no trouble in finding a better food. Flake food is very good and goldfish can exist on this food alone although an occasional feed with live foods such as garden worms or white worms will be appreciated.

I have tried throughout the year to grow water plants in my garden pond, but the goldfish and tench eat them all. Is there anything I can do about it please?

One remedy would be to feed more so that the fishes do not get hungry in the warmer months of the year when the plants should be growing. Try *Ceratophyllum demersum* and *Lagarosiphon major* as they are both rampant growers and should be able to get well established.

How can I clear my garden pond of blanket weed? It is 9 ft. — 5 ft., and about 21 inches deep. I have a number of young fish in the pond and do not want to empty the pond in case I lose them.

You may find that the blanket weed will not grow much during the winter and so this is a good time to clear it out. Twist a broken stick into the mass and you will find that it can be pulled out quite easily. Disturb the weed first to clear out any young fish which may be hiding there. In the spring try to get some Duckweed to partly cover the surface of the water. This will shade out much of the light and so discourage the growth of the blanket weed. Once the water appears to be fairly clear of the weed you can remove most of the Duckweed by flushing it across the pond with a hose. It can be rolled to one side and then removed easily.

I have a tank for coldwater fishes, 24 × 12 × 12 in., with an assortment of goldfish varieties. The tank is planted with *Elodea*, *Bacopa* and *Cabomba* species. However I cannot seem to keep Moors. I have bought four at various times recently and they all soon go off colour and die. Do they need different treatment from goldfish?

Moors are sometimes bred under warm conditions and it may be that your tank water is cooler than that from which they have come. Otherwise there is no reason why they should not thrive. You did not state the number and sizes of the fish which were already in the tank. It will hold 12 inches of body length of fish and if this amount is already in the tank, then any extra fishes could soon be in trouble. It often happens that if a tank has been established with a certain number of fishes and others are then added, the new fish may not thrive, especially if their addition has meant too many fishes in the tank. Do not add any more fish unless you are sure that there is plenty of space for them as they may not thrive. You state that you would like to keep in the tank, eight average sized fish. I do not know what you consider to be average sized fish. If the fish were two inches long in body length the tank would be over-stocked.

You are right to change some of the water each week but a third instead of half would be better, I note that you have *Cabomba* and *Bacopa* plants in your tank, this suggests that the temperature is fairly warm as these plants are usually considered to be for tropical tanks.

I have a tank, 39 × 15 × 12 in., with six goldfish, one weather loach and one catfish. They are 3-4 inches long. As I need the tank for other fishes I would like to transfer the fishes to an outside pond. Would this be safe to do in the winter?

If your tank is inside the house it is possible that the temperature of the water is about 65°F. If this is so it will be rather dangerous to transfer your fishes to the outdoor pond whilst the water is very cold. Pond water at this time of the year can be as low as 40°F, and to put fishes suddenly into this change of temperature could cause a lot of trouble. If you must move the fishes, wait until there is a mild spell, which usually happens during every winter, and then reduce the temperature of the tank water gradually to near that of the pond. This can be done by removing a quantity of water from the tank and adding cold. When introducing the fish to the pond, float them in a plastic bowl for a time in the pond so that the temperature can become better adjusted. I do not know which catfish you have, but beware that it does not grow too large or it will eat the other fishes.

I want to start breeding good quality fancy goldfish but I cannot seem to get any stock good enough with which to make a start. Must I have show specimens for a beginning please?

There is no need to start with show specimens as long as you are able to obtain some young stock from a very good source. I am enclosing an address for you to contact, but you must remember that show specimens can be rather expensive. This is because from even an excellent pair of fancy goldfish, all the youngsters do not turn out as good as their parents. They would be very cheap if they did. From a very good pair it is possible to obtain only about ten per cent of good fish. The remainder may not be worth the food they eat. Where double tailed varieties are concerned it is possible that some may only have single tails, others may have tails which are not divided and others may have the lobes irregular in shape. Then there is the question of the anal fins. These should also be double but some may have only one fin or even none at all. The shape of the body has also to be considered. With all this it may be realised that it is not easy to get many very good quality fish from any spawning.

It took me several years to breed good quality fantail goldfish and I must emphasise that unless one is prepared to pay a huge price, plenty of patience is required.

I have built a garden pond for goldfish and would like to know if it is necessary to have a pump?

A pump is not necessary for a goldfish pond. However, if you wish to operate a water-fall or a fountain a pump is essential. Many Koi keepers are finding that it is much better to have a pump to work a filter so that the water may be kept clearer as Koi are heavy feeders and are inclined to cloud up the water considerably. I have had ponds in operation for many years and never had to resort to a fountain nor a waterfall and have been able to keep the water in good condition with an annual clean-out. I am sure that a fountain will improve the look of a pond and it need not be switched on all the time but just for special occasions. A fountain does help to re-oxygenate the water for the benefit of the fishes. A waterfall can be a great attraction if properly constructed and if made correctly with sufficient fall, the trickling water will be an added attraction especially whilst one is in the garden on a hot afternoon.

Product review

Calcium Plus. 10 lb. 90p. **Gravel-Tidy.** Available in standard sizes or 1 sq. ft. 50p. **Poly-Filter.** £4·95. All prices inclusive of VAT. Distributed by Underworld Products Ltd., The Coneries, Loughborough, Leicestershire.

Unquestionably the first named item should prove of inestimable worth to the marine aquarist. For the alkalifying nature of this specially selected gravel, and its buffering qualities, is ideal for maintaining a synthetic seawater aquarium at the acceptable level of pH (7·8 to 8·4). Ordinarily 10 lb. of this gravel, a pleasing shade of light brown, washed thoroughly before use to clear away every trace of particulate matter, should be allowed for every sq. ft. of bottom area and then covered with roughly the same amount (in depth) of coral sand. Although **Calcium Plus** is marketed with the marine enthusiast in mind, it can play a most important part in the setting up of an aquarium destined for the accommodation of the fascinating cichlids native to the great lakes of Africa. These fishes, many of them of spectacular coloration, will only give their most in brightness of apparel and life-span in hard and alkaline water. Indeed, it is interesting to note that not a few great lakes' fishes are quite at home in water showing (under test) a pH value as astonishingly high (as aquarists reckon it) as 10·00.

But on to another boon for the serious aquarium keeper: **Gravel-Tidy.** This is a kind of sheeting of totally inert black plastic mesh, the perforations of which are about 2 mm. across. It will not rot away under water and is unaffected by salt. A pair of scissors is all that is required to tailor a piece to the inside measurements of any coldwater or warmwater aquarium. As it is easy to cut, the fitting of uplift tubes in a specialized filtering system is no problem at all.

The chief purpose of the **Gravel-Tidy** is to keep different layers of different floor coverings or growing mediums apart. Fishes such as certain cichlids, loaches or catfishes, that ordinarily drive channels or dig holes in the planting medium find their way to the lower depths barred by the perforated screen. Thus a buried layer of well-soaked peat or a mixture of loam and fired and crumbled clay (a most satisfactory growing medium for many of the higher plants) will stay where it is placed. Then again, coral sand (in a marine tank) is hardly likely to get stirred into a thickness of cockle shells or gravel if the **Gravel-Tidy** is there to keep them apart. It is easy to see that the perforations are large enough to allow for a free flow of oxygenated water in the substrate. Of course, there are other uses for **Gravel-Tidy**. Stretched tight over an open-topped box, it can make an escape-proof cover for glass-sided cases housing amphibians such as toads, salamanders, newts—even the smaller reptiles. And there is every reason to believe that **Gravel-Tidy** could be pressed into service as a means of saving livebearer fry from voracious parents.

Poly-Filter looks like a rectangular (4½ in. by 8 in.) piece of off-white underlay used to prolong the life of a carpet. But looks are deceptive; for bonded to a pliable matrix is a special formulation of patented materials, essentially adsorbent and absorbent, which remove suspended matter, an excess of ammonia, phosphates, and other harmful contaminants—even a build-up of drugs used in the treatment of fish diseases—from the water of a freshwater or marine aquarium. Yet at the same time, it will not remove trace elements in salt and is completely non-toxic to delicate fishes and invertebrates. All in all, then, there are a lot of things going for **Poly-Filter**. For one thing, used in conjunction with a biological filter, it allows a sufficient amount of ammonia to circulate in the filter bed to sustain proper biological activity. If, on the other hand, ammonia starts to reach a high level, the **Poly-Filter** absorbs this excess concentration while the biological filter readjusts to the higher input levels. Because of this unique filtering characteristic, the **Poly-Filter** eliminates the need and expense of carbon or ion-exchange resins or protein skimmers. Installation is simplicity itself. Full directions on using this filter material or pad are given in the 4-page explanatory and instruction leaflet.

JACK HEASS.

Pond life in aquaria

by
Cleeland Bean

COMPARED WITH the widespread interest in tropical fish-keeping the study of pond life under aquarium conditions is rather neglected. Yet here is a profitable sphere for the aquarist who will find it convenient enough to make close observations of most of the creatures which are found in the waters of wayside ponds. Even if we intend to keep only a few species or specimens at home, the natural habitats are always at hand for wider reference purposes.

Time needs to be spent in studying water creatures through the seasons under natural conditions so that an ecological picture may be gained of life patterns, food chains and plant growth. Pond animals or indeed those from canals, ditches, streams and rivers form a miscellaneous collection, and I am excluding here the larger fish species. The list is a long one, and some typical denizens include the water snail, water beetle, freshwater shrimps, aquatic moth caterpillars, water spider, water scorpion, water lice, dragonfly larva, caddis larva, alder-fly larva, water fleas, leeches, flatworms, pond mussels and the nume-

Water Boatman taking air at water surface.

rous microscopic organisms such as the diatoms and the amoeba etc.

Each class or groups within a ciass can yield new information for the alert observer, and as might be expected there are many more animal types in the comparatively still waters of a pond than would be the case for the quicker flowing streams and rivers. Before looking at some of these creatures in greater detail it may be mentioned that certain fierce predators will need to be kept in insolation if other inmates are to survive. Numbered among such attackers is the great water beetle (*Dytiscus marginalis*) in both its larval and adult forms, dragonfly larvae and the larger water bugs as representated by the water-boatmen or back-swimmers (*Notonecta*).

Dragonflies

Sticklebacks, tadpoles and the smaller sized frogs will not be safe from the attacks of such predators which will prey upon creatures much larger than themselves. Regarding dragonflies we may note that various species spend from two to three years in the larval stage, and this would again be a drawback against keeping them alongside other aquarium inmates. Investigations are still going on to find out more about the breeding cycles of the 43 dragonfly species which occur in the British Isles. Many of these will not spend longer than two years in water, and the majority of species will be found in weedy or reed bed environments where their brownish or dark green colouration matches their surroundings.

As many as a dozen species of dragonfly have been taken from particular ponds but much, of course, depends on the type of water habitat chosen. Not all dragonflies breed in still water, an example being the attractive golden-ringed species (*Cordulegaster boltoni*) with its black and yellow bands, this variety breeds amid the mud and vegetation of fast-flowing streams. Those of us with garden ponds can of course combine aquarium observations with open-air studies, such notes would be most convenient regarding the flight habits of the adult insects among which are the various kinds of damselflies. Familiar to most people is the common blue damselfly, and several larval forms belonging to this class are found in muddy places among weeds and herbage of quieter ponds or rivers.

The Aquarium

For aquarium purposes the arranging of bottom sediments, the use of plants, the introduction of scavengers, animal population density and the site location of your freshwater tank are aspects which must be considered. Necessary for the floor of the aquarium will be a covering of clean river sand which should overlie an inch and a quarter of soil or earth. The latter needs to remain firm enough especially when mud-dwelling creatures or smaller fish can be

Male and Female Diving Beetles.

expected to stir up the sediments, while added stability is provided by putting down a third and uppermost layer of gravel on top of the sand. Various wild growing aquatic plants may then be introduced, and these will readily take root to provide lurking places and food for an assortment of pond life.

The aim here is to have a reasonably large aquarium with an interesting variety of inmates, and a container having suitable dimensions would measure 46 × 25 × 25 cms. Good plant growth will mean that a self-contained ecological system operates, while at the same time vegetation will enable a wider range of creatures to be kept compared with conditions where plant growth is sparse or absent. Water snails are obvious browsers on vegetable matter, and act as useful scavengers for keeping the sides of an aquarium free from any plant slime which may develop particularly as a result of over exposure to sunlight. For this reason freshwater containers should be kept five or six feet away from windows, yet without being placed in direct sunlight, but receiving sufficient light for plant growth and photosynthesis.

Snails

Apart from being scavengers water snails are engaging subjects for study in their own right, and

specialists have hundreds of British species to occupy their attention. The shells of these freshwater molluscs come in a variety of shapes, sizes and colours, but many escape observation because of their smallness or camouflage. Easily recognised is the common pond snail (*Limnaea peregra*) and the ram's horn (*Planorbis corneus*) with each species representing two

Damsel Fly.

major family groups. Large specimens of the ram's horn can measure as much as an inch across their flat-coiled shells which are shaped like catherine wheels.

It is notable that both these snails have the capacity for breathing air through a lung cavity, while if need be the animals can also obtain oxygen supplies from the water by the use of respiratory organs located close to the pulmonary orifice. The young of such will hatch from small egg clusters which may be noticed attached to plants or stones in the aquarium, and even at this period they carry tiny glass-like shells. But not all snails hatch from eggs; an example is the fresh-water winkle which bears its young alive. This snail is an attractive looking pond dweller having a greenish-brown shell overlaid with three darker bands encircling the whorl structures.

Another freshwater snail species with a marine tag to its name is the freshwater whelk, and here too the shell structure resembles that of its seashore counterpart. The shell is about one and a half inches in length and carries from six to eight elegant whorls. This species feeds largely on water plants, so its food supply must be kept under supervision. Whelk-like again is the smaller and less common eared snail which has a broad opening to the shell cavity which resembles the shape of a human ear. All these browsers remind us that suitable pond plants for our aquarium should be helping to keep an ecological balance between the animal and vegetable spheres.

Plants

A useful oxygenator in this respect is Canadian pondweed or swan weed which readily takes root when anchored to small stones. Various other freshwater plants including brooklime, water milfoil, spring starwort and duckweed are also most suitable as aquarium vegetation. The tiny duckweed plants soon form a floating film on the surface of the water to provide shelter for minute pond creatures or smaller fish. Once duckweed has established itself excessive light is prevented from entering the water, and a heat screen is likewise at hand. If the freshwater aquarist is interested in microscopic work then indeed extra dimensions of both the plant and animal kingdoms can be studied.

Typical examples of such unicellular plants include the numerous species of algae involving chlamydomonas, spirogyra, chlorella, chlorococcum pleurococcus, desmids and the diatom groups. Although chlorella can give water a green appearance this greeness comprises billions of single cell plants which measure from 5 to 10 microns in diameter. Some idea of their fantastic smallness is gained when we note that (a micron is 0·001 millimetres) and equals 0·00004 inch. During recent years chlorella with its quick reproduction rates and protein content has come under observation as a possible food source for human beings.

Mussels

Microscopic organisms, whether plants or animals, are important food sources for pond molluscs such as the swan mussel and duck mussel, both of which depend on smaller fish species like the stickleback and minnow for their final growth stages. The story is a remarkable one including as it does a temporary parasitic phase whereby the young swan mussel

spends three months enclosed in a cyst or gall formation formed from the tissues of the fish. Unlike the pond snail the swan mussel does not liberate its eggs directly into the water, but retains them in a specially adapted outer gill pouch where they develop into bivalved larvae before being released.

At this stage the young swan mussel does not resemble its parent, nevertheless two tiny triangular valves of its shell are visible, and each valve has a sturdy toothed 'claw' which is attached to the rims. In place of a foot or gills a larva while lying on the mud has a long, thin, stickly thread or byssus which projects from its valves to sway in the water aloft. But if a stickleback touches this thread the line adheres to the body of the fish, and the young swan mussel pulls in its line until it comes close to the stickleback where upon those shell 'claws' or hooks clamp into the bearer's skin. Tissues then grow over the larva forming a gall or cyst on the body of the fish. Inside this swelling the larva absorbs nourishment from its host for a period of three months; metamorphosis occurs, and then the young mussel falls out from the cyst to lead its own adult life at the bottom of the water. When fully grown the greenish-brown valves of the swan mussel may span as much as six inches in length, and be three inches across; it is in fact, our largest freshwater mollus—a smaller species being the fawn-coloured duck mussel which is three inches in length or thereabouts.

Water Spider

Quite a different creature for the freshwater aquarium is the water spider (*Argyroneta aquatica*) which breathes air, yet it can remain below water for three hours or longer without coming to the surface. Ages before men had invented the diving bell the water spider had solved the problem of living submerged by carrying down small air bubbles and trapping them beneath a silk pocket attached to the water weeds. Given aquarium conditions one can closely observe how this feat is accomplished.

First of all the spider swims to the top of the water, then it will be seen to raise its hinder-end high above the surface, after which the body is brought down quickly thus forming an air bubble under the abdomen. Hairs on this section help to trap the air, and the bubble is held in place by the hind legs of the spider as it swims with its catch to an underwater web. Numerous trips of a similar nature are made until the silk pocket is buoyed up to form a small dome-shaped cavity. During the summer such webs may be noticed not far below the surface, but when winter comes denser webs are made in deeper water, and inside these air-filled chambers the spiders remain without taking food until spring arrives. During the breeding season the male builds his diving bell close to the female's web and joins the two chambers by a silken tunnel. But when the young

Dragonfly nymph.

hatch they stay in their mother's bell until they are ready to fend for themselves.

Diving Beetle

Another interesting bubble collector is the great water beetle which is able to trap air among the fine hairs covering the back of its abdomen. The wing cases also help to enclose the buddle, and since the rear end of the beetle first srikes through the surface of the water when the creature floats up from its foraging areas air contact is readily made. Special pores or spiracles on the insect's body enable air to be drawn into its air tubules which form networks through the body tissues. Although free oxygen is absorbed by this system an extra supply of air is provided by the trapped bubble, yet here again smaller spiracles are in contact with the bubble while the beetle is below water. Observers will be able to easily identify the female by her furrowed wing cases whereas the male has smooth wing covers.

Suitable also for aquarium observation are the various mayfly, stone-fly, caddis fly, alder-fly and dragonfly nymphs. As mentioned earlier the dragonfly larva is a fierce predator upon other pond inmates including the nymphs of mayflies etc., and for this reason it should be kept in a separate container. It will be necessary, of course, to feed carnivorous larvae and water beetles on various insects grubs and worms. If sticklebacks or other fish are kept small pieces or shreads of raw meat can be offered, but excess food should not be allowed to contaminate the aquarium. This is worth mentioning in view of the fact that

carnivorous creatures will need to be fed at regular intervals.

Mayflies and Stone-flies

Among aquatic insects mayflies and stone-flies form two important groups of which there are many species. Each year they appear in immense numbers in streams and rivers during May and June when fish take both the nymphs and adult insects. A distinguishing mark of the mayfly in its nymph and adult stages is the presence of three cerci or tails, by contrast stone-flies have only two of these tails. Mayflies with their curved bodies, delicate transparent wings and three extremely long tail streamers can be found almost any place in ponds and rivers, where the nymphs will have spent two to three years below water.

Water Spider under water.

Stone-flies are more restricted in their habitat and frequent running water which is well oxygenated.

Before moulting mayflies are rather drab coloured duns, and this second moult is a unique occurrence in the insect world. When stone-flies and mayflies emerge from the water they can only live for a few hours since their mouth parts are not formed for taking food. The females soon mate and begin to lay their eggs by dropping them into the water or dipping the abdomen just beneath the surface.

Stone-flies are largish brown insects which are often overlooked by the casual observer. Clusters of them will be found resting on bridges, fence poles and on stones near the waterside especially in hilly countryside rather than the lowland districts. They sit with wings folded flat over the body, and are easily identified in flight by their weak wing actions. Stone-fly larvae are flat in shape and live beneath stones, so the aquarist would need to ensure that the proper ground materials are available. But instead of stones the larva of the caddis fly is a common inhabitant of muddy areas amid ponds and slow-moving streams, and a similar environment is necessary for the mayfly larva which burrows into mud.

Caddisflies

Under aquarium conditions the caddis fly larvae with their remarkable variety of tub-building materials make eye-catching subjects for study. Grit particles, leaves, twig fragments, small snail shells, fine sand grains, stones and pond debris may be used to form protective coverings for the soft bodies of the inmates. The animals remain attached to their cases by using a pair of large horny hooks which are carried on the end segment of the body, these grip the lining at the rear of the tube. In an aquarium one can watch how the caddis larva or worm builds up its home if a specimen is removed from its tube and fresh construction materials provided. For this experiment broken pieces of coloured pottery, glass fragments, small coloured beads or shell fragments may give the observer an opportunity for watching the caddis larva at work. Within an hour or so the job will have been completed. In this country there are about 2,000 species of caddis fly, but the common sort displays a mottled grey and brown colouration, and is moth-like in appearance with extremely long antennae, and hair covered body and wings. The usual pond caddis fly larvae feed on vegetable matter, although a few types which live in fast flowing streams are carnivorous.

Freshwater aquarists have indeed a very wide field of animal life for studying, and some species including the water scorpion, rat-tailed maggot or drone-fly larva and mosquito larva are adapted for living in relatively shallow water. Each in turn has a remarkable breathing siphon organ which makes contact with the surface of the water. Most prominent here is the adjustable breathing siphon of the rat-tailed maggot which can be lengthened or shortened in a telescopic fashion according to water depth. This creature has a 6 in. air pipe, and such a channel enables the larva to feed on organic matter below the surface while air flows down to it, if the water is too deep the maggot will seek a shallower position.

When looking at all these pond or puddle denizens it is evident that a variety of smaller glass containers would be suitable for different specimens which one might not wish to include in the main aquarium. But whatever the vessels chosen, habitat and food supply must tally as far as possible with natural conditions if we mean to keep our captives alive for lengthy observation periods.

Above: Penguin Fish *Thayeria boehlkei*
Below: Emperor Angel Fish (juvenile) *Pomacanthus imperator*

Fish Photography

The excellent photographs of fish we see in the aquatic press and in books has led many people to believe that it is a very specialised facet of photography requiring expensive and intricate equipment. This is not necessarily so, although there are obviously people who specialise in this field and have got it down to a fine art after many years of experience.

The following comments are purely and simply based on my own experience and observations. It must be pointed out that they are in no way intended to imply that they are the only ways to successful fish photography. The intention is to give guidance in basic techniques and perhaps remove some misconceptions from your mind.

Equipment

You can take photographs of fish with any camera, really, but for ease of use and versatility I can only but recommend a Single Lens Reflex camera. With this type of camera the image, as seen in the viewfinder, is exactly that which is recorded on the film, both in composition and sharpness of focus. This is achieved basically by the use of an angled mirror which "flips" out of the way at the moment the shutter release

by Alan Rothwell

button is pressed to expose the film, which was protected prior to that moment by the mirror and a blind.

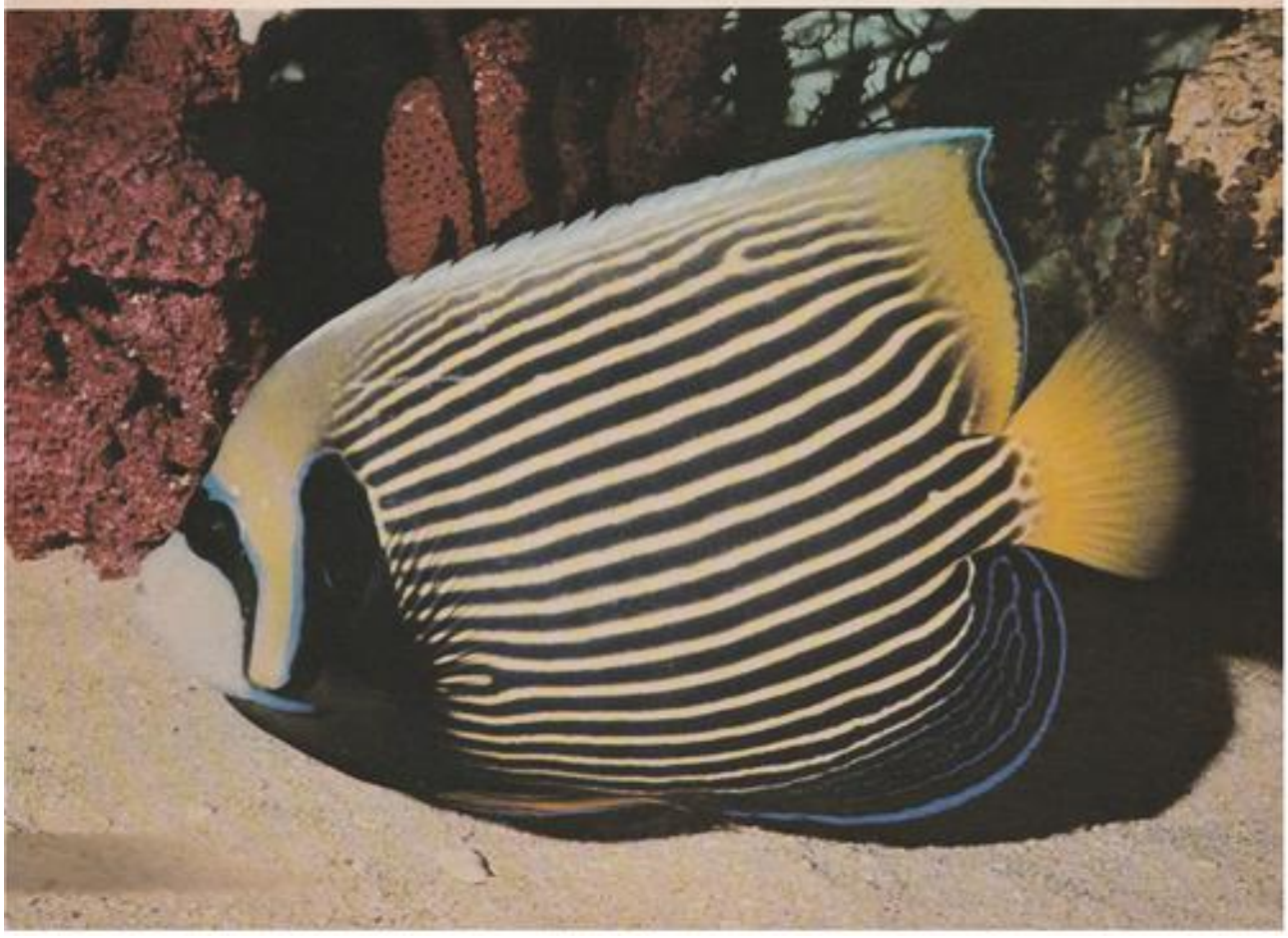
Even the cheapest S.L.R., the Zenith, is quite adequate, but perhaps others such as the Practica, Pentax, Fujica, etc. are just a little bit easier to use.

Now, we may well find that the standard lens with the camera will not focus close enough to give a large enough image of an individual fish so, we must find a way of overcoming this. A small extension tube fitted between the camera body and the lens will change the point of closest focus to less than the customary 18″ or so. Alternatively, we could use a "close-up" lens screwed onto the front of the lens. Both of these methods work well and both are readily available and fairly cheap from any photographic dealer. Some camera manufacturers have available a "Macro-lens". This is used as a standard lens and has close focusing ability built in, amongst other qualities, but is usually fairly expensive.

Lighting

So, we can now fill the frame as we choose. Now, to illuminate the fish in the aquarium we will find that the

Above: Bleeding Heart Tetra *Hyphessobrycon rubrostigma*
Below: Emperor Angel Fish *Pomacanthus imperator*



usual aquarium top-light is not bright enough to take photographs by, but may well be adequate to focus by.

Perhaps at this point I should point out that I prefer to photograph the fish *in situ* and not use glass sheets to trap them between. O.K., it may mean perhaps being a little more patient but the fish are far happier and in the best of colour when not distressed. If, for a particular reason, it is necessary to transfer the fish to a slim-line photographic tank, take care in handling.

A small electronic flash gun is all that is needed to provide illumination. This should be held by a bracket above the camera tilted down at an angle in the direction of the subject depending on how far away from the subject the camera is. Electronic flash is ideal for the purpose primarily because of its fast action-stopping response and for its consistency in quantity and quality of light output. A small gun suitable for the purpose can be bought for £10–£20. Indeed, you may already have one for general photographic use.

Film

Any medium speed film is suitable. For black and white work Ilford F.P.4 at 125 A.S.A. is ideal. For colour prints Kodocolor II at 100 A.S.A. or any similar film is fine.

For colour slides (which I personally prefer—for they have an intrinsic luminosity and quality unobtainable with conventional colour prints) most of the currently available films are suitable. Although they may all have their own slightly different characteristics, none is really bad.

I have found that films of 25–100 A.S.A. are ideal to use with a small fiashgun at close distances giving exposures in the range f11–f16–f22. There are many films available in this speed range i.e. Kodachrome 25 (25 A.S.A.), Agfa C.T. 18 (50 A.S.A.), C.T. 21 (100 A.S.A.), Ektachrome 64 (64 A.S.A.), and Kodachrome 64 (64 A.S.A.), etc. I personally use Barfen CR 100 (100 A.S.A.) mainly because I can process it myself quite easily and have finished results within a short time of taking the photographs. All of the photographs used to illustrate this article were taken on Barfen CR 100.

Should a print be required for any reason, there are no problems. These are quite readily obtained using Kodak "reversal" paper or the more expensive Ilford "Cibachrome" process, which, incidentally gives results of exceptional quality. Your photographic dealer should be able to help you here if you are unable to do your own.

Exposure

For the particular flashgun/film combination you decide to use you must determine the correct exposure. You must also take into account any extension tubes in use, as they increase the exposure required, although "close-up" lenses don't.

This is best done using your first film as a "test film", and making careful notes, but as a rough guide the exposure for say, a 100 A.S.A. film will be about f16 to f22, with the shutter speed set to that which synchronises with the flashgun according to your camera instruction manual. This will be suitable for fish approx. 3" long. The further away the camera is from the subject the more exposure you may need.

The taking

Dirty glass can be quite a problem. Clean the inside a day or two before and remove all smears, etc. from the front of the glass. Reflections in the glass also mar the finished picture. To overcome this I take my photographs in a darkened room with only the aquarium top light on. Any small reflections that may still occur, can of course, be seen in the viewfinder of the S.L.R. and we can avoid them as necessary. A lens hood is useful for preventing any stray light entering the camera lens. Another thing often overlooked is the background. This is probably the most common fault in amateur photography generally. Keep your angle of view away from heaters, thermometers, cables, etc. A "plainish" background of rockwork, plants, etc. is often ideal. It really is amazing how easy it is not to notice aquarium hardware when taking the photograph but how much it tends to dominate the finished picture. Whilst mentioning angle of view, we must hold the camera "square-on" to the aquarium at all times for distortion free pictures.

Sequences

Besides the usual fish "portraits" I have derived a tremendous amount of pleasure in compiling series or sequences of pictures such as, for example, the complete life cycle of the Kribensis (*Pelvicachromis pulcher*). Any other egglayer for that matter is equally rewarding. Most of the Cichlids spawn fairly readily under the right conditions. A set of pictures showing the ritual courtship, spawning, fry at various stages, etc., is not only photographically interesting but very educational and can teach us more about the behavioural patterns of our fish than reading any number of books.

Other sequences such as change in coloration and pattern from juvenile to adult is particularly interesting. Probably the most striking examples of this occurs in the coral reef fishes, i.e. The Emperor Angelfish (*Pomacanthus imperator*), the Blue-Ring Angelfish (*Pomacanthus annularis*), the Sweetlips (*Gaterimidae* family) and some of the Wrasses.

This extreme difference in colour and pattern has led many species to be incorrectly named in the past and even today there is still some doubt with some of the rarer species. It is with these sort of projects that colour transparency film really comes into its own, indeed it is invaluable. And you may also have the pleasure of coming up with some hitherto unknown information as a bonus.

CROSSWORD PUZZLE

by Dylan Pugh

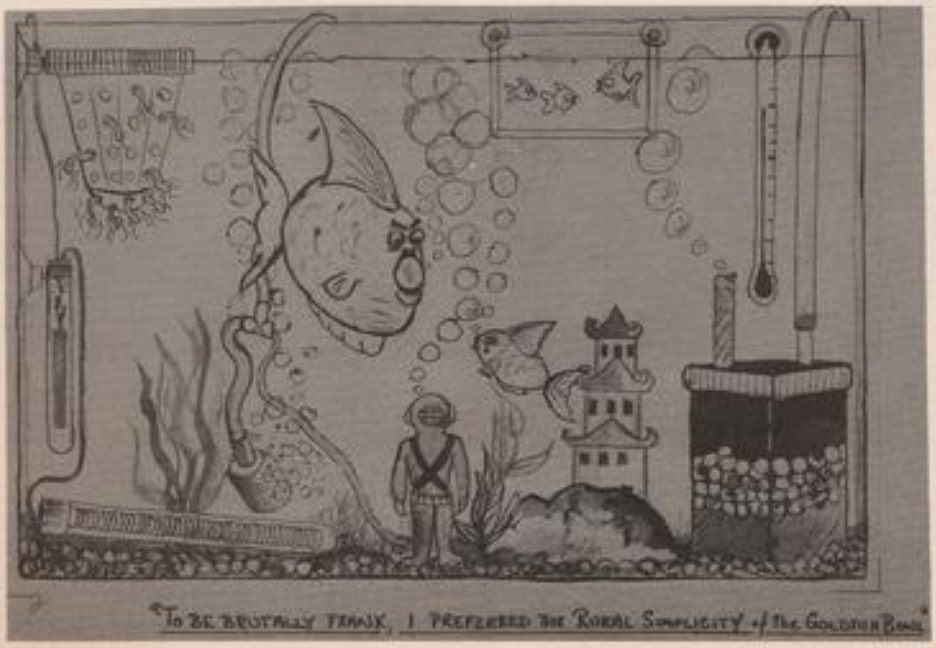
ACROSS

1 Is this marine a great talker? (6)
8 What an angel might get if its fins are nipped? (4, 5)
9 Something we try to avoid, such as *Argulus*. (8)
11 We might get these from a piranha! (5)
12 Jumpy things in the garden pond? (5)
14 Small Indian fish that sounds naughty. (5)
15 Would we use this to catch a mackerel? (5)
16 Necessary state for an aquarium. (5)
19 *Corydoras* . . . . ., the Leopard catfish. (5)
20 Occasional hungry visitor to the pond. (5)
21 Sharp sounding carps? (5)
23 Stainless type of tank frame? (5)
25 *Aphyocharax rubripinnis*. (8)
26 *Xiphophorus* . . . . . ., the platy. (9)
27 Six-legged fish food? (6)

DOWN

1 Is this relative of the seahorse a heavy smoker? (8)
2 Regarding a South American city we find a Zebra? (5)
3 A place to fish in the desert? (5)
4 Fish eggs. (3)
5 Colour of a discus? (3)
6 Honey Gourami. (6, 5)
7 Temper we expect from *Pterophyllum*? (7)
8 Common native fish with outstanding parental habits. (11)
10 Fruity sounding molluscs. (5, 6)
13 . . . . . *petersi*, or an elephant. (11)
17 What we can't afford to do in a furnished tank. (4, 1, 3)
18 A fin on the belly. (7)
21 Colour of a trout, not from the rainbow? (5)
22 We might need this to catch an armoured catfish. (5)
24 Composition of adipose fin. (3)
25 Blooming part of a water-lily. (3)

Solution on page 514



SPAWNING WALKING CATFISH

by R. D. Chalmers

As a regular reader of your magazine, I thought that your other readers may like to hear of our method of spawning *Clarius batrachus* (the walking catfish). We started with six of these fish at the beginning of this year. These were put into a 4 foot tank until we could sex them when it turned out we had 5 females and 1 male. The fish were left in the tank until a pair began to chase the others around the tank. At this time we had no information on these fish, but we did receive this at a later date from your Mr Jack Hems and the Unit of Aquatic Pathobiology at Stirling University, the latter for whom we are breeding different types of fish including *C. batrachus*. This is being done for future fish farming in countries from which these fish come. The method that we used is as follows:

The fish were placed into a 4 foot all-glass tank with a water depth of 11½ in. and a 2 in. covering of fine gravel on the bottom of the tank. This was cleaned by 2 box and a power filter, with a 2 gals water change every day. The fish at this time were (the female was 12½ in. and the male 11½ in. in size) being fed on a diet of raw meat, earthworms, young fish and a high protein pellet.

The tank was kept at a constant temperature of 80°F over a period of 5 months; all this time the female appeared to be full of eggs but with no sign of spawning. We tried different types of spawning mediums in the tank with still no success. The fish did not take any notice of the spawning mediums until we placed a woodwool packing material in the tank with them. When this was put in the tank they began to take an interest but still no spawn appeared. It was then decided to give them a change of tank, and when this was done the fish began to swim up and down the tank at high speed, and tried to leap out. As a result we dropped the water level in the tank to only 4 in. and at this the fish seemed to slow down for short periods of time, but soon started doing this again for about 1 hour. After this the male wrapped his body around the female's head in a 'U' shape. This was repeated often during the next 1½ hours by both fish. Then both fish began to gather all the woodwool together into a clump in the middle of the tank until it was in a circle measuring 6 in. by 2 in. When this was finished both fish started to nudge each other at their genital regions. This was done in a very gentle manner and then both fish began to flick their dorsal fins at each other. This seemed to spur them into a frenzy of renewed activity which started them swimming up and down the tank again, but with both fish taking great care not to disturb the nest they had built. The male then wrapped his body around the female in the way that fish such as Danios do when spawning. I thought that they were now spawning but this was not so. The behaviour then changed and both fish began to swim in a very tight circle over the nest with the male to the inside of the female. It was after about 5 mins that I noticed that there was a stream of eggs falling from the female into the nest and this continued for a few minutes before the female broke away from the male to swim around the tank a couple of times before returning to the male to spawn again. This happened 5 times before they finally stopped spawning. They then took up positions one lying on top of the nest and one patrolling the tank to investigate anything approaching or being dropped into the tank. I left both fish in the tank at this time as this seemed to be the best thing to do.

The eggs were about ½ mm in size and almost clear with a slightly grey colour, they were also very adhesive as those that fell onto the gravel had small particles sticking to them. The eggs began to hatch after 24 hours and were free swimming after three days. It was at this time that the barbels started to appear on the fry and was also, unfortunatly, when we lost the fry. We have since spawned these fish again but the male did not fertilize the eggs for some unknown reason. We will continue to try until we have complete success and now have three pairs of these fish.

From a Naturalist's Notebook

by Eric Hardy

The captive breeding of the green sea-turtle at Makapuu Point sea-life park, Hawaii, the other year was an experiment that worked. A Beluga white whale was born in Vancouver Aquarium. At the Curie University, a French biologist has reversed the sex of Spanish sharp-ribbed salamander female tadpoles, with high temperatures. A Colorado University researcher finds that it is the striking action of a rattlesnake which then releases its chemosensory search for wounded prey. Another at Miami showed a specific difference in the smells of different garter-snake trails, which presumably applies to other snakes too.

The skin-secretions of amphibians have an anti-predator function, especially regarding snakes, and snakes have died from fatal toad poisoning. Albinism is known in snakes. It was recently described in an American sagebush-lizard and a snapping turtle, while the reverse, a nearly all black colony of salamanders, is described from Ohio. From Cosnipata Valley of Peru comes a new species of piping frog, *Eleutherodactylus unistrigatus*, and from Guatemala's Baja Verpaz, a new salamander, *Chiropterotriton veraepacis*. Two new lizards from South Africa's Kruger Park are named *Monopeltis leonhardi* and *Afroedura transvaalica*. Meanwhile, feral cats and dogs are having an adverse effect on West Indian rock-iguanas, but the common Turkish house-gecko of Mediterranean lands from Europe and North Africa east to India, *Hemidactylus turcicus*, has been established in Big Bend national park in Texas.

Natterjack Toads

No American rattlesnake is on the endangered list, but some, like the rock-rattler in Texas, have local state protection. Was the position of the English natterjack toad near Southport exaggerated in recent years with panic station publicity about its endangered position? Dramatic ups and downs in dry/wet changing habitats are typical of this toad. A country trust census reported that in 1978's wet season it bred back until "the population now numbers many thousands". The creation of new water-pools helped it. The decline of sand-lizards on the same dunes is attributed to a succession of cold Mays.

No such publicity reached starfruit or thrumwort, *Damasonium alisma*, an aquatic water-plantain on its way out of Britain. From gravelly ditches and muddy pools in 13 English counties 25 years ago, it is reduced to one known site in Kent. It has tiny white, 3-petal flowers and floating or submerged leaves. Like a little water-plantain, it is presumably poisonous like the latter.

Fungus Rots

Growers of bog and waterside plants may often be troubled with fungus-rots. Some, like rhizome-rot in flag-irises, cause much trouble unless it is cut away and the sound part dusted with flowers-of-sulphur or a copper fungicide, but don't use sprays where fish are kept. Many are dust-like rusts and mildews and often, fortunately for us, specifically limited to a particular species or group. Many belong to the tiny *Ascomycetes* or cup-fungi and the rusts, smuts or *Basidiomycetes*, needing a magnifying glass to see details. Minute dot-like swellings scattered over brown blotches of faded sweet flag leaves are caused by *Ascochyta acori*. *Coleosporium sonchi*, a sow-thistle mould, is common on butterbur which has its own species *C. petasitis*. Wintergreen (*Pyrola*) has its own *Chrysomyxa pyrolæa*. Hartstongue ferns are hosts for *Uredo scolopendri*. *Fusarium oxysporum* differs from lawn-wilt *Fusarium*

in inhibiting fern seedlings from growing to maturity by producing ethyl alcohol, ethanol and acetaldehyde. Water-plantain is linked with its dusty fungus *Phyllosticta alismata*.

Bog-primula leaves are commonly attacked by the rust *Puccinea primulae*, whereas water-mint and other cultivated and wild mints are attacked by *P. mentha*, sedges by *P. caricis*, violet leaves and their stems by *P. violae*, amphibious polygonum by *P. polygoni*, marsh-orchids by *P. orchidearum*, *Melampsora orchidi-repentis* which has also been found on *Salix*, etc. Primula leaves are also attacked by *Peronospora candida*; *Ramularia primulae* and *Ovularia primulaena*. Sedges by *Leptophaeria michotii*, *L. epicaercta*, *Septoria sparganii*, *S. riparia*, *S. caricicola*, *Stagonospera paludosa*, *S. caricis*, *S. arundinacea*, etc. Willows and sallows (*Salix*) by *Diplodina salicis*, *Discella carbonacea*, *Cyrospora salicis*, *Dichomera salicina*, *Meampsora farinosa*, *M. caprearum*, *Rhytisa salicinum* (leaf-spot), *Phoma salicina* (very common on osiers) and *Valia salicina*. For large measure, bigger gilled brackets of *Pleurotus salignus* a relative of oyster-fungus grow from willow-trunks, also *Polyporous squomosus*, *Trametes rubescens*, etc.

Guelder rose, a flowering shrub of damp places, is host for *Phyllosticta opuli* and *Cytospura lantana*. *Spiraea* may have native meadowsweet's common *Sphaerotheca castagnei*, *Triphragmium ulmeri*, *Lepto-stroma spiræinum* and *L. spiræae*. Lesser celandine and other *Ranunculus* leaves are attacked by red-spotted *Entyloma ranunculi*, *Peronospora ficariæ* (on living leaves), *Uromyces ficaria*, and *U. poæ*, while other *Uromyces* attack grass and dock-leaves.

Rush-stems are attacked by *Leptostromella juncina*, *Septoria junci* (spotting), *Stagonospera innumerosa*, *S. typhoilearum*, *Phyllacora junci*, *Hendeesonia junci*, *Erinella apala* and *Sclerotina curreyana* (when dead). Typha the reed-mace is attacked by *Guignardia perpusilla*, *Hymenula rubella*, *Leptophaeria typharum*, *Ophiochaeta herpotricha* and *Septoria menispora*. Reeds by *S. arundinacea*. Finally, waterside alder-twigs are the host for *Melanconis alni* and *Melanconium thelebola*, the leaves or *Gleosporium cylindrospermum*. Even *Bryum's* moss spore capsules may be attacked by *Phoma muscicola*.

Their spores are distributed by insects and mites as well as the wind, and some root-rots are caused in minute eelworms. Mint-rusts, and others, can be eradicated by watering with tar-oil in late autumn, as used on fruit-trees. When one turns to other plants, they have their specific rust fungi, like violets and *Puccinia violæ* and docks by *Uromyces rumicis*. So the phytologist specialising in plant-infections, and his mycologist colleague identifying the micro-fungi, have an exacting time. Many fungi grow on dead stems or leaves. Some bog-primulas may suffer from just too much water if they stood in it all winter, turning plants yellower, unless one forks between them, or cuts channels to drain off surplus water from their crowns.

Poisonous Aquatics

Water-plantain is far from the only poisonous aquatic. All the *Ranunculus* group including marsh-marigold, globe-flowers, spearworts (blistering) but excepting water-crowfoot, have dangerous alkaloids in their leaves at flowering time. Most waterside umbellifers are poisonous, notably cowbane and parsnip-like roots of hemlock waterdropwort which have cicutine. The seeds of all irises and guelder rose are poisonous. If brooklime is confused for watercress before its 4 blue petals show the difference from 4 white ones, it may cause violent arguments with your digestion. Purging buckthorn's berries are well named. This plant has its own fungus *Æcidium rhamni*.

Many upsetting or irritating plants, troubling some people more allergic than others, are often loosely called poisonous when no direct cause of death has been proved. However, umbelliferous cowbane or waterdropwort root contains 3 poisonous principles, an alkaloid cicutine, oil of cicuta and the bitter, resinous cicutoxine. The normally colourless sap of stem and root turn yellow on exposure to the air but the plant is fatal fresh or dry and in man death occurs in 45% of cases when eaten. Its poisonous qualities are greatest when in fresh growth in spring, least in the dying stalk of autumn, and its tuberous root contains the greatest amount of the poison in spring. Root, stem or leaves are fatal, sometimes within a few minutes, or after a few hours illness according to the stomach being full or empty as no absorption of the toxic can take place until digestion. Symptoms include giddiness, salivation, vomiting, dullness, rolling of the eyeballs, convulsions and usually unconsciousness before death. Large amounts of strong black coffee are said to be of temporary aid, but symptoms develop so rapidly that the alkaloid must be removed with a stomach-pump, vomiting or other medical aid immediately.

Irritant

Not poisonous, but with a very irritant sap, is the enormous giant hogweed, a waterside umbellifer up to 10ft tall with huge, ragged leaves, often ending up with hollow, tube-like stems, once grown beside Victorian lakes and pools. Monkshood or Aconitum also in the buttercup family, whose tall, deep blue flowers mark shady stream-banks in limestone woodland, like Derbyshire, or many a garden, is poisonous in all its parts as well as its horse-radish-like but white roots, containing aconitine, fatal at only one-sixteenth of a grain. Digitalin, the foxglove's poison, has been used medically to counteract it. The wine-like odour of bruised hemlock-waterdropwort leaves produces giddyness if inhaled too long; if eaten they are poisonous. In addition, many land plants growing near water are also poisonous.

Female *Aphanius dispar*

Speckled Arabian Killifish

by W. Ross

Photography P. W. Stroud

WHILST working and living in the Eastern Province of Saudi Arabia I have had the pleasure of collecting and studying the Arabian Killifish. This part of Saudi Arabia is quickly becoming the industrial area of this country. It consisted mainly of desert with the occasional oases but the desert is disappearing under heavy construction sites. Most of the oasis areas are along the coast with a few inland. The water in the oases comes from deep wells. It is very hard and remains in the lower 80's F even in the winter.

Aphanius dispar (Ruppel) is a cyprinodontid found throughout the Arabian peninsula. These fish live in the sea and the fresh water sulphur springs of the interior. The marine specimens are drab in comparison to the freshwater ones.

Azizia is a small strip of oasis with the streams running into an almost land-locked bay. On a trip there early in 1978 I found what I believed to be a speckled variety of *Aphanius dispar*. These fish were similar to the Arabian Killifish in colour, size, shape and breeding habit. The only difference was the irregular greenish black specks on their bodies, fins and tails as can be observed from the photographs. I personally found these more attractive than the normal *Aphanius dispar*. From my limited library and whatever other books I could borrow, including Sterba's "Freshwater Fishes of the World", I could find no information on a speckled Aphanius.

The first specimens I collected I passed on to some friends who are interested in Killis. Having decided to study these fish a little more closely, I set out for Azizia intent in collecting a few more fish. At a point where we have to leave the road and motor along the beach to get to the oasis a security guard post had been set up. The guard stopped me. I had no Arabic and he no English. It was very plain from his attitude that I could not get onto the beach. I left for home empty handed. A few days later I made another attempt but with the same result. Through enquiries I finally elicited that this beach was now classed as a "Family Beach". No unaccompanied men would be permitted onto it. At this stage I am deeply indebted to Susan Stroud who kindly accompanied me on two fishing trips. I am sure she had more important things to do than sitting on a rather grubby beach watching her husband and I catching tiddlers in the streams running out of the oasis.

After the fish had settled down to aquarium life, Peter Stroud kindly photographed them. Some of the slides were sent to Mr. James Chambers at the British

Male *Aphanius dispar*

Male *Aphanius dispar* with flukes

Female *Aphanius dispar* with flukes

Museum (Natural History). The following is an extract from his reply.

"I would say that these black spots are the metacercaria larvae of a trematode fluke. The adult worm is parasitic in aquatic birds and sheds eggs which reach the water in the birds' droppings. Subsequent larvae enter snails and then yet others bore into the skin of a fish and encyst. The whole ingenious business is completed when a bird eats the fish."

I greatly appreciate the help I received from Mr. Chambers in ascribing the specks to a fluke and not to a genetic factor in these fish. Instead of having, as I thought, a sub family of Aphanius I have *Aphanius dispar* plus a fluke. Black spot as opposed to white spot. Although the fish are carrying a fluke they are not unwell, the fluke is encysted therefore dormant. I find they thrive well in captivity breed easily and produce normal healthy babies.

THE GARDEN POND

Useful Water Plants

by Arthur Boarder

In My previous article on ponds I described the methods of construction. The addition of water plants will be the next consideration. I do not think that any pond would be complete without at least a few water plants. Before obtaining the plants, the method of planting must be considered. It used to be thought necessary to have some soil, sand or gravel in the bottom in which to set the plants, but this idea is now out of date. For the average garden pond no soil etc., is needed. It is much better to set all water plants in separate containers. This enables one to remove them quite easily when cleaning out the pond.

There are three main types of water plants. The underwater oxygenating ones, the floating ones and those which grow in the water but have their leaves on or above the water surface. The underwater kinds serve more than one purpose. Most important is their capability of giving off oxygen during the hours of sunlight. They are also very useful as their roots feed on the detritus or the waste matter from the fishes. To a certain extent they also prove very useful in keeping down the green Algae which would green up the water without them. They will also provide anchorage for fishes' eggs and shelter for fry. The floating plants will shade out much of the sunlight and check the growth of green Algae. I do not think that these are necessary and need only be added if the water has become very green.

N. gladstoniana

The other type of plant includes the water lily, and the decorative water plants which grow their stems and leaves above the water level. Not only do these plants give an added attraction to the pond but their roots can use up much of the waste matter in the pond. The water lilies not only use up waste matter but their leaves shade out much of the light and so tend to prevent the formation of green Algae. The containers for these plants should be of the open-work type so that their roots can spread out over the base of the pond and use up waste matter as nourishment. However, when planting water lilies in such containers it is necessary to include something heavy to act as anchorage or else when the lily leaves have grown well and spread out over much of the surface, the whole plant can be drawn up from the bottom and look unsightly. A large stone or piece of concrete can be put in the container but with a large container, as for a lily, I find that it is better to provide something heavier. I have used the following method with success. Place a few sheets of paper on a firm surface and then a large blob of freshly mixed concrete. Then press the base of the container into it and leave to set. This will make a very firm base which will prevent the whole plant and pot from rising to the surface, neither will it tip over. The container with base can be slid out when necessary for cleaning out the pond.

There are plenty of underwater plants from which to choose but one should not be tempted to plant too many species as most water plants grow very quickly and the pond should not be overstocked with plants. It will also be found that some types are more vigorous growers than others and these could choke out those weaker ones. Two kinds of oxygenators will usually be sufficient for the garden pond. The old favourites are the *Elodeas* which always seem to do well in most ponds. There are three old favourites but two of them have been re-named and so may be found under their new names. The most common one is *Elodea canadensis*

Lemna minor

and it is a very rampant grower with many fine stems and masses of very small leaves. This plant is a very good oxygenator but it is inclined to make rather dense masses which could entangle a small fish like a fantail with the double tail. Another good plant is *Elodea densa* known as *Egeria densa*. This plant has much larger leaves than the first named and is less likely to become tangled up. The third one is the best of them as it is a very strong grower with recurved leaves which give the stems an appearance of a long cone. It may be necessary to prune this plant occasionally as it is not a very good one for sending out offshoots. The stems may run for a few feet before any side shoots are made. However, if the stems are shortened, several branches will be made.

An excellent plant for the fish breeder is Hornwort, *Ceratophyllum demersum*. The closely leaved stems are very good for the reception of fish eggs. Also, as this plant never makes any roots, it can be removed from the pond with eggs for hatching in a separate container which need have no sand in it. This means that the plant will keep alive whilst the fry are developing and not die as would most other water plants. There are several other oxygenating plants which, although very useful in a tank, are not of great value in the garden pond. There is no need to try to grow too many water plants as those mentioned will prove adequate. However, there is a plant which will be of value in a small shallow pool. This is the Water Crowfoot, *Ranunculus aquatilis*. This plant has two types of foliage, an underwater fine-leaved type and another which floats on the surface and is an attractive shiny dark green. A further advantage of this plant is that it produces masses of small white flowers just above the surface. These are the shape of a small buttercup. As this plant will thrive in quite shallow water it can be used as a substitute for a water lily for the very small pool.

When planting the oxygenating plants there is no need to use pots or other firm containers. Use a plastic net bag with no soil but a stone to keep the whole on the bottom. A few shoots of the water plant can be added and if thrown into the pond this will be all that is necessary as regards planting. Roots will be sent out through the netting and mulm etc., will be attracted to them. It is surprising how much matter will be drawn to these roots, much through the movements of the fishes. Even the Hornwort, which makes no roots, is able to attract nourishment which is taken in by the stems and leaves.

I do not intend to take up space by naming many floating plants, as I do not think that they serve a very useful purpose in the garden pond. Usually one can get all the cover necessary from water lily leaves. One plant which can be rather attractive when it flowers is the Water Soldier, *Stratiotes aloides*. This plant has deeply serrated leaves in the form of a rosette which roots on the base of the pond but rises to the surface to flower and then sinks to the bottom again afterwards. One floating plant which has a specific purpose is Duckweed. *Lemna minor* is a common one which can increase at an alarming rate if left undisturbed. The tiny bright green leaves float on the surface with tiny roots below. Many fishes eat this plant and so it is useful in that way, but its chief advantage is that if a pond contains very green water, a good coating of Duckweed will soon clear the water by depriving the Algae of light. The trouble can occur when one would like to get rid of it. If only a little is left in the pond it will soon spread again. I have found that once the Duckweed has cleared the pond of Algae, it can be removed by flushing it across the pond with a hose. It will then roll up and can be removed easily with a rake.

Ornamental plants are most necessary even in the smallest pond and there are many from which to choose. However, as with underwater plants, these should not be introduced into a pond in large quantities or they

Water Crowfoot

can take over and constrict the swimming space for fishes and spoil the general appearance of the pond. I am sure that most pondkeepers will agree with me that the water lily is the finest water plant available and no pond of a decent size would be complete without one. Although water lilies cannot be classed as oxygenators, they have other uses in the pond. When in flower they can give that added attraction which raises them above any other water plant I know. Few ponds are unsuitable for at least one lily as they may be obtained for large ponds and very small ones. The best time of the year for planting lilies is in the spring when active growth is being made, but they can be planted at any time during the spring and summer as long as they are not allowed to dry out before being set.

To be successful at growing water lilies it is well to treat them to a little more attention than is given to underwater plants. A certain amount of soil or compost is necessary to give the plant a good start. Some people recommend adding cow manure to the compost, but I do not think that this is necessary. All that is needed is to line the container, which should have holes in the side, with some old turf. This is likely to remain in the container for some time, whereas soil could soon seep out into the water. Why I do not recommend using too strong a fertiliser is that one of the main functions of the lily is to use up much of the waste matter from the fishes. If too much nourishment is provided the plant will not have to search for food by sending out roots outside the container.

There are three main types of water lily. Those suitable for shallow ponds, those for medium depth ponds and the others for deeper water. There are many species available and so I shall only mention a few. Catalogues may be obtained from dealers and when ordering it is well to state the depth and size of the pond together with the colour of flower required. The dealer will know which species to send. Do not try to grow too many lilies in the pond. It is surprising how much growth can be made in the summer months and so one should always see that there is plenty of surface space for the leaves as they grow. If a pond is stocked too heavily or too large a type is used, it is probable that in a short space of time, the whole of the surface will be covered and the fishes will not be seen. I think that if about a half of the surface is covered with lily leaves, this is quite sufficient. When the leaves become too thick some will grow up into the air and look unsightly.

Do not allow the lily root stock to become dry before it is planted. When in the container see that it is secured firmly with plastic string. This is to prevent the whole plant from floating to the surface when many leaves are on the top of the water. If the pond is fairly deep it is as well to support the container on a few bricks so that the head of the root stock is not too low in the water. As the plant grows the bricks can be removed. I do not think that any pond will function well unless it is at least twelve inches deep, and this only if a heater can be used during severe weather. For the shallow pond I suggest the two following species:- *Nymphaea pygmaea alba*, white, and *N. pygmaea helvola*, yellow. For the deeper pond choose from:- *N. laydeckeri purpurata*, with flowers a rather deep rose-crimson; *N. odorata alba*, a scented white and *N. rose nymphe*, a fine pink species.

For the deep pond one may use:- *N. escarboucel* one of the best dark reds and *N. "Sunrise"*, a very good scented yellow. A good strong growing type is *N. gladstoniana*. Unless the pond is a very large one I do not think that more than one of the larger types should be used. The above plants are just a suggestion as there are many more species available.

To add to the attraction of the pond there are some very good plants which grow in the water but have their leaves held well above. Besides their attraction they also help to keep the water pure by using up much of the waste matter in the pond. Again there are plenty of species from which to choose but I will only quote a few which I have found to be very useful. The Pickeral weed, *Pontederia cordata* is an excellent one which sends up large stems with elongated heart-shaped leaves and it has blue flowers on spikes. Another good one is *Sagittaria japonica alba flora pleno*, which has arrow-shaped leaves with fine white flowers on long stems. There are several types of rush and a good one is *Butomus umbellatus* which produces a fine umbel of pink flowers. There are several quite attractive water flags and one of the best is *Acorus calamus var. variegata*. All of these plants should be set in containers with a little turf, but they must be kept in strict check as they can grow rampantly.

In the next article of this series I shall deal with stocking the pond with fishes.

Biorell Painting Competition

The recent painting competition organized by the makers of Biorell Fish Foods and other aquatic products proved extremely successful.

From the exceptionally high standard of all the entries received it seems that a good many keen aquarists are in fact AQU*ARTISTS*!

The talent displayed in all age groups gave the judges a hard task in selecting an outright winner in each age category. However, after much deliberation the prizes were awarded as follows:—

Group One—up to 12 years

First Prize

Andrew Davies (age 8) 9, Ashby Close, Westborough Way, Hull.

Second Prize

Miss M. Taylor (age 10) 58, Bursledon Road, Bitterne, Southampton, Hants.

Third Prize

Miss Allison Grove, (age 12) 39, Tennyson Drive, Glasgow G31, Scotland.

Consolation Prizes

Elizabeth Jowett (age 7); Sarah Anne Bridgman (age 6); Richard Robinson (age 8); Margaret Horribing (age 12); Emma Bridgman (age 11); Kim Edelston (age 11); Susan Jac'kson (age 12); Bernadine Widdecombe (age 10); Darren Biddulph (age 9); Nicholas Vyse (age 8); Richard McIntosh (age 9); Jason Brase (age 9); Stephen Jackson (age 10); Sandra D. Jeanne; Victoria Taylor (age 10); Deborah Troughear (age 11).

Group Two—13-17 years

First Prize

Simon Whittaker (age 14) 103, High Street Wootton Bassett, Swindon, Wilts.

Second Prize

Kenneth Totten (age 15) 90, Sedgebank, Ladywell, Livingston, W. Lothian.

Third Prize

Trevor Bradley (age 13) 21, Stowe View, Tingewick Bucks MK18 4NY.

Consolation Prizes

Joanne Vyse (age 13); Joseph Soleiman (age 14); Lynne Hopkinson (age 14); Stephen Edelston (age 14); Adrian Round (age 14).

Group Three—Over 18 years

First Prize

Mrs. Pam Taylor 25, Agate Road, Clacton on Sea Essex.

Second Prize

E. Jackson 49, Redland Drive, Chilwell, Beeston Notts.

Third Prize

J. R. Woodvine Flat 1, 'Penniston Ridge' St. Leonards Road, Malinslee, Telford, Salop.

Top—1st prize Group 1. Centre—1st prize Group 2. Bottom—1st prize Group 3.

WHAT IS YOUR OPINION?

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

Photographs by the Author

THE FIRST of this month's letters was written by Mr. Martyn J. Gill, of 4 Fitzgilbert Road, Colchester, Essex CO2 7XB. He writes: "Since writing to you on 6th July, and the publication of my letter in the October, 1978 issue of *The Aquarist & Pondkeeper*, I have received numerous letters asking for copies of *The Aquarist & Pondkeeper* index I produced for 1977. I have now produced indexes for the years 1976 and 1978, a complementary copy of each of which I enclose, and I am at present working on an index for 1975.

"As the 1977 index was so popular I am again prepared to make copies of these indexes available to my fellow aquarists on receipt of 25 pence for each copy to cover my costs of copying and postage. For those aquarists who did not see my previous offer I am still able to provide indexes for 1977 at 25 pence each. May I take this opportunity to wish you a Happy New Year and every success in all your fishkeeping activities during the forthcoming year."

Thank you for your kind wishes, Mr. Gill. Snow and strikes have managed to keep my attention fairly firmly concentrated on personal survival and have left little time for me to admire my fish tanks. Early in the month of January I visited a Belfast aquarium shop and purchased a pair of *Corydoras* and four, young cardinal tetras. The cardinals cost me 70p each and both they and the catfish are thriving in their respective tanks. Fortunately neither electricity nor water supplies have been affected in my area, to date (late January), so my fishes have remained unaffected by the striking effects that have struck most of us in the U.K.

Incidentally, Mr. Gill's latest indexes are up to the high standard of his previous one and I can thoroughly recommend them to readers. 25 pence per copy is little to pay when one considers the amount of work that must have gone into the preparation and printing of each index. The indexes are printed on A4 paper and enable one quickly to find references to specific animals and plants in a particular year's issues of *The Aquarist*. Those who, as I do, bind their copies in official binders should find it very useful to insert the appropriate index in each binder.

Mr. K. J. Newman's home is at 6 Manor Road, Witham, Essex CM8 2NH, and he has the following for sale/exchange items: three 1½ in. zebra danios at 25p each; one *G. aymonieri* sucking loach, 2 in., at 20p; and one 2½ in. red-finned shark at 80p; or he'd swop all five for four black phantom tetras—*M. megalopterus*. He also has more than 200 goldfish fry of various ages; they have not yet changed colour (in January). Mr. Newman would be willing to exchange them for one 4-5 ft. fish tank; however, the exchanger would have to be willing to take a risk that not all the fry are very large and, hence, some might not reach maturity. If no exchanger is found the goldfish will be sold, at a later date, at 20p each. Anyone interested should write directly to Mr. Newman.

No. 9 South Street, Hebburn, Tyne-Wear, heads the letter sent to me by Mr. T. Corr, who writes: "Concerning aquatic plants: ordinary garden plants need good fertilizer to make them grow; but aquarium plants rely on fish droppings for their nourishment; so perhaps the type of food eaten by the fish affects the growth of plants. I wonder if any readers have noticed better plant growth when they have fed their fish on a good protein diet, e.g. bloodworms or *Daphnia*. I should be grateful if any of your readers—particularly local people—could help me obtain some good, Bristol shubunkins and some blue limias or other unusual, peaceful livebearers."

"Having been an aquarist for one year I consider myself a novice, to say the least," writes Mr. R. Moyes, from 40 Barra Crescent, Fraserburgh, Aberdeenshire. He continues: "I regard regular water changes as very necessary. After three set-ups of my 2 ft. tank I finally mastered the art of proper feeding. From then on I have been changing one third of the water monthly and replacing it with mature rain water. As an experiment I left the water for two months without any visible deterioration. It wasn't until I had changed half the amount that I witnessed a dramatic transformation. The tank seemed to come to life: it was as clear as crystal; the fish seemed to perk up; and my shoal of glowlights commenced to spawn—which I don't think was a coincidence. So, in my opinion water changing is necessary and beneficial both to fish and plants—not to mention the part it plays in successful breeding. As a new subscriber to *The Aquarist* I consider it a very interesting and helpful publication. I only wish it were weekly!"

Photograph 1 shows a candy-striped wrasse; and photograph 2 a sailfin tang/zebra-striped tang. Both of these beautiful marines belong to my friend Bob Crossan. Please send me a few lines if you have successfully kept any kind of coldwater or tropical marine fishes or invertebrates. Incidentally, could you tell me the correct name of the fish shown in the third photograph, please? It appears to have two names. As readers know, I am totally ignorant about marine fishes because I have never attempted to keep tropical marines.

The next letter was written by Mr. C. B. Davidson, of "Cicero", Queens Road, Turriff, Aberdeenshire. "I thought I would drop you a note as one of the last things in 1978 to congratulate you on a very well-edited feature in *W.Y.O.* The pages always contain a wide variety of topics which I am sure find a vast audience each month.

"I should also like to raise a problem I have just recently come across. In an effort to further promote plant growth in my 53 in. × 12 in. × 15 in. Gem tank I

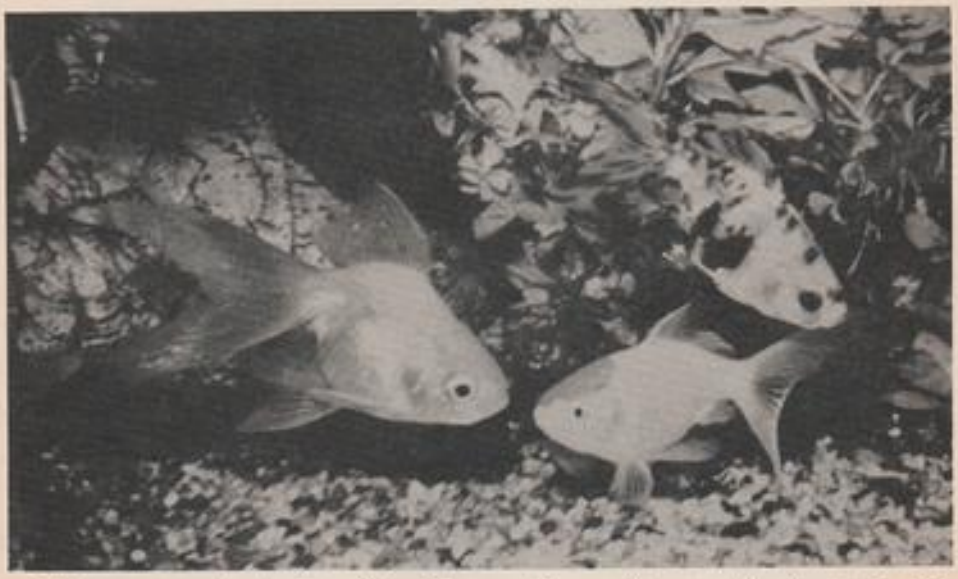
have been using (a named) plant hormone food following the instructions to the letter. However, I now find the pH in the tank drastically reduced to 6·0 or, in one case, even lower. Fortunately I have not lost any fish as a result but were it not for my routine tank duties I doubt if I would have known. Would the pH have continued to drop? As I have not had any previous troubles with the water in my area I must assume it should be attributed to this plant food. However, I should be very interested in any comments either you or any of your readers may wish to make. May the ink continue to flow for you in 1979." (I have not used the plant hormone food in question and, hence, am unable to comment. B.W.)

Sadly I have to curtail this month's feature owing to my having to travel almost one hundred miles daily to get to and from work and visit a close relative who underwent a fairly severe operation in a far-off hospital. I trust readers will accept my apologies and appreciate the stresses I have been undergoing while driving such long distances on ice and snow-laden roads.

I'll conclude with Photograph 3—which I hope will prompt some of you to write to tell me about your coldwater fishes and, in particular, the problems presented by outdoor ponds and fishes in such weather—and a letter from Mr. A. J. Hewitt, who resides at 174 Salisbury Road, Liverpool. Mr. Hewitt writes: "Since I last wrote to you I have once again become the owner of a comparative rarity in my area—four *Haplosternum littorale*. I have never before seen these fishes for sale in Liverpool as they are not particularly attractive, having armour plates like all the *Callichthydae*. Body colour is a dark brown to brass green when in good condition. They are easily fed on all available live foods, going into a literal frenzy over a chopped earthworm. They even take flake food straight from my fingers. They appear to be two males and two females, identified by the method given in an article in your magazine in February 1977.

"These fish are housed in the same tank as my discus and other south American cichlids and catfish. They are excellent scavengers and the muck they rake up is usually attacked by the other fishes in search of food; and any left is quickly siphoned off by me. Not that the fishes can dig all that far as the tank is densely planted with rapidly-growing *Vallisneria*, *Bacopa*, *Ambulia* and *Cryptocoryne* which combine to bond the gravel together as they send out shoots and new roots.

"As far as size is concerned, these fish vary from 4½ in. to just under 3 in.—which makes them the largest variety of catfish I've ever kept. They are well worth a try—if you can get them.



"I am still amazed by the obvious lack of south American cichlids on sale in my area—in particular members of the *Aquidens* family which I would like. If there are any members of the British Cichlid Association or other generous aquarists in the Liverpool area who could provide me with these fishes I would be willing to pay a fair price for them—especially for *A. portalegrensis*, *curviceps* and *pulcher*. I wish you, your magazine and your article a long life and continued success."

For a future feature please send me your opinions on any of the following: (a) unusual tetras; (b) unusual livebearers; (c) species of *Cryptocoryne* and their cultivation; (d) cultivating live foods; (e) noises made by fishes; (f) the best lighting to encourage plant growth; and (g) suitable programmes for fish club meetings: who and what entertains *you*? I look forward to hearing from you!

ANTICIPATING ALEXANDRA PALACE

The Federation of British Aquatic Societies is pleased to announce that London will not be without a major aquatic Show in 1979.

As a result of plans and meetings between interested parties over the past few months, plus the encouragment from the hobbyists, the Federation together with *The Aquarist & Pondkeeper* magazine, will be organising **THE AQUARIST FISHKEEPING EXHIBITION,** at **Alexandra Palace, London N.22 on the 13th-15th July inclusive.**

Previous supporters and visitors to Shows at 'Ally Pally' will know why it is considered an ideal venue for an aquatic Show: plenty of parking (FREE!) so that exhibitors can unload their entries right on the doorstep; plenty of open space in the parkland where families can picnic, or where those who are not totally fish-dedicated can spend the day; easy access from the nearby North Circular Road with its connections to the M1 motorway. Now that you know how easy it will be to get to the Show, what will await you there?-

We think we've included something for everyone in the aquatic hobby, combining years of experience in organising such Shows and yet paying attention to the needs (and wishes) of exhibitors and visitors alike.

There will be **FISHES**—singly, in pair and in Breeders' Teams—from tropical and coldwater worlds. Within these classes there will be some extra emphasised sections; as the Show will be held in what we hope will be summer temperatures, the Coldwater Classes will be especially enlarged to cater for all types of Fancy Goldfishes, Koi and native species.

With the changeover from an autumnal Show, it is regretted that there will not be the final stage of the FBAS SUPREME CHAMPIONSHIP to look forward to, as there will not be enough qualifiers by July. However, in its place there will be a special Display Class for Angelfish, **'The Angel of Angels',** a favourite fish, even with non-fishkeepers.

The recent upsurge of interest in the more uncommon species of tropical livebearing fishes will be reflected in a separate section for these fishes—so if you want to broaden your knowledge of these species, make your way to Class T, there'll be many more different livebearers there than you expect!

A feature at the Show will be a stronger emphasis on information about the exhibits. There seems little point in putting on a Show only for fishkeepers. After all, the hobby needs a constant supply of newcomers and no potential new fishkeeper should leave the Show without learning as much as possible about his intended new hobby. It is intended to have printed informative notes on display at the beginning of each Class outlining the types of fishes on display together with their aquarium care.

To complete the 'animal' classes, a **Reptile and Amphibian** section will be included.

Furnished Aquaria and Aquascapes naturally bridge the gap between the **Fish** and **Plant** Classes, while on the social side the member Societies of the FBAS will be exhibiting competitive **Tableaux.** In addition to the Trophy for the Best Tableau overall, there will be awards for Best Aquatic Content, Best Model, Most Informative and Most Entertaining categories; plenty of scope for everyone within those limits. A floor space of 8 ft. × 6 ft. will be available for each Society entry and a height limit of 8 ft. will be set. The rest is up to your Society's imagination and ingenuity—the top prize of £50 is worth aiming at too!

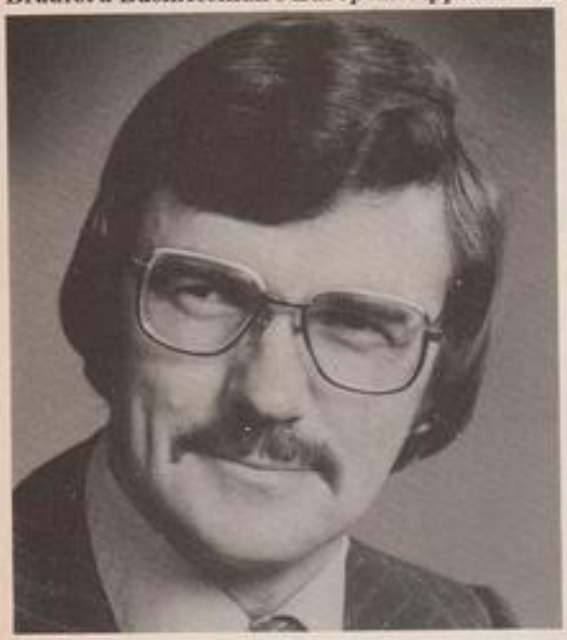
Specialist Societies will also be in evidence, bringing their own expertise and knowledge to the Show for the benefit of visitors.

A major aquatic Show is a traditional meeting place where old friendships are renewed and fresh contacts made; it's also a shop window for **Traders** offering the hobbyist a chance to 'get up to date' on all the new products, in addition to chatting to manufacturers about their aquatic problems. The hobby as a whole is the beneficiary from such two-way communication.

Above all, come and enjoy yourselves, drop in at **'The Aquarist'** stand and meet your favourite authors; the **FBAS** Stand will also be the social 'crossroads' of the Show—anything from lost children to a jolly good chinwag will be found there. More Show news next month, so remember to keep the 13th-15th July dates free in your aquatic events diary!

PRESS RELEASE

Bradford Businessman's European Appointment



Keith Barraclough, Managing Director of Keith Barraclough (Aquarist) Ltd., and King British Aquarium Accessories Co. Ltd. of Bradford, has recently been elected by the Pet Fish Distributors Association as one of two British representatives to the European Tropical Fish Importers Group.

The Group, made up of representatives from nine countries, was formed in May, 1978 to establish required standards for aquarium fish import stations throughout Europe.

"After being flown thousands of miles from their natural habitat, tropical fish often arrive in Europe in a rather jaded condition", says Mr. Barraclough. "Import Stations should have the means and knowledge quickly to restore the fish to sparkling health. To do this means that suffering is avoided and the buying public gets fish in tip-top condition."

Aquatic Company re-organises management

Rapidly increasing trade, especially in the export market, and future expansion plans have made necessary a major management reorganisation in the Bradford companies of Keith Barraclough (Aquarist) Ltd. and King British Aquarium Accessories Co. Ltd.

A recent addition to the management staff is David Shaw who, with 15 years experience in the pet industry, takes over responsibility for the general sales of Keith Barraclough (Aquarist) Ltd. and for the large Cash and Carry Warehouse.

Brian Simpson, formerly in charge of the Warehouse, has moved to the Production Unit of King British Aquarium Accessories Co. Ltd. The Company, which is at present being re-equipped with new machinery, is making remarkable progress in the export field, where its high quality fish food products are in increasing demand.

Newly-appointed as Administrator and Personal Assistant to the Managing Director, Janet Graves becomes responsible for general office efficiency and for the new computer system which is currently being installed to give greater flexibility and speed to the invoicing and accounting section of the two Companies.

Paul Barraclough becomes Company Secretary following the recent resignation of Pamela Essex.

The two companies' dramatic progress began with the move, six years ago, to very much larger premises at Hayfield Mills, Bradford. Concurrently, the King British company began its export drive and was very successful in Holland and Australia.

Says Managing Director, Keith Barraclough, "Exports now represent some 50% of the King British sales and, over the last two years, exports to Europe have increased significantly. To back up our vigorous sales policy, we have recently produced a multi-lingual full colour brochure of all King British products and the resulting sales have been most rewarding."

An entirely new range of King British Aquarium foods will be launched in May at the British Pet Industries Fair and at the Paris "Prodaf" Fair.

Enlarged fish house

The already extensive wholesale tropical fish house, managed by Michael Cole, is in course of being doubled in size. This, says Mr. Barraclough, will vastly improve the standard of service, offer to customers a much greater choice of fish and comply fully with the anticipated tightening up of regulations covering the import of live tropical fith.

David Shaw

News from AQUARISTS' SOCIETIES

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

Medway A.S. now meet on every 2nd and 4th Wednesday in each month at the Black Lion public house, Mill Road, Gillingham, Kent, at 8 pm. At their recent annual general meeting the following officers were elected: chairman, G. Carpenter; secretary, K. Grubb; treasurer, P. Brown; publicity, J. Gay; show secretary, K. Grubb, 66 Norman Close, Gillingham, Kent.

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AT the recent annual general meeting of the **Midlands Aquatic Study Group** the following officers were elected: chairman, I. Fuller; treasurer, Mrs C. Darbey; minutes secretary, A. Ford; magazine editor, P. Allen; general secretary, R. White, 21 Johnson Close, Rugeley, Staffs, WS15 2PR.

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THE January meeting of **Evesham Fishkeepers' Society** provided an opportunity for members to gain valuable information on showing fish, when Norman Binding, chairman of Cheltenham Tropical Fish Club, gave a very interesting talk, supplemented with slides, on "Judging Problems concerning Mollies and Swordtails".

Mr. Binding kindly judged the Miniature Aquarium competition, also the Table Show which featured Danios and Minnows, with results as follows: Miniature Aquarium: 1 and Shield Winner, B. R. Goll; 2, D. R. Goll; 3, Mrs I. Hessel; 4, Mrs E. Thornton. Danios and Minnows: 1, Mrs E. Thornton; 2, 3 & 4, S. Biddle.

The Society meets on the first Wednesday of every month at 8.00 pm. at Hampton Scout Hut, Pershore Road, Evesham, Worcs. Visitors and new members welcomed. Club Secretary Mr. M. Pattison, 22 Dudley Road, Honeybourne, Evesham, Worcs. (Tel: Evesham 83415).

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New Forest A.S. recently held their January meeting at the "Community Centre", Lymington, Hants. The main item was a colour slide lecture entitled A Fistfull of Showtanks, being one of those exchanged to British aquarist clubs by their counterparts in the United States of America. It explained how to set up furnished showtanks to enter in the open shows over there! It showed how best to use plants, gravel, rocks etc. to the greatest advantage, and what best fish species to put together in a showtank. In general the Americans seem to use much more bog-wood than we do, in place of rockwork, and it seemed to be very effective. At the end of the lecture all members agreed they had learned many new ideas that one day, they could possibly use in their own home aquariums.

The table show was judged by Mr. G. Edwards, a qualified judge of the F.B.A.S. Results—Labyrinths: 1 & 2, Mr. T. Kirby; 3, Mr. R. Travers. Tropical Catfish: 1, Mr. R. Travers. Show Secretary, Mr. P. Wheeler, said the Labyrinths shown were of good quality. But the Tropical Catfish, though of good shape etc. was rather small! The New Forest Aquarists meet on the third Monday of every month at Lymington, and the Secretary would be pleased to welcome new members at meetings.

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THE following is the new committee elected by the **Taunton and District A.S.**: president, D. Fleetwood; secretary, E. J. Stanton; chairman, D. Fox-Spencer; Vice-chairman, A. Cavill; treasurer, R. Baily; Social sec., R. Garland; Show judge & manager, M. Bray; trophy sec., J. Sommerhayse; editor, D. Davis; P.R.O., E. J. Stanton; committee member, T. Gorman; show assistants, Mark Paul, Steve Trot.

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THE following officers were elected at the a.g.m. of the **Sheaf Valley A.S.** on January 12th: chairman, Mr. L. Hattersley; vice-chairman, Mr. J. Stevenson; treasurer, Mr. H. Darley; show secretary, Mr. D. Golland; social secretary, Mr. F. Toyne; hon. secretary, Mrs M. Kemp, 167 Buchanan Road, Pseson Cross, Sheffield S5 8AS (Tel: 619562); other committee members, Mr. L. Hattersley, Senior, Mr. M. Kemp & Mr. J. Barlow.

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THE meeting of the **Mid-Sussex A.S.** held at the Fox and Hounds, Haywards Heath, on 11th January, was opened by the chairman, Mr. N. Short, with a discussion on various club functions to be held this year. The first point was on the topic of how to defeat Mid-Sussex's old enemy, Brighton and Southern A.S. in the Interclub meeting at Brighton on 19th March and the Over the Downs tournament on 12th April. Another venture planned on the Fish Show side which was discussed was a proposed Open Fish Show to be held later this year. This raised some interesting comments, and it was pointed out quite strongly that such an event would have to be a club effort and not left to a few members. The members present reacted favourably.

The major event of the club year, the annual presentation dinner dance, to the Country and Western Group "Cornerman" will be held at Clair Hall, Haywards Heath on 17th February, at 8 pm. Tickets are available from the Secretary at £2.50.

The monthly table show was judged by Mr. D. Soper who awarded the cards as follows:—Class O, Male Guppies: 1, P. Levine; 2, J. Birch; 3, A. MacKenzie. Class P, Female Guppies: 1, J. Birch; 2, E. & T. Tester; 3, G. Yule. Class No-p, Guppies Pairs: 1, E. & T. Tester; 2, B. Sayers; 3, P. Levine.

The next meeting will be the annual general meeting to be held at the Fox and Hounds, Haywards Heath, on 8th February, at 8 pm. Further details may be obtained from the Secretary, Mr. B. Slade (Tel: H. Heath 53747).

St. Helens A.S. changes to the committee: chairman, M. Lawson, 21 Penrith Road, Grange Park, St. Helens. (Tel: St. Hel. 51159); secretary R. Jones, 47 Gray Avenue, Haydock, St. Helens. (Tel: St. Hel. 56330); show secretary, T. L. Penny, 19 Hawkshead Road, Burtonwood, Nr. Warrington. (Tel: Newton-le-Willows 22447).

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AT the A.G.M. of **North Wilts A.S.** the retiring chairman, Mr. I. McGinley, became their first present. Committee: chairman, Mr. B. Kirk, vice-chairman, Mr. D. Payne, secretary, Mr. P. Taylor; treasurer, Mr. A. Daniels; committee members, Mrs M. McGinley, Mr. T. Monk, Mr. G. Reynolds, Mr. M. Brown, Mrs P. Brown, Mr. T. Middleton. New members are welcomed—more information from club secretary, Mr P. Taylor, 7 Ridgeway Road, Stratton, Swindon, Wilts. (Tel: 0793 82-4114).

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THE **Bradford and District A.S.** had a very successful year in 1978 with a variety of events taking place, including a trip to Chester Zoo; a stand at the Yorkshire Aquarists' Festival at Doncaster, and an excellent Christmas Dinner.

At the a.g.m. in January 1979 the winners of the annual society trophies were as follows:—Thornley Memorial Trophy: 1, Mr D. Sugden; 2, Miss L. Mottershead; 3, Mr. L. Gatenby. Open Show Shield: 1, Mr. L. Gatenby; 2, Mr. D. Sugden; 3, Mr. R. Gatenby. AOV Trophy: 1, Miss L. Mottershead; 2, Mrs R. Mottershead and Mr. B. Greenaway. Junior Trophy: 1, Miss L. Mottershead; 2, Mr. S. Stansfield.

The new committee is as follows: president, Mr. K. Avison; vice-president, Mr. D. Sugden; secretary, Mr. A. D. Fisher; 2 Sherborne Rd, Idle, Bradford; treasurer, Mr. A. Daughtery; show secretary, Mr R. Stansfield, Station House, Leeds Rd, Shipley; publicity officer, Mr. B. Greenaway; committee men, Mr. J. Barfoed, Mr. B. Isaacs, Mr. N. Keighley, Mr. E. Mottershead.

The society would like to thank anyone who helped to make 1978 a successful year for the Bradford fishkeepers and hopes for even more support from local fishkeepers in 1979. They meet at Textile Hall on the second and fourth Thursdays of each month at 7.45 pm. All are welcome.

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BRISTOL AQUARISTS SOCIETY GOLDEN JUBILEE

THE **Bristol Aquarists' Society** was founded on the 25th February, 1929, at 17 Bath Street, Bristol, when seven local aquarists met together and unanimously agreed "to form a Society entirely separate from the British Aquarists' Association and to call it The Bristol Aquarists' Society".

Thus was formed the Society, which has survived various set backs over the years and maintained a leading position among similar societies throughout the country, following the ideals of those founder members at the inaugural meeting.

After a slow start the membership quickly increased and meetings were held at various

Officers of the Bristol A.S. (left to right) Mr. S. Lloyd (president), Mr. V. Cole (secy), Mr. H. C. B. Thomas (vice-president).

sea rooms, restaurants and hotels in the City. The first Society outing was held in 1933 and the first open show of coldwater fish took place in 1931. Right from those early days a great interest was shown by the members in the shubunkin goldfish. The development of this fish, the adoption of the Bristol Shubunkin Standard in 1934 and the continued improvement of the Bristol Shubunkins which have been exhibited at the Bristol Open Shows, has probably been the most important achievement of the Society to date.

Whilst tropical fishkeeping has featured amongst the members' interests, with a large tropical open show being staged annually at one time, the main concern of the Society during it's 50 years span has been in coldwater fish, specialising in those of the goldfish family. In addition to the widely acknowledged Bristol Shubunkin, there have been excellent strains of other goldfish varieties kept and bred by the members from time to time.

During recent years the Bristol Aquarists' Society has liaised with other specialist goldfish societies and exchanged opinions upon goldfish standards. Using the information thus gained, the Society has produced its own book of standards intended for use as a guide to the breeders, exhibitors and judges who support the Bristol shows.

To all those who have supported the society over the past fifty years, members recollect with gratitude the aid that they have given to the Bristol A.S. and hope that in future they will continue to deserve and receive such tokens of esteem.

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AT the recent annual general meeting of the **Leicester A.S.**, held in January, the following were elected to the committee: chairman, Mrs. M. Williams; chairman elect, R. Weston; president, C. Cartwright; treasurer, B. Peel; general secretary, S. Poynton; show secretary, N. Boot. Committee members: J. Williams, J. Frearson, J. Evans, D. Sewell, and A. Hurst.

Meetings are held on the 1st Thursday of each month at the St. Matthews Community Centre, Malabar Road, Leicester. Enquiries to the honorary secretary, S. Poynton, 35 Briar Road, off Scraptoft Lane, Leicester.

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THE London Section of the **British Koi-Keepers' Society** meets regularly at Conway Hall, Red Lion Square, London, W.C.1 throughout the year, meetings usually starting at 2 p.m. sharp unless otherwise stated.

Many other outings and shows are planned throughout the year but the meetings held at Conway Hall usually include an illustrated lecture on some aspect of Koi-keeping and a slide or film show which would be of interest to most coldwater fish enthusiasts.

On Sunday, 14th January, Section Secretary Tony Bullock gave the first of this year's lectures on Carp Erythrodermatitis (Hole Disease) with Wendy Mintram giving a practical demonstration of how to anaesthetize a carp with MS222, inject with chloeampbenicol and cauterising the wound with a veterinary spray. Subsequent meetings at Conway Hall will be on the following dates: 1st April, 20th May, 23rd September, 2nd December.

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AT the January meeting of the **Northern Goldfish and Pondkeepers Society,** Pauline Hodgkinson gave a talk on how she spawned and reared her Lionhead goldfish in 1978. The speaker gave a step by step account of the proceedings of two spawnings and several important factors noted by her during the rearing of her fish. All questions were answered. Then Mr. Bill Ramsden explained the best way to hatch brine shrimp that will give best results. On display were two tanks of young Lionheads retained from Mrs. Hodgkinson's spawnings, all of which were fully coloured and three of which had earlier been in a winning team of fish in 1978.

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ON 15th January, **Brighton and Southern A.S.**, held its annual general meeting. The committee elected were as follows: chairman, B. Rice; secretary, T. Ramshaw; treasurer, T. Martin; chief steward, J. Smith; trophy secretary, B. Sayers; F.B.A.S. delegate, F. Hine; equipment officer, M. Smith; public relations officer, C. Raggio.

Meetings are held at the K & T Social Club, Franklin Road, Portslade at 8.00 p.m. on the first and third Monday of each month. New members are always welcome.

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THE **Association of Midland Goldfish Keepers,** which is the only society devoted soley to the interests of goldfish enthusiasts in the Midlands, elected their 1979 committee as follows: present, Frank W. Orme; vice-president Tony E. Roberts; chairman, Norman R. Giles; vice-chairman, Dave Denny; secretary, Janet A. Amos; treasurer, John Moore; show secretary, Geoff. Howe; lay member, James R. Amos.

During the meeting it was reported that there had been a substantial increase in membership and that the bank held a very healthy balance of society funds. In view of this it was decided there was no reason to consider any increase in subscriptions—these have now been held steady for three years—and should remain at £1.50 for individual membership and £1.75 for a married couple.

Meetings have proved interesting, and this has resulted in good membership attendance. The society is fortunate in having not only some of the country's best known goldfish breeders and exhibitors, but also some excellent photographers within its ranks. Fellow members have been able to enjoy some first rate slide shows, and gain valuable information as a result of their skills.

Meetings for 1979 will be held during January, March, May, July, September, and November, during a Sunday afternoon, at the Foleshill Community Centre, Coventry. Full details of the A.M.G.K., and its future meetings can be obtained from the secretary, Mrs. J. A. Amos, 31 Greenview Drive, Kingsley, Northampton, NN2 7LA. All visitors can be assured of a warm welcome, and the venue is only a short distance from the M.6 motorway, making it easily reached from most areas of the Midlands.

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THE **Wyre Forest A.S.**, which held there a.g.m. on 11th January, elected the following officers: chairman, Mrs A. Hodges; secretary, D. C. McDermid; show secretary, C. Baskerville treasurer, R. Bentley.

It was also decided to hold an open show in September if a suitable venue could be found. Any hobbyist wishing to attend the meetings should contact the secretary at Kidderminster 63188.

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AT the recent annual general meeting of the **Nuneaton Aquarium Society** officers and committee elected were: life president, K. Jones; chairman, M. Hall; vice-chairman, G. Cox; secretary, J. Lamb; treasurer, I. Cox; show secretary, J. Salisbury; Asst. show secretary, G. Hemmings; librarian, K. Griffiths; P.R.O., S. Hemmings; committee members, M. Short, T. Redfern.

The society meets at Clarksons Sports and Social Club, Anker St., Nuneaton, every third Tuesday of the month. New members always welcome. For further information contact: The secretary, Mr. John Lamb, 4 Belle Vue, Stockingford, Nuneaton, Warwickshire.

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AT the annual general meeting of the **Loughborough and District A.S.**, held on 11th January, the following officers were elected for the year: chairman, Mr. J. Booth; secretary, Mr. A. Onslow, 8 Garfield Rd., Hugglescote, Leics. LE6 2HU. (Coalville 31606.); treasurer, Mr. G. Howe; show sec., Mr. I. Purdy; show manager, Mr. G. Taylor; newsletter ed., A. Onslow; P.R.O., A. Onslow.

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AT the annual general meeting of the **Goole and District A.S.** the undermentioned Officers were elected for this year, 1979: chairman, Mr. J. Scarll; treasurer, Mr. P. Shipley; show secretary, Mr. P. Hutton, 9 Hood Grove, Goole; secretary, Mrs C. Collier; programme sec., Mr. P. Shipley; Catering sec., Mr M. Shipley.

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AT the annual general meeting of the **Norwich & District A.S.** the following officers were appointed: chairman, Mr. N. Keeler; secretary, Mrs B. Williamson; treasurer, Mr. A. Waring; show secretary, Mrs J. Waring; other committee members to be appointed later.

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THE annual general meeting of **Pisces A.S.** was held at 104 Ilford Lane, Bournemouth on Thursday 11th January. Gerry Edwards, who has been chairman for the past six years wished to stand down and the members elected Peter Willis as their new chairman. The present secretary, Michael Kerr, also wished to stand down and the present treasurer, Margaret Phipps was elected as joint secretary/treasurer for the coming year. Clive Phipps was re-elected as the Club's show secretary.

A table show was held at which 12 cups were won, the winner were as follows:— Home Aquaria, P. Willis; Home cichlid (over 6 in.), C. Phipps; Best fish of A.G.M., P. Willis; A.O.V. Egglayer, C. Phipps; Barbs, C. Phipps; Catfish, P. Willis; Labyrinths, C. Phipps; Loaches, M. Kerr; Rasboras, P. Willis; Benched cichlid (under 6 in.), C. Phipps; Swordtails, P. Willis; Characins, C. Phipps.

Pisces' Club meetings are held the second Thursday in every month at the above address and anyone interested should contact Margaret Phipps, 104 Ilford Lane, Bournemouth, Dorset.

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AT the annual general meeting of the **Midland Aquarist League** held on 29th January, two additional societies were welcomed into the League, namely: Wolverhampton A.S. and the Corby A.S. (Northants), bringing the total membership to eight.

The League this year has increased the number of show classes at each of their four shows, thus providing more competition and more interest to spectators. It is hoped that the open classes at each show will again attract exhibitors from various parts of the country. The League has agreed to engage extra judges and bring forward the benching time to allow more time for spectators to view the fish.

The first Competition of the year commences on 1st April, the hosts being the Loughborough & D.A.S. with the final show of the year on 21st October, the hosts being Rugby Fishkeepers.

Committee re-elected: chairman, T. Parry (Loughborough & D.A.S.); secretary, F. Underwood (unit 59), 10 Hyde Road, Kenilworth, Warwickshire CV8 2PD; treasurer, R. Tedds (hon. member, Coventry).

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AT the annual general meeting of the **Bristol A.S.** the following principal officers were elected: President, S. Lloyd; treasurer, Mrs. I. Day; secretary, V. Cole, 10 Hardwick Close, Bristol BS44 NL (0272-711286).

The Officers' reports showed that the Society had had a busy and successful year. During 1978 the membership again increased and the year ended with the financial situation greatly strengthened. Activities during the year involved building a new hut at its new H.Q. to house show stands and 600 show tanks and the publication of a set of standards for the 1979 Jubilee Coldwater Show.

After the business of the evening members enjoyed a party generously provided by the president. The party celebrated the fiftieth birthday of the society and the special birthday cake was suitably inscribed.

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AT the annual general meeting of the **Walthamstow & District A.S.**, the following officers were elected: chairman, G. Smith; vice-chairman, C. Peck; treasurer, T. Needham; Show secretary, S. Furnsedown; 1st committee member, D. Goodbody; 2nd committee member, A. Chandler; secretary, Penny Chandler, 34 Lechmere Avenue, Chigwell, Essex (500-2399).

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SINCE their annual general meeting the committee of the **Redcar A.S.** has been changed as follows: chairman, J. Duffill; secretary, L. Grant, 1 Yeoman Street, Redcar, Cleveland TS10 2BQ; treasurer, P. Duffill; committee, K. Grant, D. Lawrence, J. King, R. Gledhill, B. Haigh, S. Noble, H. Fall. F.B.A.S. delegate: D. Readman.

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AT the annual general meeting of the **Kings Lynn A.S.** the following officers and committee were selected: chairman, M. Laws;

secretary, J. Towler; treasurer, G. Osler; show secretary, B. Towler; vice-chairman, T. Turner; magazine editor, A. Freeman; Others: A. Joyce, R. Warner, and C. Simper.

The address of the secretary is now 35 Russett Close, Kings Lynn.

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AT the **Portsmouth A.S.** Inter-Club Show last year, the Shield was won by Brighton and Southern A.S.; 2nd were Havant A.S., and 3rd Salisbury A.S. Points were allocated according to F.B.A.S. show rules, and the winners of the 12 classes were: Class D, Gosport; Class B, Basingstoke; Class E, Roehampton; Class U, Kingston; Class C, Havant; Class J.K, Brighton; Class O.T, Salisbury; Class V, Isle of Wight; Class G.H, Havant; Class F, Wessex, Class L.M, Portsmouth; Class W, Gosport.

Other societies attending were Petersfield, Southampton, Pisces and New Forest.

While Mr. C. A. T. Brown, Mr. R. D. Esson, Mr. C. Creed and Mr. J. A. Carney were judging the fish, there were films to entertain those who stayed at the hall instead of going to the beach. The films shown were: "Beneath the Bahamas", "King Cods and Stripers", "The Lonely Places", "The Hungry Fish" and "Waves on Water".

Hounslow and South Park Aquarist Study Societies were unable to attend the show

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NEW SOCIETY

A NEW Aquarist Society has been formed in the Tyne & Wear area. It is called the **Boldon Aquatic Study Society** (B.A.S.S.) and caters for people who are interested in all types of fish, tropical, coldwater and marine, whether they are beginners or experienced aquarists. The Society meet fortnightly on a Thursday evening at 7.30 in the Boldon Community Centre. The chairman is A. Cutting and secretary, K. Sawyer, 13 Gladstone Street, Hebburn, Tyne & Wear NE31 2XJ.

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SECRETARY CHANGES

Norwich & District A.S.: Mrs. B. Williamson, 24 Magdalin Road, Norwich NR3 4AA. Tel: Norwich 60776.

Taunton & District A.S.: E. J. Stanton, 28 Lyngford Square, Taunton.

Reigate and Redhill A.S.: Secretary, Mr. Brian Knight, 41 Charlesfield Road, Horley, Surrey (Tel: Horley 71079). Open show secretary, Mrs. G. Sandford, 5 Victoria Road, Redhill, Surrey (Tel: Redhill 69339). Table show/interclub secretary, Martin Fewtrell, 34 Bolters Road South, Horley, Surrey (Tel: Horley 6078).

Yeovil & District A.S.: The secretary, Mr. Phill Johnson, has changed his address to Brook Cottage, Yeovil Marsh, Nr. Yeovil, Somerset.

Leeds & District A.S.: The new secretary of the Club which meets at the Anglers Club on the second Wednesday of each month, is Mr. G. F. V. Balkwill, 32 Nuwoyd Road, Leeds 17, to whom correspondence should be addressed.

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CHANGE OF VENUE

Swillington A.S. Mini Show will be held at the Scholes Village Hall, Main Street, Scholes nr. Leeds, on 28th March. Schedules available from Mr. B. Shelden, 11 Leveen Bank, Leeds 15.

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CALENDAR

4th March: Keighley A.S. Open Show at the Victoria Hall, Keighley. Please write for schedules from Mrs B. Pickles, 11 Lawcliffe Crescent, Lees Lane, Haworth, BD22 8RD.

9th March: Scunthorpe & District A.S. bring and buy sale at the Brown Cow Hotel, High Street, Ashby, Nr. Scunthorpe. 7.30 p.m.

10th March: The British Aquarists' Study Society. First Spring Meeting at 2 p.m. at the Meeting Rooms of the Zoological Society of London, Regents Park, N.W.1. Killies—an afternoon of practical killie keeping with Ian Sainthouse and other speakers. To be followed by a visit behind the scenes at the London Zoo Aquarium by kind permission of the Curator, Dr. H. Gwynne Vevers. Tickets £1·25 members, £1·50 non-members, from Mr. W. E. Goodwin, 14 Dawlish Drive, Devon Park, Bedford.

11th March: Worksop Aquarist and Zoological Society open show at the Lady Margaret's Hall, Welbeck Worksop, Nottinghamshire. Details from Bill Stephenson, 2 Popular Street, New Ollerton, Newark.

17th March: Riverside Aquarium Society Open Show at St. Etheldreda's Church Hall, Gloncurry Street, Fulham Palace Road, SW6. Schedules, phone 02403222786 or 385 0276, or write W. Nethersell, 13, Greyhound Road, Fulham W6N 8H.

30th March: Chesterfield A.S. are holding an auction of fish, plants, etc., at the New Inn, Hasland, nr. Chesterfield, at 7.30 p.m. Leave M1 motorway at Junction 29. For further information phone Chesterfield 36546.

31st March: Croydon A.S. open show. Schedules from Mr. Trevor Skeet, 64 Sumner Road, West Croydon (tel: 01-681 7861) or Mr. Les Derrick, 5 Glenthorne Avenue, Croydon (tel: 01-654 0984).

1st April: Reading and District A.S. Open Show at St Peter's School, Church Road, Earley, Nr. Reading. Ample car parking; 5 mins from M4. Schedules from P. C. Rushbrooke, 34 Melrose Gardens, Arborfield Cross, Berks. (Tel: A/C 760303).

1st April: Midland Aquarist League open show and inter-society show, Burleigh Community College, Thorpe Hill, Loughborough. Close of Junction 23M1. Benching 12.00-2.00 p.m. Schedules: F. Underwood, 10 Hyde Road, Kenilworth (Tel: 59280).

7th April: Catfish Association of Great Britain Open Show, Raynes Park Methodist Hall, Worple Road, Raynes Park SW 20. Schedules from Show Secretary, Mr. T. Cruickshank, 82, Stanley Avenue, Greenford, Middlesex, phone 01 578 0104.

8th April: Malvern & District A.S. open show at St. Joseph's Hall, Newton Road, Malvern. Schedules from J. V. Walton, 1 Beaver Close, Lower Wick, Worcester WR2 4EG (tel: 422002).

8th April: Kettering A.S. open show at McKinley Theatre. Schedules available from D. McAllister, 105a Welland Vale Road, Corby, Northants.

8th April: Halifax A.S. open show at Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Schedules: s.a.e. to David Shields, Cobblestones, Gainest, King Cross, Halifax, or telephone Hx 60116 after 8 p.m. for details.

8th April: Morley A.S. open show at Newlands School, Wide Lane, Morley, Nr. Leeds. For further details ring Wakefield 62144.

8th April: Kettering A.S. open show. Schedules from Show Sec., Mr. D. McAllister, 105a Welland Vale Road, Corby, Northants.

14th & 15th April: Aberdeen A.S. open show in The Music Hall, Union Street, Aberdeen.

15th April: Stockton-on-Tees A.S. 14th open show at Kiora Community Centre, Roseworth Estate, Stockton. Schedules from Mr. D. Knibbs, 15 Gray Street, Norton, Stockton, Cleveland.

15th April: Hyde A.S. open show at the Hattersley Community Centre, Hattersley Road East, Hattersley. Benching 12,00-2.00 p.m. The show will be run on F.N.A.S. rules and regulations and the F.N.A.S. show league will be in operation. Schedules from show secretary, K. J. Sherwin, 14 Lime Grove, Denton, Manchester, Lancs. s.a.e. please.

16th April: Marlow and District A.S. Dr. Ford of Aquarian.

16th April (Easter Monday): **Southampton A.S.** Open Show at The Avenue Hall, The Avenue, Southampton. Schedules from Don Mills 30, Ferndene Way, Bitterne Park, Southampton.

22nd April: York and District A.S. Open Show at the Livestock Centre, Murton, York. Benching 12 noon to 2 p.m. Details from Show Secretary Mrs H. Welsh, 1 Enfield Crescent, Holgate Road, York.

22nd April: The Hertfordshire Area Group of the British Cichlid Association are holding a convention at the Elstree/Borehamwood and District Community Centre, Alum Lane, Elstree, Herts., at 2.30 p.m. The speaker will be Mr. Brian Chandler, of Thringstone Aquatics, who will be talking on African cichlids. Admission free.

28th April: Southend, Leigh and District A.S. open show at St Clements Hall, Leigh-on-Sea, Essex. Details from Open Show Secretary, Ray Stanford, 1 Hilary Close, Rochford, Essex. (Tel: Southend (0702) 546090).

28th April: Bristol Tropical Fish Club annual open show of tropical fish, will be held at the United Reformed Church, Whitefield Memorial Hall, Muller Road, Horfield, Bristol, to F.B.A.S. rules. A Trophy class has been applied for. Show Secretary, Mr. T. A. Coggins, 36 Leighton Road, Southville, Bristol BS3 1NT (tel: 631307) from whom copies of schedule will be available on request and accompanied by s.a.e. Postal entries will be accepted up to Thursday, 26th April.

29th April: Half Moon A.S. open show, Corporation Hall, West Row, Stockton, Cleveland. Schedules from C. W. Buck, 22 Danby Grove, Thornaby, Cleveland, TS17 8BX. Tel: Stockton 65284.

29th April: Corby A.D.A.S. Open Show, Corby Civic Centre. F.B.A.S. rules. Schedules from C. MacAllister, 18 Maidford Road, Corby, early March.

29th April: Havant & District A.S. open show at the Horndean Community Centre, Merchistoun Hall, Portsmouth Road, Horndean. Schedules from the show secretary, Mr. H. Armitage, 74 Park House, Farm Way, Leigh Park Havant (Tel: Havant 473192).

6th May: Bournemouth A.S. annual open show at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Schedules available later from J. V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth, Dorset, BH6 4JP.

6th May: Yeovil & District A.S. open show at the Martock Village Hall.

6th May: Midlands Aquatic Study Group open show at Conniston Hall, Chadsmoor, Cannock, Staffs. 37 classes with over 100 trophies to be won. Schedules available (s.a.e. please) from I. Fuller, 38 Cambrian Labe, Rugeley, Staffs, WS15 2XH.

12th May: Tonbridge and District A.S. fish exhibition at Lambeth Walk, High Street, Tonbridge.

12th May: Port Talbot A.S. open show at the Talbach County Youth Centre, Margam Road, Port Talbot, West Glam. Trophies, plaques, cards for all classes. Schedules early March from Show Secretary, A. E. B. Pouracre, 3 Cross Street, Velindre, Port Talbot, West Glam. SA13 1AZ. (Tel: 3752).

13th May: Goole and District A.S. open show at the Shire Hill, Howden, Nr. Goole.

13th May: British Koi Keepers Society national a.g.m. at the Botanical Gardens, Egbaston, Birmingham, at 1 p.m. Membership details apply Mr. M. Waumsley, 165 Woodside Road, Amersham, Bucks, HP6 6NR.

19th May: Trowbridge & District A.S. Open Show at St. Thomas Church, Timbrell Street, Trowbridge, Wilts. Schedules will be available from Mr. J. Bennett, Show Secretary, 30 Lewis Cresent, Frome, Somerset.

20th May: Caer Urfa A.S. 1st annual open show at the Chuter Ede Community Centre, Benton Road, Bidelak Hall Estate, South Shields. Fish auction and entertainments. Schedules later from the Show Secretary.

20th May: Gloucester Aquarist Society Open Show to be held at Chequers Bridge Centre, Painswick Road, Gloucester. 31 classes to F.B.A.S. ruling. Trophies for 1st and 2nd plus award cards. Dr D. M. Ford of 'Aquarian' will give a slide talk on Aquaria around the World during judging. Schedules from March, from Mr. S. Grainger, 2/10 Bazeley Road, Matson, Gloucester.

26th May: The British Aquarists' Study Society, Second Spring Meeting at 2 p.m. at the Meeting Rooms of the Zoological Society of London, Regents Park, N.W.1. The Barbs—Dr. Keith Banister of the British Museum Natural History and other speakers. Tickets, £1·25 members and £1·50 non-members, from W. E. Goodwin, 14 Dawlish Drive, Devon Park, Bedford.

27th May: Merseyside A.S. annual open table show at the Rainhill Village Hall, Rainhill, Lancs.

27th May: Portsmouth A.S. inter-club show at Portsmouth Community Centre, Malins Road, Portsmouth.

27th May: Bridlington & District A.S. open show at the Hilderthorpe Junior School, Shaftesbury Road, Bridlington. Details from Mr. M. Jordan, Show Sec., 12 Greenfield Road, Bridlington.
May: Trowbridge and District A.S. open show. Date to be announced later.
3rd June: Scunthorpe Museum Society Aquarist Group 9th open show at Charter Hall, Corporation Road, Scunthorpe. Schedules available from Mr. D. Caldow, 5 St. Martins Road, Scawby, Brigg, South Humberside DN20 9BG.
3rd June: Redcar A.S. open show at Coatham Bowl, Redcar.
3rd June: Loughborough & District A.S. open show at Burleigh Community College, Thorpe Hill, Loughborough. Schedules from I. S. Purdy, show secretary, 10 Cleveland Road, Loughborough, Leics. LE11 2SP.
10th June: St Helens A.S. open show.
16th June: South Park A. (Study) S. SPASS open show at the Community Centre, St. George's Road, Wimbledon, S.W.19. Will all holding cups please return these by Thursday, 15th May, to the Show Secretary, Mr. L. Clapp, 16 Overhill Way, Beckenham, Kent. (Tel: 01-657 4404, daytime).
17th June: Loyne Aquarists open show, St. Paul's Parish Hall, Scotforth, Lancaster. Details from Mrs. H. Batchelor, 76 Greaves Road, Lancaster (Tel: 66633).
17th June: Salisbury and D.A.S. annual open show at the Activity Centre, Wilton Road, Salisbury. 50 classes including 6 Cichlid classes and 10 Coldwater classes. Judging to F.B.A.S. standards. Further details and schedules from Mr. R. F. Adams, 26 Empire Road, Salisbury. S.a.e. please.
24th June: British Koi Keepers Society, 1st national koi auction at the Botanical Gardens, Egbaston, Birmingham. Further details, write Mr. R. Hodgson, 5 Westbourne Road, Egbaston, Birmingham, or Tel: 021-454 6283.
1st July: Kings Lynn A.S. open show at the Corn Exchange, Tuesday Market Place, Kings Lynn.
8th July: Lytham A.S. Annual Open Show at Lytham Baths, Dicconson Terrace, Lytham, Lancs. Schedules from Show Secretary, Mr Peter Ham, 1 Wyndene Grove, Freckleton, Preston, Lancs. (Tel: Freckleton 633182).
8th July: Scunthorpe & District A.S. open show at the Park Community Centre, Ferry Road, Scunthorpe, South Humberside. Also bring and buy sale. Benching 12.00-2.00 p.m.
15th July: Scarborough A.D.A.S. open show at Gladstone Road Junior School, Wooler Street, Scarborough. Schedules (March) from J. F. Richardson, 5 Keld Garth, Pickering, N. Yorks. YO18 8DG. Tel: 73964.
15th July: Sandgrounders A.S. open show at Meols Cop School, Meals Cop Road, Southport. 30 major trophies. Schedules later from Mr. B. Baldwin, 10 Olive Grove, Southport.
22nd July: Gosport & District A.S. open show.
3rd, 4th, 5th August: Three-Rivers Aquarian Fish Keeping Exhibition in the Crowtree Leisure Centre, Crowtree Road, Sunderland. Further details from the show manager, Mr. G. Liddle, 19 Pamleston Ave., Newcastle-upon-Tyne.
4th August: Northern Goldfish and Pondkeepers Society hold their 3rd Coldwater fish show at the Sports Centre, Silverwell Street, Bolton, Lancashire. Schedules from Mr. B. Rothwell, 4 Whalley Road, Hale, Cheshire. (061-980 8801).
2nd September: Bethnal Green A.S. open show.
7th September: Scunthorpe & District A.S. mini show at the Brown Cow Hotel, High Street, Ashby, Nr. Scunthorpe. Benching 7.30-8.00 p.m. Also bring and buy sale.
8th September: Bristol A.S. jubilee open coldwater show at St. Ambrose Church Hall, Stretford Road, Whitehall, Bristol 5. Schedules from Mr. W. G. Ham, 18 Imperial Road, Bristol BS14 9ED (Tel: 0272-776924).
9th September: Longridge and District A.S. open show at the Civic Hall, Willows Park Lane, Longridge, Nr. Preston, Lanc.
9th September: Huddersfield Tropical Fish Society open show at Slaithwaite Civic Hall. Show secretary, Mr. D. Hill, 30 Celandine Avenue, Salendine Nook, Huddersfield (Tel: Hudds. 659977).
9th September: Evesham Fishkeepers' Society open show.
9th September: Novo's Tropical Fish Club open show at Heaton School, Newton Road, Byker, N.C. Further details from Mr. P. Caddle, 47 South Street, Deckham, Gateshead, NE8 2BD.
15th September: Hounslow and District A.S. open show at Hounslow Youth Centre, Cecil Road, Hounslow, Middlesex. Schedules and run on from Show Secretary, Mr. T. Bolingbroke, 2 Holmwood Close, Addlestone, Surrey. (Weybridge 54976).
23rd September: Chesterfield & District A.S. open show at Clay Cross Social Centre. Schedules mid-May. Details from Mr. L. Waller, 79 West Street, Eckington, nr. Sheffield (Tel: Eckington 2531 or Chesterfield 36546.
23rd September: Whitby & District A.S. open show at the Spa Pavilion, Whitby. Schedules from show secretary, Mr. D. Forbes, 12 Lockton Road, Whitby.
5th October: Scunthorpe & District A.S. bring and buy sale at the Brown Cow Hotel, High Street, Ashby, Nr. Scunthorpe.
6th October: The British Aquarists' Study Society annual general meeting, followed, at 2 p.m. in the Meeting Rooms of the Zoological Society of London, Regents Park, N.W.1 by the Annual Conference. Membership details from the Secretary, Michael Shadrack, 61 St. Barbabas Road, Woodford Green, Essex.
7th October: Louth and District A.S. open show.
21st October: Midland Aquarist League open show and inter-society show, incorporating 1st award winners' classes. Venue in Rugby. Schedules from F. Underwood, 10 Hyde Road, Kenilworth (Tel: 59280).
4th November: Halifax A.S. open show. Details later.

CROSSWORD SOLUTION

ACROSS:

1 Parrot; 8 sore point; 9 parasite; 11 bites; 12 frogs; 14 Badis; 15 sprat; 16 level; 19 *julis*; 20 heron; 21 Barbs; 23 steel; 25 Bloodfin; 26 *maculatus*; 27 insect.

DOWN:

1 Pipefish; 2 *rerio*; 3 oasis; 4 roe; 5 Red; 6 *Colisa chuna*; 7 angelic; 8 Stickleback; 10 Apple snails; 13 *Gnathonemus*; 17 miss a net; 18 Ventral; 21 brown; 22 rifle; 24 fat; 25 bud.