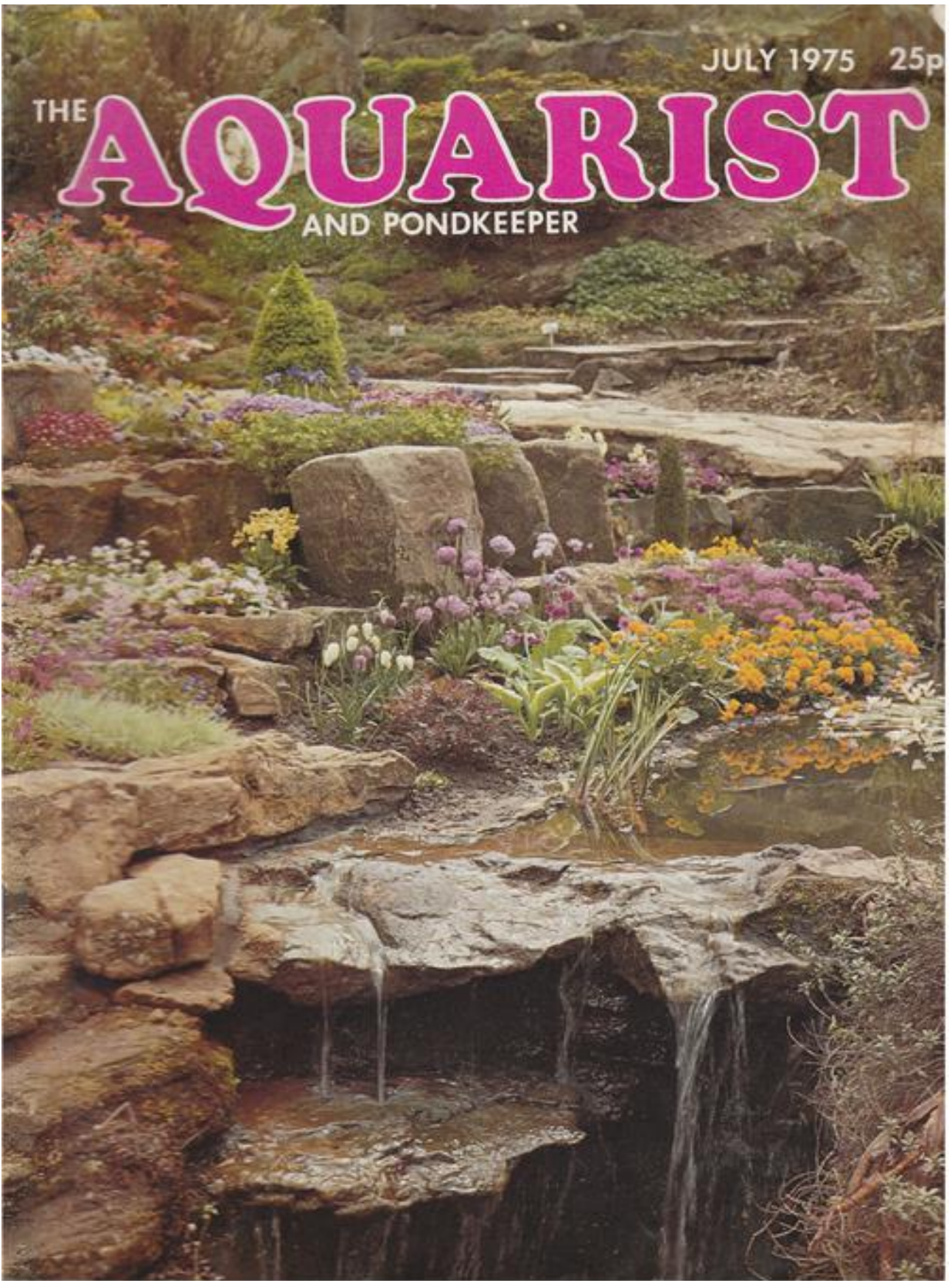


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THE AQUARIST

AND PONDKEEPER





THE AQUARIST

AND PONDKEEPER

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The Editor accepts no responsibility for views expressed by contributors.



Aequidens curviceps

THE ACARAS

Written & Illustrated by Jack Hems

SPECIES of the genus *Aequidens*, better known as acaras after their former generic name, are distributed over the Americas from Panama in the north to Argentina (La Plata) in the south. They are very diverse in size. Take, for example, Thayer's or the flag cichlid (a common name sometimes applied to *Cichlasoma festivum*) known to science as *A. curviceps*. This pygmy cichlid from the upper reaches of the Amazon inside Brazil is full grown at 3 in. By contrast, *A. rivulatus* from Peru may reach a length about 10 in. Then again, apart from their differences in size, the acaras show considerable differences in their behaviour in the aquarium and environmental requirements or preferences.

One of my firm favourites is *A. maronii*, more usually called the keyhole cichlid. This species is native to north-eastern South America or, to be precise, Guayana and thereabouts. It is as mild-mannered as any aquarist could wish a fish to be and, into the bargain, leaves the plants alone.

A. maronii reaches a maximum length of about 4 in. Its popular name fits it like a glove. For below the rear spines of the dorsal fin are two dark spots joined by a shortish vertical bar. The top spot is noticeably larger than the bottom spot and looks like the shadowy aperture of a keyhole. The sides themselves are beige to greenish olive.

Another acara almost, but not quite, as inoffensive as *A. maronii* is the dolphin cichlid (*A. ityami*). This fish is coloured greenish brown with a blackish stripe extending obliquely from the snout through the eye to the posterior base of the sickle-shaped dorsal fin (in well-grown male specimens). A dark blotch is present in the upper half of the tail. A failing of this acara, however, is that it is not overtly fond of bottom-

anchored plants. Hence it is advisable to furnish its tank with large pebbles or smooth-surfaced stones to afford a playground and suitable shelter. Strong light from above may be softened by introducing some plants that grow floating such as hornwort, *Elodea densa*, or the thread-fine species of *Utricularia* called lesser bladderwort.

An acara known formally as *A. potaroensis* is illustrated in some publications printed abroad. It is said this fish attains a length of 4 in. I gather from what I have read that it is suited to a community tank. American aquarists call *A. potaroensis* the dwarf aequidens. Why it is called "dwarf" when it grows larger than *A. curviceps* is beyond my understanding. *A. potaroensis* is native to Guayana and, in all probability, Venezuela too. It is reputed to be highly coloured. This piece of information, which I came across in an American magazine, arouses one's interest but is not helpful, especially as the photographic reproduction of the fish in question shows it to be a kind of inky blue, darker above than below, with a much darker, maybe blackish, band extending from the head and through the eye to the lower edge of the gill-cover.

The hercules cichlid grows to about the same size as *A. potaroensis*. It is known to science as *A. hercules* and is found in the upper Brazilian Amazon and parts of Peru. It is a greyish or grey-blue to greenish fish adorned with several dark blotches crossed or interspersed with half bars. There is some red colour in the fins. It is a retiring species. Another and more important characteristic of this fish is that it is given to stormy moods. Therefore it is not recommended for a non-spacious community tank or for a tank housing fishes much smaller than itself.

A. awani or the golden cichlid is from southern Brazil. It attains a length of some 5 in. and is quite suited to living with other fishes providing there is plenty of swimming space available, and non-toxic tree branches and large stones are present to afford retiring places for nervy or easily intimidated species.

It is named golden cichlid because its sides are a pale honey gold. It has, however, some vertical dark bars that come and go according to its mood and certain environmental factors. There is also a conspicuous black blotch in about the middle of the body and a smaller blotch in the upper base of the tail.

Although the golden cichlid will sift the compost around the crowns of plants and uproot those without much in the way of a rooting system, deep-rooting species such as *Cryptocoryne affinis* or, say, *C. blassi* will usually stay secure. That is if they are anchored in about 3 in. of compost. It is, however, sometimes

are brown to green, mature fish are rusty brown to brownish green to brownish black. A broken blackish stripe extends from the eye to the tail where it ends as a vertical blotch edged with greenish yellow. Shadowy or occasionally dark bars are present on the sides.

A. portalegrensis is not nearly so harmless in a tank of mixed species as *A. pulcher*. More than that, it is likely to tear up the plants. In the wild state it ranges from Uruguay in the south to Bolivia and beyond in the north.

A. tetramerus is another 6 in. acara with a wider distribution than the above over South America, namely from the north-eastern corner thence through Brazil to Rio de Janeiro. According to Professor Günther Sterba, it is looked upon as a food fish in parts of South America. It is greenish olive to light brown on the back and silvery overlaid with green or blue lower down. Here and there glow patches of red



Aequidens awani

more sensible and easier on the pocket to keep this fish with plants that float free.

A. pulcher, the blue acara, is a most decorative fish. It is native to Panama, Colombia, Venezuela and Trinidad. In its smaller sizes it does not ruin a tastefully arranged aquascape. Large fish will disturb plants in a thinly planted tank, but introduced into a thickly planted tank it appears to do little, if any, damage. Furthermore, a forest of plants will permit fast-moving and alert livebearers to flourish in its company.

A. pulcher reaches a length of about 6 in. and is brownish grey or slate grey (according to the quality of the light) overlaid with brilliant electric blue streaks and myriad spots of the same colour on the head and sides. The blue acara is a very knowing species.

About the same size as a full grown *A. pulcher* is *A. portalegrensis*, variously known as the green, brown or black acara. All these popular names suit it at different times and stages of growth. Young fish

or violet or both. There are blackish blotches or bars between the head and the tail. A thin red line adorns the upper margin of the dorsal fin. It is not unknown for this fish to move stonework or plants about the aquarium. The popular name of this species is saddle cichlid. It is best kept out of a community tank (by this I mean a community tank housing small characins, barbs, and the like) because in its larger sizes its relationship with other fishes may be stormy or spiteful.

A. mariae is from the upper Amazon, Colombia and Peru. It reaches a length of about 5 in. and is peaceable enough with fishes of about its own build except when breeding time comes around and then it will fall out with all and sundry. It is a handsomely garbed fish, with rows of irregular dark markings on the greyish to blue-green sides and some blue to grey-green markings around the eyes and on the gill-covers.

Among the easiest, perhaps the easiest, of the acaras to breed in the aquarium is *A. portalegrensis*. Sexing

Continued on page 147

THE LONG WAIT

OR THE SPAWNING OF ANNUAL KILLIFISH

by Bob Purdy

ANNUAL killifish live in what are known as temporary waters; that is, waters that dry up for part of the year. In order to survive in this particular environment the fish have developed an unusual method of spawning which bridges the gap caused by the dry season.

The fish spawn in the mud at the bottom of temporary pools, usually burying the eggs about one-quarter to one half an inch below the mud surface. When the pool dries up at the end of the wet season, the parents die but the eggs live on until the rains come again. At this time the eggs hatch and the cycle is restarted.

Because of its life style, the annual killifish has developed a few differences as compared with an ordinary fish. In order to keep and breed annual killifish these differences must be known and understood. The egg is as good a place as any to start and this will be dealt with first.

Ordinary fish eggs have very thin fragile shells but the eggs of killifish, especially the eggs of annual killifish, have hard and tough shells which resist drying out and protect the embryo inside from desiccation when the pool disappears. The shell also acts as a physical protection and withstands crushing to a remarkable degree, often being capable of resisting a weight of as much as three hundred grams.

When the eggs are first laid they are clear and there are no signs of embryonic development for quite some time. The embryos grow much more slowly than normal, reaching a stage of almost total development before they stop completely. When this happens all growth and motion ceases, the heart stops beating and to all intents and purposes the embryos are dead.

In the wild, the mud in which the eggs lie never quite dries out and peat (the substitute used in the aquarium) should be dried to the consistency of moist pipe tobacco. When the rains come and the mud is wetted the embryos are "brought back to life" and proceed to hatch out. In artificial hatching in the aquarium, it is important to use no more than about one inch of water so that the fry are able to reach the surface and fill their swim-bladders with air.

A premature rain storm can cause water to collect and eggs to hatch; naturally the young fish die when the pools dry up again. In order to guard against this, a certain percentage of eggs are not hatched during this period and when the rains come again these eggs hatch and the species is not lost. When eggs are hatched in the aquarium it is always wise to redry the peat and wet it again in about two weeks or so; this second hatch can sometimes be even larger than the first.

After the young fish have hatched in the wild they have about four to six months before the dry season comes again and their water disappears, killing them. Because of this young annual killifish grow at an astounding rate often reaching sexual maturity in four to six weeks. The young fish have huge appetites and it is essential to feed as much as possible.

When the eggs hatch there is no yolk sac for the young fish to feed on and it must start eating immediately. *Infusoria* should be given for two to three days followed by newly-hatched brine shrimp. In larger species newly-hatched brine shrimp can be fed from birth. Always give more than the fish can eat but be certain to remove the dead food regularly and don't leave it to rot in the tank. Microworms can be fed in the initial stages but it is a food low in protein value and does little for growth. Grindalworm can be fed after about five days and as soon as the young fish are large enough to take chopped *tubifex*, give it to them. They have big mouths and can take *tubifex* at a much smaller size than normal fish.

As soon as the fish are sexable it is wise to pick out two good females and place these in a tank with the best male. Two females should always be used with one male as these fish are very hard drivers and if a single female is used the male often drives her to death. The spawning tank should have a layer of peat about as deep as the fish is long, the peat being well washed and well soaked beforehand. South American annuals are often called peat-divers because of their spawning habits. A male will clasp a female with his dorsal fin

and dive headfirst into the peat with her. If the peat is too shallow he will not be able to do this and the spawning will not be as prolific as it usually is.

In order to keep the peat free of rotting food it is best to divide the tank below the water level and only fill one half. Food can then be dropped into the bare half and siphoned off if uneaten. It is important to continue to feed the fish well at this stage because they need large amounts of protein to sustain their growth and to produce viable eggs.

It is best to feed mainly live foods such as earthworms, small live fish, mosquito larvae, *tubifex*, bloodworm, glassworm, and whiteworm. Always vary the diet and do not continuously feed only one kind of food. A word of caution: whiteworm is quite rich in fatty substances and if fed too often will slow a fish down and shorten its lifespan. Feed whiteworms two to three times a week at the most. Killifish do not normally recognise dried foods as edible and for this reason usually refuse to take it. A good way to persuade them to eat dried foods is to include a few livebearers in their tank, who, by their example, will soon show the killifish the way. Do not rely too heavily on dried foods as the fish will soon become stunted; a light feeding once a day is enough.

After about a month remove the peat and rest the fish, separating the male from the females. Normally, after about ten days, the fish can be put to spawn again but make sure that the females are in good condition and well rested. The removed peat should be dried to the consistency of moist pipe tobacco and stored in airtight containers. Incubation periods vary tremendously, some being as short as nine weeks and some being as long as six months. When a species is chosen it is best to check on this. Some eggs, known as resting eggs, can take as long as three years or more to hatch, skipping two wet seasons or more and making sure, in the event of any kind of disaster, that the species is continued. In a normal spawning these eggs are few and far between so do not try to incubate a spawning longer than the stipulated time. Most of the eggs will die.

Apart from the phenomenal growth rate of the young fish there are some other differences worth noting. Some South American annuals have been found in waters that have a layer of ice on the top, proving that they can withstand very low temperatures indeed. Most annuals live a lot longer if they are kept at lower temperatures than other tropicals, at about 65°F. is suitable, and although six months is an average lifetime in the wild, some annuals have lived as long as two years in the aquarium. With careful acclimatisation some South American species can be kept in outside pools during our summer months.

The remarkable ease with which killifish, including annuals, can cope with varying water conditions is another interesting difference they exhibit. In the

wild, when the rains first come, the pools are very soft and acid but towards the end of the wet season, as the pools are drying up, they become very hard and alkaline. Whatever your own water conditions annual killifish will be at home in it but it is well to remember the one similarity they have with any other fishes: killies enjoy clean living conditions and regular, small water changes.

It would be difficult and boring to present a detailed description of all the annual killifish but a brief word about some would not be out of place.

Of the South American annuals, or peat divers, *Cynolebias*, *Cynopocilus* and *Pterolebias* are the three genera most usually kept by killie fanciers in this country. *Cynolebias* species are usually a dark colour, a blue or grey background which is very brilliantly spangled. They normally have long flowing dorsal and anal fins which carry the same colour patterns as the body. Some of the species in this genus are the Argentinian Pearlfish (*C. bellotti*), the Black Pearlfish (*C. nigripinnis*) and White's Pearlfish (*C. whitei*). White's Pearlfish also comes in a most beautiful albino form. Two more species of this genus have recently been discovered, they are *C. alexandri* and *C. antenori*. So far, specimens of these fish have been somewhat smaller than most *Cynolebias* species and of a more overall reddish hue, otherwise they resemble the genus description.

Cynopocilus is a genus of only two species, *ladigesi* and *melanotaenia*, both closely resembling the genus *Cynolebias*. *Cynopocilus ladigesi* is a small fish growing to only one and a half inches and is basically blue with red spots arranged in a striped pattern. *Cynopocilus melanotaenia* is twice the size of *ladigesi* and is a fawn fish with again red spots forming a striped pattern.

Pterolebias species are more elongate fish than are *Cynolebias* and have in most cases very long flowing tails. Basic body colours are brownish and once again they are very brilliantly spangled, usually carrying the colours and patterns into the fins and tail. The Peruvian Longfin (*P. peruensis*) is one example of this genus.

As with most killifish, the females of the above species are much less colourful than the males and do not grow to the same size. The same is true of the following African species.

There is no definite dividing line between annuals and non-annuals in Africa. For example, the eggs of *Aphyosemion sjoestedti* can be either dry-stored or water incubated with equal success. Because of this situation only fish whose eggs cannot be water-incubated can be called true annuals and these will be dealt with below.

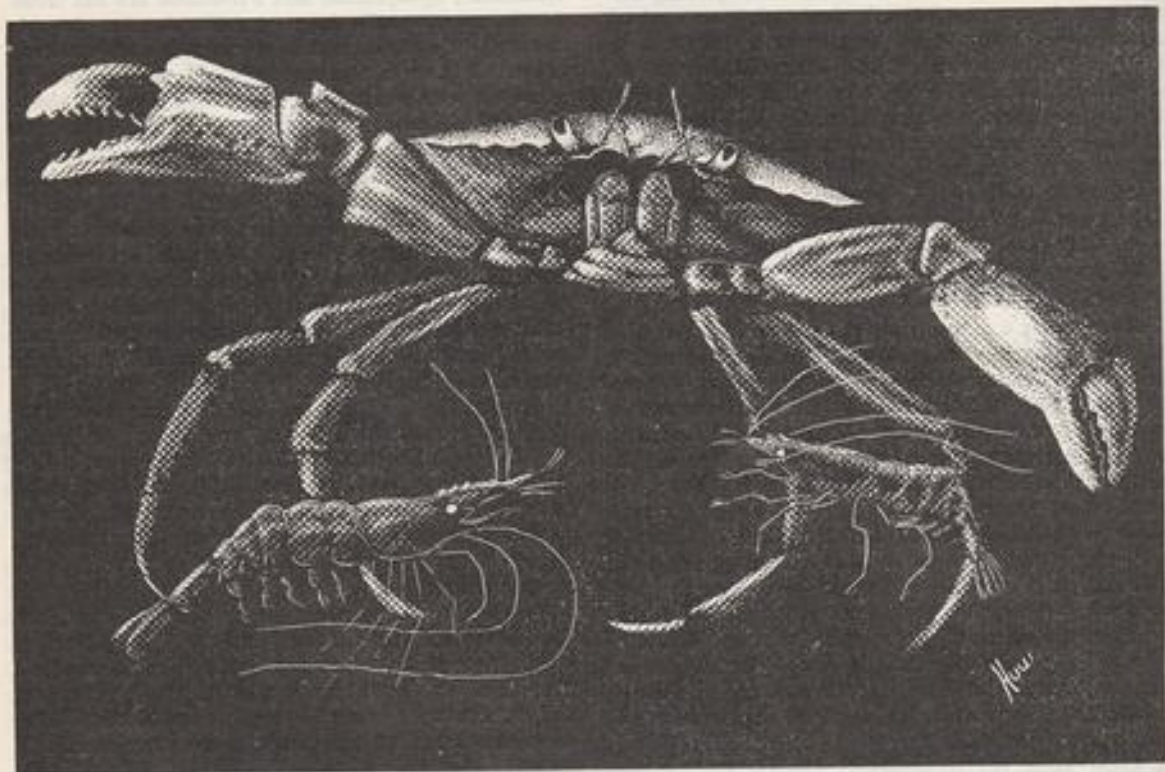
The genus *Nothobranchius* is comprised totally of annuals and all of them are very brightly coloured, so

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THE MAD CRAB

ITS LIFE AND TIMES

Written & Illustrated by Huw Collingbourne



ON THE WHOLE he is regarded as no more than a tiresome nuisance by bare-footed bathers and rock-pool explorers, or as an unwanted pest by marine aquarists (No, I do not mean me!)—I'm talking about crabs actually, and, in particular, green shore crabs—because these little chaps are altogether more interesting than they are generally acknowledged to be (save in scientific circles—but more of that later). But first I suppose I had better make it quite clear just which crabs I am talking about, because all the aggressive meat-pie-shelled creepy-crawlies found in rock pools, and called simply "crabs" are not necessarily green shore crabs (*Garcinus maenas*)—they

could just as easily be swimming crabs, velvet crabs, edible crabs or any one of a number of other different types.

The one that I am talking about may be identified by the five sharp "teeth" on the carapace (its shell) at either side of the eyes, and by the three blunt projections between the eyes. Its carapace is usually black or green in colour, though red or brown green shore crabs are not uncommon. (Now you see the importance of scientific names!) I have even seen a completely white individual. This little chap was one that somehow found his way, unbid, into a coral fish set-up I once kept. This is not surprising

really, as I used only natural sea-water in this tank and very possibly the crab entered as a larva in the plankton.

If you are a really ambitious marine aquarist you may want to try to breed crabs in an aquarium (and good luck to you)—in which case you will want to know which sex is which—at any rate, I can't think of another reason why any normal person should want to know such a thing—but just in case you do, the way to tell is to examine the animal's tail, which is a flat, segmented object tucked under the shell. If it is narrow and pointed, with five points, it is a male; broad and seven jointed indicates a female crab.

Of course, the most prominent feature of a crab is its fearsome nippers. These are extremely powerful appendages, possessing an astounding strength which enables the crab to grip and pull thirty times its own weight, should it be so disposed (a man's puny best, by the way, is just two-thirds of his own weight).

The crab's alarming threatening posture displays these potentially dreadful weapons most dramatically (see illustration) and no doubt with this in mind, the French have called this crab *le crabe enrage*, the mad crab or the raging crab.

In the aquarium

Bearing in mind the crab's obvious capabilities for wholesale destruction, one would be inclined to exclude it at all costs from all aquaria. And, indeed, if all your aquaria are stocked to the brim with delicate sea-stars, urchins, fan-worms and living corals, or if they are resplendent with luxurious growths of seaweed, then I would certainly agree with you. One of the little blighters would waste no time in wreaking havoc in such circumstances. But let's not get carried away in our condemnation of little *G. maenas*. In the right surroundings he can be a fascinating and harmless creature.

Ideally, a tank for a shore crab should provide opportunity for the amphibious occupant to come out on wet land occasionally, in addition to providing a submerged environment, though this is certainly not essential.

Unfortunately, shore crabs do not get on very well with other animals and, in the confines of an aquarium, seldom get on well with one another either. There are exceptions, however. For instance, it would be quite safe to include crabs in a tank of anemones or to include a small crab in a tank of larger fish.

A small shore crab would make a delightful addition to most coral-fish set-ups; it is a lively scavenger, invariably making its presence known at meal times, darting out from one piece of coral to grab the piece of prawn flesh which the clown fish has just missed, and quickly darting under another piece of coral before the trigger fish decides to have a change of diet from prawn to crab!

Crabs are not fussy about what they eat: shrimp, earthworm, dog-food, flaked food, Moorish idol, it's all the same to them. No, actually I was being flippant about the Moorish idol—you need have no fear in that way, as a small crab constitutes no threat whatsoever to your prize fish.

However, a very sick fish (which you must remember, would certainly not live long enough ever to recover in the wild), will simply be an easy meal for an adult crab. But an adult crab (which can be 10 cms. or 4 in. in width) would be likely to disrupt coral displays anyway and you would be advised to remove crabs from tropical marine tanks some time before they attain these proportions.

Of course, you can make an advantage of the crab's taste for fish flesh too! Just think what problems a fish can cause if it creeps away into the recesses of some piece of coral to die—and especially if you are away at the time. But two or three little shore crabs would find the corpse in no time and would have devoured it long before the flesh had decomposed and caused enough pollution to devastate your collection.

The best time to collect little crabs for tropical marine aquaria is in the summer when the water in many of the rock pools will be quite as warm as your aquarium water, but even when taken from an icy cold sea, shore crabs may be introduced directly into warmer water with no ill effect.

They will even tolerate life in the less saline water preferred by some brackish-water fishes (they are able to adapt to water of just one-sixth the salt content of seawater) for crabs are found quite a way inland high up into estuaries and they have the ability to vary the salt content of their own body fluids, thus maintaining the correct osmotic balance with the water in which they live. If they did not do this, they would very likely explode in highly saline water, or implode in less saline water!

To breed or not to breed?

In springtime, female crabs can often be found with big, dark orange, granular lumps like clumps of tiny berries stuck firmly under their tails. These are the egg-masses from which, all being well, the tiny larvae of zoea will hatch to join the drifting plankton. At this stage the baby crabs bear precious little resemblance to their parents and they were originally believed to be a completely different species of crustacean. Those few individuals which survive this precarious period of their lives will develop into pupae or magalopa, following several skin casts; and by this time they will look just like very minute versions of adult crabs.

However, if you do come across an adult crab with a colourful lump wedged beneath its tail, don't be too

hasty in identifying it as a mother-to-be. Should this lump be smooth and coloured yellow instead of orange, then it is not an egg mass at all; it is a type of barnacle which parasitises crabs, both male and female, in a most horrible way.

The larva of the barnacle (*Sacculina carcini*) settles on the crab's jaws and then bores its way into the host's bloodstream; from here it makes its way to the underside of the crab's intestine. Once settled there, it puts out long food-absorbing threads permeating the crab's entire body—even into its eye-stalks! The yellow lump which develops externally on the crab contains the reproductive organs of the parasite.

Now, in the normal course of things, a crab casts its shell periodically, exposing a soft new shell underneath—but at these times it becomes easy prey for its enemies and, therefore, should a parasitised crab shed its shell, the parasite too would be at risk. But, in fact, a crab thus parasitised never does shed its shell! The parasitic barnacle effects a change in the crab's body chemistry, causing an interruption in the crab's development—and the carapace of a crab afflicted with *S. carcini* often becomes so old that colonies of hydroids, fan-worms and barnacles develop on it—creatures which normally settle on the more permanent features of the aquascape—rocks and stones.

When, at long last, the parasite has released its sperm and ova into the water (it is hermaphrodite or bi-sexual and possesses both male and female organs) then it dies and the crab is free to moult its carapace.

There are a couple of curious side-effects which a parasitised crab suffers. Neither sex is able to reproduce at this time but a very strange thing happens to male crabs. Very often the parasite destroys the male crab's gonads and this effectively changes the crab's sex to female!

New Crabs for Old?

Meanwhile, back in the rock pool: the crab, free at last of his unwelcomed lodger, is able to moult that old shell of his. This moulting behaviour is something easily observed in an aquarium, and it takes place on numerous occasions in the life of any hard-shelled crab. First, it will seek shelter, under an overhanging rock perhaps or amongst a clump of seaweed. Then the carapace splits open along the back edge, allowing the crab to work its way out through the newly formed opening—this fracture occurs due to the internal swelling of the crab's body resulting from a deliberate intake of water to the extent of about 70 per cent of its normal body weight. After some struggle, the crab emerges with a, as yet, rather soft new shell which hardens in a few days, being about one third larger than the previous one.

Now, it may not have struck you particularly, but crabs have very interesting legs. You may not have realised it but not only has a crab got three pairs of ordinary walking legs and a further pair possessing those formidable pincers, but it also has a specially flattened pair at the back which enable it to swim through the water (though this is more highly developed in the various species of swimming crabs). But more interesting still, to my way of thinking, is the crab's ability to purposely break off one of its own legs should the need arise, and grow in its place a perfect new one! This is called "autotomy" (the word is of Greek derivation, meaning "self-cutting"). The crab sheds its legs if they become trapped between stones, for example—not an uncommon occurrence on a rocky shore, I imagine. Certainly, crabs with various numbers of missing limbs are very easy to find.

A groove round part of each leg allows the crab to break off the limb with ease. The remaining parts of the nerves and arteries to the leg are withdrawn into the leg-stump and two special membranes seal off the wound.

Almost at once a minute new limb begins to grow in place of the old one and the replacement leg will be fully grown within about three months.

Crabs that tell the time!

"What o'crab is it?" could well be an expression to be cultivated by marine aquarists up and down the country; for there is no doubt about it—crabs can tell the time much more accurately than most of us could without the aid of a watch.

Now, anyone who has kept crabs (or any of the other amphibious forms of shore life) in an environment which gives them freedom to leave the water whenever they so desire, will know that they tend to do so mostly at specific times of day—times which correspond with the times of the tides. Why is this? Do they remember the times?

Well, there has been a considerable amount of research undertaken by scientists in various parts of the world, trying to find the answer to this problem. Several species of crabs have been used in experiments, but the green shore crab has been a type frequently used. However, the activity rhythms of different species of crabs are adjusted to respond to different types of stimulus (e.g., *Lunar day rhythms*—adjusted to the two tides of the lunar day, and *Solar day rhythms*—adjusted to the night-day rhythm, which is, of course, the rhythm which the human species responds to).

Now, although this article is chiefly concerned with the green shore crab, I think it would be relevant to quote the results of some research into the rhythms of another species, the fiddler crab, before going on to work done specifically on the shore crab.

In its natural habitat, the fiddler lives in a burrow which it makes in the wet sand or mud, only emerging to scurry about and do the things that crabs are wont to do, when the tide recedes. So, you see, in this way it establishes a definite pattern of activity: twice daily, at high tide, it is in its burrow; twice daily, at low tide, it is out and about on the sand. Of course, the obvious dramatic change in its environment as the tide changes tends to suggest nothing remarkable in its ability to "tell the time". Well, wouldn't you be able to tell the difference between a nice, warm, dry, sandy burrow and one flooded with several feet of freezing cold and rather turbulent sea-water?

So this is where we get back to those people who have kept crabs in rock-pool type aquaria and who know that even without tides, natural or artificial, crabs continue to behave as though there were tides—and at the same times as the natural tides actually occur! But how on earth do they know this? Do they remember? do they somehow sense the tide? Well, experiments have been carried out with numerous tidal animals and, in some cases, results seem to indicate that the animals are able to respond to the "tides" in their own body fluids, which, some scientists maintain, are quite as prone to the pull of the moon as the ocean itself. Some animals, moved from one area to another have even been observed to adopt the rhythms appropriate to the tides in the new area—tides which they have never experienced!

In laboratory experiments in America*, fiddler crabs taken from the shore were isolated in plastic containers which were balanced very finely on a fulcrum and this apparatus was placed in constant conditions of heat, light, moisture, pressure, etc., to prevent the crabs receiving any clues about the true nature of the tides at that moment. When the crabs moved about, the containers they were kept in rocked to and fro and these movements were recorded. The greatest period of activity was found to correspond with the greatest period of activity in nature (i.e., at the times of low tide).

Occasionally these experimental subjects maintained this rhythm for as long as five weeks, but more often they "forgot" the times of the tide much sooner, after a week perhaps, unless they were "reminded" by periodic immersion in seawater.

These results pose the question: do the crabs actually forget the rhythm or are they adapting to their new tideless environment by simply not responding to the rhythm? It has been found that crabs living in the environs of salt-water pools which are unaffected by the tide, react to a solar day rhythm, but will adopt lunar day rhythms when placed lower down the shore where they are exposed to the action of the tides.

But let's get back to our original subject of dis-

cussion: the shore crab's activity cycle is the complete reverse of the fiddler crab's. Their greatest period of activity coincides with the times of high tide; they are more active in water than out of it. It has been found that when a captive specimen loses its tidal rhythm it can easily be re-instated by cooling the animal to 4°C (39°F) for six hours. But we are still in the dark about how the crabs know the tides in the first place. Do crabs, like elephants, never forget? Well no, it seems not. Research workers at University College, Swansea, went to the trouble of raising shore crabs from eggs, ensuring, of course, that they never experienced any tidal movement throughout their lives. The only regular rhythm which they ever experienced was a solar, day-night, light and dark rhythm. But when they had grown, these crabs were chilled for a period of fifteen hours and following this, definite, regular tidal patterns began to emerge. So obviously the crabs are not possessed with extraordinary powers of recall—for, although crabs do need some stimulation to initiate their regular patterns of life, the "clock" which informs them of the correct time for certain behaviour is, in fact, a built-in mechanism, so to speak—it is a sort of "biological clock" which scientists now believe are common to most if not all living things—even the tiny protozoan plant-animals like *Euglena* appear to have them.

So where does a crab keep its in-built little time-piece? Well, experiments seem to indicate that, along with the organs which control shell-casting, this other mysterious organ is located in the eye-stalks.

The time-keeping gland regulates the green shore crab's activity to tidal (lunar) rhythms, circadian (solar) rhythms and also appears to effect coloration changes at various times of the day. Removal of the eye-stalks (not a procedure recommended to aquarium hobbyists) halts these rhythmic changes, but when replaced with eye-stalks from another crab, they begin all over again.

There have been attempts to reverse crabs' tidal behaviour, taking specimens from the shore and exposing them to 6.2 hours under water when their biological clock tells them it's time to be out of water, and 6.2 hours out, when they should really be in, and meanwhile, the air and water temperature was kept constant at 19°C. The cunning experimenters tried to confuse the crabs in this way for a period of five days—but it was no good—the crabs jolly well knew the real time and continued to behave accordingly.

Only when exposed to sufficient temperature changes (with a difference of about 11°) was the crab's activity rephased and this happened whether the crabs were kept in water at all times or in the air at all times. So, far from responding to the obvious water-is-wet changes, it seems that basically

the crab's clock responds mainly to temperature changes and possibly to pressure changes too.

Well, we've got this far in our discussion of the shore crab and still haven't succeeded in dealing with more than a minute fraction of all that is known about this intriguing creature. And even all that is known is but little compared with what there is to know. There are still an awful lot of questions to be answered; and perhaps even more to be asked.

The question is often more important than the answer: somebody keeps an animal, notices something about it that nobody has ever paid attention to before, and he asks, why? What is the reason?

And what better observer is there than the amateur enthusiast? Yes, I mean you!

*"Biological Clocks of the Tidal Zone," by John D. Palmer, *Scientific American*, Feb., 1975.

THE LONG WAIT *(continued from page 123)*

much so that some people call them "firefish". The main body colour is a bright metallic blue shading to red towards the tail. The belly is mostly grass green or yellow and the fins and tail are a brilliant scarlet. Rachov's *Nothobranchius* (*N. rachovii*) and Guenther's *Nothobranchius*, (*N. guentheri*) are typical members of this genus.

Finally, leaving the best till last, two species of the genus *Roloffia* are also annuals, they are the Golden Pheasant (*R. occidentalis*) and the Blue Pheasant (*R. toddi*). Think of a colour and these fish have it. They are impossible to describe and have to be seen to be believed. Both species are large fish growing to about four and a half inches in the wild and unfortunately both are quite difficult to spawn and raise. A pair of these are usually the pride and joy of any killifish fancier.

Most annual killifish are virtually unobtainable at

retailers and there are two main reasons for this. The first is that the fish are impossible to breed on a commercial basis and therefore fish farmers in the Far East and Florida do not cultivate them. Secondly, it is hard and tiring work to catch these fish in the wild and obviously this drives the price up and makes for an uneconomical venture.

The British Killifish Association has often been accused of being a closed shop but, like it or not, the B.K.A. is about the only way of getting killifish into this country. Joining the B.K.A. gives the killifish fancier a wide range of species to choose from, including, from time to time, most of the annuals. All killies sold through the B.K.A. are at much lower prices than they would normally be if they were obtained through more usual channels. Think carefully however because once you start keeping killifish it is difficult to stop.



THE BRITISH AQUARISTS' FESTIVAL

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24th
YEAR

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M.A.F., 1975

by F. R. Close

WE NOTE WITH significance, that exactly 40 years ago The Midland Aquarium and Pool Society staged its first aquatic show at The Bingley Hall, Birmingham. What took place at that show was recorded in the M.A.P.S. first number of their Journal (Jan. 1936) and reads as follows:—

"A meeting was held at the Chamber of Commerce, Birmingham on Tuesday 3rd December 1935." Chairman's opening remarks. "I want to tell you something about the show at Bingley Hall. The society is a very young one, and it was rather an undertaking to run an exhibition, however small, at such short notice. The object of the Committee in doing so was to test the possibility of running a bigger show; to see how the public would take to it; and particularly how the officials of the Chrysanthemum Show would act. We had difficulty in getting them to give us any space, and even at the last minute they wanted us to take space on the side gallery. However, finally they gave us a very good space. I might say that we were let down very badly on the heating arrangements; it was not our fault at all, and I do not think it was the fault of the Chrysanthemum Society. When the heat was arranged to come on they found they were up against difficulties in the way of Fire Regulations; the Corporation and Fire Authorities insisted on a separate supply being put in, and the consequence was that we did not get the supply on until the show had been open some hours. I have to apologise to a number of members who brought down quite a number of tropical fish and had to take them home again. This rather spoilt our show, and we were very sorry about it. The Show as a whole went remarkably well. There was very little time to organise anything, and our thanks are due to those members who 'put their backs into it' and got things going so well. It created a tremendous amount of interest—in fact, more than any individual exhibit in the Flower section. The authorities of the Show were highly delighted, with the result that they have promised that next year we can have almost any space we want."

The above is an extract and gives us an insight to some of the problems to be overcome at that time. Some forty years later there are some who can look with nostalgia to those pioneers of the early days, whose high ideals and concept of the hobby have paved the way to the hobby as we know it today.

Thirty or so shows have been staged in as many years at this Venue by M.A.P.S. with a determination

to do better with each successive exhibition. In 1974 the title was changed to "Midland Aquatic Festival" (M.A.F.) and the name is now firmly established nationally.

Preparation for the M.A.F. (1975) is well in advance of schedule and includes items of interest for the young and old alike. The Venue, once again is Bingley Hall, Birmingham, open to the public August 14th-16th (inc.) 1975.

On display and in competition, there are many hundreds of exotic fishes "Tropical and Coldwater" to be admired. Specimens of some of the world's rarest species can be seen together with several varieties bred in this country. Society tableau is again a popular feature at the Show, attracting the many varied and imaginative talents of respective societies in competition. Reptiles and amphibia are also on show in their many shapes and sizes. To the growing number of herpetologists attracted to the hobby each year this exhibition is an annual event not to be missed. Talks are given at regular intervals in the hall when questions on all aspects pertaining to the aquatic hobby, will be answered. The aquatic trade is well represented, and equipped with full range of items necessary to the aquatic world, and may be purchased. Adequate car parking facilities are available in the vicinity as are numerous restaurants and cafeterias. Refreshments are also available within the exhibition hall.

At the M.A.F. this year, and for the very first time in the history of coldwater fish-keeping in this country, M.A.P.S. are privileged and indeed proud, to act as hosts to five National Societies reputed for their progressive activities, and strong ties with the coldwater fancy. The five organisations are as follows:—The Association of Goldfish Breeders—The Bristol Aquarist Society—The Goldfish Society of Great Britain—The Midland Association of Goldfish Keepers—The Northern Goldfish and Pondkeepers Society and the hosts, The Midland Aquarium and Pool Society. The "six" have pledged their support for a "National Exhibition of Coldwater Fishes." The decision was taken at a meeting of representatives and members, of the above listed societies, at Coventry on April 20th 1975. Our coldwater fraternity will no doubt recognise and appreciate the significance of several points of agreement derived from that meeting.

For this year (1975). "The National Exhibition of Coldwater Fishes" will take place at the Midland

Continued on page 131



Goldfish Standards

I was disappointed to read Mr. Boarder's reply to the person whose Bristol Shubunkins "do not come up to the Goldfish Society standards" (*Aquarist*, March, 1975). In the hope of averting further possible misunderstanding and confusion regarding the Bristol Shubunkin, may I draw attention to a few points which have obviously been overlooked by Mr. Boarder.

Friendly relations are prevalent, more so now, than at any other time in the history of the Goldfish Society of Great Britain (G.S.G.B.) and the Bristol Aquarist Society (B.A.S.). It is not surprising then, that the two bodies should compare notes prior to publishing the Bristol "type" shubunkin by G.S.G.B., which in effect is the modified form of their previous "single-tail." Although a step in the right direction, the Bristol "type" shubunkin is not to be confused with the Bristol outline, featuring the illustrious caudal fin in a more upright position, with broad and well rounded lobes, in contour with the grace of a "Cupids Bow," to the vee at the rear. However, they are two quite different ideals and the approach to the subject, and the difference of opinion are respected by both societies, resulting in "agreement to differ" for the time being (the door being left open for discussion) which is some consolation as we envisage, and strive for, ultimate unification for the hobby.

Adverse pressure and derogatory remarks in the Aquatic Press, even from aquatic dignitaries, can only impede, rather than improve, relations between responsible societies whose genuine endeavours for agreement are positive, constructive, and admirable.

The introduction of the Bristol Shubunkin by the International Judges Association for Goldfish Varieties and what Mr. Boarder describes as "conforming to something near the Bristol Standard," is, in fact, the new and updated, authentic and modified version of the Bristol Shubunkin by the B.A.S. The new Bristol Standard complete with script and pointing system has been in use over a wide area in recent years and the publication in the "Book of Pedigree Standards" supersedes all previous publications which are now obsolete.

The F.B.A.S. in the latest standards book No. 4, the Bristol Shubunkin is acclaimed as that of the authentic and "original Bristol Standard". This is

thought to be grossly inaccurate and misleading, as the original Bristol Standard, produced by the B.A.S. and published in the *Aquarist* in September 1934 bears little resemblance. It is not as Mr. Boarder stated "produced exactly as that of the Bristol Society." The B.A.S. have, over the years, produced for publication but three outline drawings—the original—the modified drawing of the original, contained in their book of standards, and the updated and authentic version found in the Book of Pedigree Standards. The F.B.A.S. issue and text conforms to neither one.

Mr. Boarder in his closing statement clearly attacks those responsible for the Book of Pedigree Standards, this condemnation is unwarranted and your readers are requested to consider what to me is justification for the introduction of a new and updated set of standards. Of the three sets of standards in current use in the 1950's the F.B.A.S. loose leaf form was favoured and adopted by most coldwater enthusiasts in the midlands. Over a long period these standards were maintained and complied with, the exception being "their Bristol Shubunkin."

In the late 1960's the announcement of the F.B.A.S. standards to be replaced by those of the G.S.G.B. was received in the Midlands and elsewhere with much illfeeling. This was thought a "sell out" by the F.B.A.S. for no apparent reason. However, yet another "about turn" was in evidence with the publication of their latest manifesto. It was a little later, at the instigation of Midland Aquarists, talks took place with representatives from all organisations with a keen interest in fancy goldfish. Several meetings were convened and endeavours to agree on one solitary set of standards, to be used throughout the country, ended in dismal failure. Only after all endeavours for national unity had failed, and the door to further negotiation's firmly closed, was the decision made to publish the "Book of Pedigree Standards." It was clearly a case of having no standards at all (the existing standards in current use being unacceptable) or compile an up to date set credible and coherent with the expressed wishes of prominent aquarists throughout the country. In the circumstances would Mr. Boarder have not taken the initiative, as did the Midland Aquarists?

The "Pedigree" book was compiled by long standing national, and certificated judges, who's success as fancy goldfish breeders, and exhibitors at national shows over several decades, is unsurpassed.

Views and opinions were expressed by many experts in the hobby (including Mr. Boarder) prior to publication and the book reflects the consensus of opinion and expertise of the most knowledgeable and experienced aquarists in the hobby.

The success of this book may be measured by its adoption by three of the five leading national societies whose membership includes up to 100 per cent

goldfish enthusiasts. This in its first year, and with the very minimum of publicity.

Difference of opinion on the controversial subject, "Goldfish Standards" will only be resolved by those directly involved with the coldwater fancy, and one "National Standard" acceptable to all is envisaged in the foreseeable future. The "Cons and Feds" also have a part to play, and their voice, proportionate in respect of coldwater aquarists, cannot be denied.

We may all one day "justify our existence" by conforming to a national coldwater group in the interest of unity, and on a national scale.

Yours faithfully,
F. R. CLOSS,
154 South Road,
Handsworth,
Birmingham, B18 5LE.

Elemental

I should like to comment on the article about marine fishkeeping, especially the part about "trace elements" at page 68 of the May, 1975 *Aquarist*, as, although I am not myself a marine aquarist, I feel some of the statements in that article might confuse. For example, the number of chemical elements was said to be probably unknown: there are 91 naturally occurring elements, plus a dozen or so man-made

(such as technetium and plutonium) which are unlikely to matter in marine salts.

Also, that article gave a list of elements which a marine salt should contain, including helium, neon, krypton, xenon and radon. As these particular elements are gases forming no compounds under normal conditions, radon moreover being radioactive, it is perhaps unfair to expect a marine salt preparation to contain them, and any preparation which *does* claim to contain them may be regarded with "a pinch of salt."

Yours faithfully,
P. W. NEVILLS,
1A Allandale Crescent,
Potters Bar,
Hertfordshire EN6 2JY.

Aquarist Indexes

If anyone would like duplicates of my indexes for Vols. 37 and 38 (1972-3 and 1973-4) at cost, drop me a line with s.a.c. so that I can get a quotation for the duplicating.

Geoff Hopkins,
Achvarasdal,
Reay,
Thurso,
Caithness KW14 7RR.

M.A.F., 1975 (continued from page 129)

Aquatic Festival, and is to be organised by the six societies involved.

The "six" would combine to ensure the success of the show and would encourage their members to participate in the "National" also in shows organised by the respective societies i.e. The Goldfish Society of Great Britain Convention, The Bristol Aquarist Society Show etc.

Societies would reserve the right to promote their own shows and to use show standards of their choice. The "six" would accept for this particular National Show (1975) the show standards and schedule of the host society. Judges to be invited from Societies involved. Societies would not lose their individual identity and Society status would be upheld. In addition to the many points of understanding and compromise a "National Committee" is being formed to further the mutually agreed aims of improving stability, and would assist the ultimate unification of organisations within the hobby. This Show is open to the Nation's Coldwater Fishkeepers and promises tremendous and exciting possibilities for the future.

The six societies are to be congratulated for their consideration, co-operation and compromise, and

their magnanimous gesture to stage the "National" is deserving of the heartfelt thanks of the Coldwater fraternity throughout the land. It will not go unnoticed, history never does.

With the new Exhibition Centre nearing completion the M.A.F. organisers are investigating the possibilities of its use as a Venue, for shows in future years. Situated in the heart of England this multi-million pound project has already been acclaimed as "The pride of the Nation." Speculation however, seems to have "run riot" in the Midlands as to the merits and high potential of an Aquatic Exhibition staged at this new and enterprising building. One suggestion favoured a "National Exhibition of Aquarium Fishes" (Tropical and Coldwater). The idea at the moment seems impossible, but warrants some consideration.

With the "Coldwater People" acting in the best interests of the hobby, why can't the "Feds and Cons" convene a meeting and try to resolve their differences? They have much in common, and could "agree to differ" on the rest, thus leaving the door open for further negotiations. What better place for friendly discussion than Bingley Hall and the Midland Aquatic Festival?

WHAT IS YOUR OPINION?

by B. Whiteside, B.A.

Photographs by the Author



I AM PLEASED to be able to begin this month's feature with a letter from a young aquarist who lives in my part of the country. He is Master Jeremy McNeice and his address is 134 The Roddens, Larne, Co. Antrim. Jeremy writes: "I thought you would be interested to know how my tortoise fared during his winter hibernation. He awoke on 27th February and, as this was rather early, I kept him awake, warm and well fed, beside the kitchen stove, until the weather improved enough to allow him to venture outside. He appears to have suffered no ill effects from his winter sleep and he has eaten consistently since then. He completely devoured all the young seedlings in the rockery where he is enclosed; but he soon won his way into favour by clearing up the vetches, buttercups and dandelions that were also appearing. By the way, I have called him 'Tojo' after your late specimen. I hope you raise no objections.

"I was recently forced to sell my tanks as we were moving; but I am now making preparations to start up again. The last tank I bought was a 48 in. x 12 in. x 15 in. nylon-coated aquarium and it cost me £11.00. I now find, however, that a similar tank has more than doubled in price—and the cost of other equipment has also risen drastically. Although a fair number of people I know have started, or are about to start, the hobby, I fear that continued rising prices might discourage further prospective aquarists." (Only today I dug up the shell of my late tortoise; hence I'm pleased to know that there's another 'Tojo' thriving in the area).

Mr. R. Myatt's home is at 85 Neville Street, Oakhill, Stoke-on-Trent. He states: "I have been keeping tropical fishes for about 10 years and I think that *The Aquarist* is still very good value. I have been interested to note that you have a pair of angels that spawn quite frequently. My angels have spawned regularly too. They do so nearly always on a large leaf of Java fern. The first couple of times I didn't bother about the eggs; but on the last two occasions I decided to try to hatch them away from the parents. The eggs hatched all right but the fry did not survive to the free swimming stage. Anyway, I have not given up yet as the angels have just spawned again. The plants that do well in my community tank are *Microsorium pteropus* (Java fern), *Aponogeton crispus*, *Bacopa*

and baby tears (*Helxine* species). The lighting is 2 x 40 watt tungsten bulbs on for 10 hours per day. I have a U/G filter and the water conditions are pH 7.2 and 12°DH. I have just finished assembling an all-glass aquarium following the directions in a useful article that was printed in a back number of *The Aquarist*. Finally, I would like to say that *What Is Your Opinion?* is always very interesting and some good tips and ideas are often contributed."

Mr. D. J. Radford, of 1 Greystoke Avenue, Newcastle-upon-Tyne, writes: "... I find that *Cabomba* and *Ambulia* do best in my aquarium, growing at a rate of 1-2 in. per week; and I frequently have to throw pieces away in the absence of someone to whom I could give them. Also, I have no trouble in growing duckweed—which proves a positive nuisance as I have to keep clearing it off the water surface." (I too find duckweed an absolute pest. Four of my six tanks have the water surfaces covered with this plant and I frequently have to net large quantities of it to allow any light to reach the bottom rooting plants. Last week, in despair, I added an algae killer to the four tanks in the hope that it might kill off the duckweed. The duckweed population in one of the tanks has diminished but those in the other tanks show no signs of being affected. It's virtually impossible to remove all pieces of duckweed—and one or two remaining plants can soon re-populate a whole tank. The only interesting thing about duckweed species is that they bear the smallest flowers of any plants in the world. Do any readers know of fishes that would feed on duckweed plants while leaving larger plants alone? The plants' name suggests that they might be eaten by ducks—but I don't fancy putting a duck in my tanks to clear up the duckweed. A piece of absorbent paper drawn across the water surface will often remove a lot of duckweed plants; but those that are missed soon reproduce to re-cover the water surface. What solution do you suggest?) Mr. Radford continues: "My tanks are kept at 74°F and the pH is around 6.7. A plant I am not so successful with is *Vallisneria*, both straight and twisted species; both grow very slowly, if at all. Lighting is from one 12 in. clear tube for 12 hours daily. I am glad you included a photograph of water wistaria plants in the May edition. It enabled me to identify a

single specimen which I have had for some time. When it was about 3 in. long, and planted in 12 in. of water, the leaves grew with smooth edges; but now it has reached the water surface the leaves are developing with more jagged edges as in your photograph. This is an interesting phenomenon, presumably due to the increasing light intensity nearer the water surface. The conditions are as previously mentioned. On the subject of powdered dried foods for fry, I have found that the TetraMin food for egg-layers is acceptable to both honey gouramies bred by myself and cherry barbs bred by a friend. It is not long before the fish are prepared to take small pieces of the large flake food by TetraMin, a food which I also feed to my young live bearers from birth. I look forward to you readers' comments on the breeding of *Corydoras* catfish, a group of fish I find very interesting."



Christopher Dean is 17 years old, resides at Old Tom's Farm, Long Marston, Tring, Herts., and has been keeping tropicals for six years. He writes: "Fish keeping is spreading like wildfire in our small village and I am glad to say I inspired some of it. I think a lot more people would keep fish if only someone could get them started. As to your question about dried fish food going soft, I think this is inevitable due to the fact that the tin is being opened twice or more times per day, thus letting in moist air from around the tank. The lid is then shut down tight and damp air is trapped in. As for being less popular with fish, I don't find this. All my fish take the food eagerly whatever state it is in, although a fresh tin always looks to me to be more appetizing than one that has had damp fingers plunged in regularly. Last year I bought a small 18 in. x 12 in. x 12 in. tank and put one male and one female guppy in it. They started having babies almost at once. Then six

months later there seemed to be hundreds of babies, of different sizes in there. I began to wonder what to do so I bought another 24 in. x 12 in. x 12 in. tank. This was soon full of guppies and they seemed to be ever increasing and seemed to breed before I could sell them. At the moment I am at desperation point and am going to have to put in an angel fish to clear up some of the smaller guppies. The shop I sell them to gives me 15p for my males and then retails them at 45p each. This seems to be a big profit margin for the dealer. What do you think?

"I would just like to say that I think the *Plecostomus* catfish is one of the best fish on the market. I have a 4-5 in. specimen and it keeps my 36 in. x 12 in. x 15 in. tank spotless and is a beautiful, rich brown colour which is so varying that one never tires of watching—especially when he plays in the air bubbles from the air stone. He is very peaceful and does not

eat even the tiniest guppy. He is just the right size for my tank because when he gets bigger he will probably look cramped in a tank such as mine and won't look half as nice. My plants grow well under Gro-Lux or tungsten lighting. The best plants seem to be water roses. I started with one of about 1-2 in. high and it has grown to the top of the tank three times after having been cut back to 6 in.; and now I have four 12 in. tall water roses. They are not at all straggly and are a very lush green colour."

The next letter comes from Mr. J. R. Wheeler, whose home is at Wembury, Newport Street, Clun, Craven Arms, Salop. Mr. Wheeler writes: "May I dissent from Mr. Delaney's opinion of *A Naturalist's Notebook*? We are not all technicians, or even specialists. Some of us are naturalists with a strong bias towards aquatic biology. *A Naturalist's Notebook* is like a breath of fresh air. I enclose some twelve reasons for growing plants in aquaria. 1. In daylight

or artificial light, the plants breathe out oxygen so benefiting the fish. 2. The plants' roots use up the excreta of the fish. 3. Green plants are the perfect background for red/gold fish, and a good background for fish of other colours, e.g. black. 4. Plants have an aesthetic value. A tank can be made beautiful with plants alone without rock work or even fish. 5. Goldfish and some other species obtain some of their food from plants. 6. Growing plants is interesting. 7. Plants give shade for species which need it. 8. Plants provide a spawning medium. 9. They provide nesting materials for certain species. 10. Plants enable fry to escape from adult fish. 11. They provide, in the community tank, refuge from aggressive fish for inoffensive species. 12. In such a tank plants may be used to demarcate a territory."



Mr. Nigel Steer, of 229 Kimberworth Park Road, Rotherham, S. Yorks, writes: "I alternate my flaked fish foods between TetraMin and Phillips. These do not seem to go dry after a while, and the fish in my 36 in. community tank still eat them with relish even after a long while. I also use Phillips Aquavite as a vitamin tablet. After keeping fish for about one year none of them has been ill, so I must presume that this is due to the tablets. I also believe that dealers make excessive profits on some fishes. I recently saw one advertisement in *The Aquarist and Pondkeeper* inviting you to import your own fish from 2p each; so how is it that the cheapest fish I can find is 15p? My local dealer also told me he had bought some large angel fish for £2.00 and £2.50, and yet he was selling them for £4.00 and £4.50. Taking into account the cost of air freight he still must be making an exorbitant profit. Recently I started my own *Daphnia* pool. This is an old wash basin with rocks in it; and it is

placed under the hedge. A good growth of *algae* is present on the rocks; and the *Daphnia* are fed twice a day on a pinch of yeast. They are now thriving well and soon I hope to take off my first culture."

No. 42 Kildare Crescent, Kirkholt, Rochdale, Lancs., is the home address of Mr. J. Ellis. He states: "I am writing to express my thoughts on the large cichlids. I have kept Zebra-Texas and, what I think the most rewarding of them all, Oscars. After reading your February and March issues I realise I am not the only Oscar lover. I keep my cichlids in 3 ft. tanks. I find U/G filters ample to keep my tanks clean. I also found it impossible to keep real or plastic plants with my cichlids as they just ripped them out of the gravel. I feed my fishes on non-fatty food, i.e. meat. This might sound expensive but it only means cutting

all the fat off such meats as bacon, stewing steak, etc. I have had no luck breeding the large cichlids but I will keep on trying."

On now to some opinions from Michael Brennan, aged 15 years, who lives at 4 Vale Road, Oatlands Park, Weybridge, Surrey. Michael writes: "When I saw your question asking if dealers are making excessive profits on some fish I felt I had to write to tell you about a pet shop near where I live. Most of the prices asked for the fish are high—like nearly £1.00 for a male Siamese fighter; and a pair of *P. kribensis* costs £3.00. When I enquired further the man, who claimed to be an expert, said that the fish with the red sides was the male, and the fish with the spots on its caudal was the female. I told him that I breed *P. kribensis* and know that the fish with the bloated, red sides is the female. It wasn't until another customer agreed with me that the shopkeeper admitted that he must have made a slip up. It annoys me when

I meet people who think they know everything and really know nothing. In another aquatic shop I was selling 49 multi-coloured delta guppies to the owner. He gave me 5p each for them; but was selling them for 70p per pair! I think this is a big profit. I hope you print my letter as I feel strongly about the profit dealers make on fish. I would like to exchange letters with somebody who keeps and breeds Mozambique mouth-brooders or *P. kribensis*. I think your magazine is brilliant!

Mr. T. J. Jones, a beautifully neat writer, lives at 43 Rudd Street, Hoylake, Wirral, Merseyside. He states: "... I have two tanks of tropical fish—one 48 in. x 15 in. x 12 in., and another 36 in. x 18 in. x 15 in. In addition I have one 36 in. tank housing 5 veiltail goldfish and one Japanese blue shubunkin. I have also a 30 in. tank which is the home of a large *Talapia maria* female which is a family pet and very

in a way, he has a point; but for their aesthetic value alone, and the challenge they present, surely they are worth something. What do you think, Mr. Whiteside?" (Mr. Jones sent me some very interesting photographs of his fresh water and marine aquaria. The marine tanks certainly look most colourful and attractive. Although I have not yet gained enough courage to venture into the field of marines I know, from the comments of Mr. Douglas Rose, that marine fishes can be kept as easily as fresh water fishes—if one knows how. If I were you I would ignore the comments of your club secretary. Most egg-laying fresh water fishes, when first kept in captivity, could not be bred—until individuals around the world managed to breed specific species. I have no doubt that in a few years' time marine fishes will be being bred fairly easily by numbers of amateur aquarists. Tropical marines are a fairly new branch of the hobby and it



tame. Recently, after extensive reading and study, I decided to attempt marine fish, so I prepared a 39 in. x 15 in. x 12 in. Jewel tank, with Synthetica sea salt, and furnished it with rocks, coral and various tropical sea shells. It has Algarde U/G filters with four air lifts, supplied by a Rena 301 air pump, and the filter is covered with a 3 in. bed of crushed cockle shell. The tank after 34 days, and using hardy damsel fish to mature the water, is now nitrate free and houses one Malayan angel, one saffron blue damsel fish, and one humbug damsel fish. I have prepared a small 18 in. x 10 in. x 8 in. nylon framed tank as a quarantine aquarium, and at the moment I have a domino damsel and an electric blue damsel under medication as a safeguard against *Oodinium*. You can imagine my drop in spirits when the secretary of my aquarist club poured cold water on the whole marine set up. According to him marines are a complete waste of time and money; they are expensive because we cannot breed them; and the coral reefs are being denuded for no good reason. I suppose,

will take some time for them to become very popular. When they do—and when numbers of people learn how to breed them in captivity—their price should drop down to a level where the average aquarist will be willing to move into the marine field without worrying about losing one very expensive fish. It was amateurs like you, Mr. Jones, who probably bred for the first time some of the tropicals that we now consider to be easily bred. Keep at the marines; you might even be the first person to breed a specific species in captivity!

Master C. Atkinson of 7 Mill Balk Place, Snaith, Nr. Goole, N. Humberside, is 14 years old and he writes: "I find fish foods do go off if left in cardboard containers in a damp atmosphere, i.e. near the tank itself, and they are best kept in a closed container like a screw top jam jar. I did an experiment to find out whether or not vitamin tablets for fishes work. I bought four opaline gouramies and put two into each of two different tanks. Every three days I dropped a vitamin tablet into one tank. I did this for three

weeks, at the end of which time the two fish given the added vitamins appeared to be in outstanding condition. All four had been fed on the same foods—flake foods and occasional *Daphnia*. After this period I used the tablets on guppy, platy and swordtail fry, and when they reached a reasonable size they were a wonderful sight. My pond fishes, with the exception of one or two, survived the winter well despite an excessively cold spell. I would be grateful to have any information on the breeding of lace gouramies. I also agree with the points mentioned by Mr. Delaney; however, I feel that *From a Naturalist's Notebook* and *For the Herpetologist's Bookshelf* should really be in a magazine of their own intended for those who are especially interested in these subjects."

The next letter reached me from Mr. J. A. Dymott, whose home is at 18 James Street, Barrow-in-Furness, Cumbria. He informs us: "I notice that many people regard algae as pests in an aquarium, something with which I wholly disagree providing the algae are of the green variety. In my Malawi community tank, which is 36 in. x 12 in. x 15 in. I have three 40 watt bulbs used for about 14-16 hours per day. I grow a fantastic amount of algae and the tank looks better for it. I also have two *Vallisneria torta*, ten *Cryptocoryne* and seven Amazon swords, all thriving together. About $\frac{3}{4}$ of the tank is filled with rock work and this is where the algae are beneficial for they hide cracks where the rocks join and disguise different coloured rock work. Algae are also one of the main foods of my fish and never do they run short. My fish will gorge themselves on algae regardless of whatever food is put in the tank.

"This is the first time I have ever had success with plants. I had tried many times in the past to grow swords, *Vallisneria*, *Cryptocoryne*, *Cabomba*, *Elodea densa* etc. in local tap water—pH 7.0, 80 p.p.m. CaCO_3 —and even *Vallisneria* took root and started growing within a fortnight of being planted. Amazon swords took about one month and *Cabomba* and *Elodea densa* grew immediately. The *Cryptocoryne* took about two weeks. Whether or not this is attributable to the chemical treatment I do not know as I feed the fishes heavily on mussel meat and most of the flake I give them settles and decomposes in cracks in the rocks forming a good thick layer of detritus which always seems to end up round the roots of the plants. In my other two tanks I do not use plants—just a large amount of rock work set up to form caves and small fissures. These latter are handy for fry to grow up in. I once grew a convict from five days old to $\frac{3}{4}$ in. while in a tank containing a 3 in. pair of jewel fish, a 2 $\frac{1}{2}$ in. pair of Texas cichlids and a 2 in. pair of convicts, just by having these fissures.

"Finally I would just like to tell you how I grow cichlid fry away from their parents. I normally use a 2 ft. tank which I allow to become thick with algae

and I throw in several boiled mussels and plenty of flake foods. I use this method so a thick organic deposit forms over the bottom. This method causes the fry to grow on at a rapid rate with little loss. I just throw in a couple of mussels from time to time after that to keep the food supply well up. A word of warning though—a good air supply is necessary otherwise a fungus will settle on the detritus and kill off the fish."

Mr. M. McDonald, a Scottish reader, lives at 11 Carron Walk, Almond West, Livingston, West Lothian. He writes: "I feel I am quite qualified to give a reply to the query about dealers' profits. I have been an aquarist for a number of years, am show manager for our local society, and at one time ran a part-time fish business which was really more part of my hobby than a business; however it was enough to give me insight into the requirements of a large, full-time shop. Let me start by saying that there are definitely not fantastic profits to be made from tropical fish as a business on their own unless one goes into them on a very large scale: importing one's own fish and bulk buying dry goods on a massive scale. So, let us consider the average pet shop with which most of us deal. The normal retailer buys his fish from a wholesaler and sells at twice the price he pays for them. Now at first glance this sounds like a terrific profit margin—100%—until you consider that each batch of fish bought will produce at least 25% losses, plus some runts which either have to be destroyed or sold very cheaply. Next we have the cost of feeding the fish—which is quite high. Any self-respecting retailer will feed so that he attracts customers. Nothing looks worse than walking into a shop and seeing a lot of scraggy fish in the tanks. It is the first thing to turn away your customers. Everyone knows what a quarterly electricity account is like. In a shop, whether they have individual tank heaters or room heating to a temperature of 75°F, heating has to be kept on 24 hours per day, seven days per week, the whole year round. The cost of lighting the tanks and the shop, and a constant supply of hot water, all add up to a massive electricity bill. Then there are wages to be paid as well as rent and rates. A lot of older property which used to be a source of cheap rent and rates is now giving way to modern shopping centres with the result that rent and rates are in some cases prohibitive. £40.00 per week is not an unusually high figure for this.

"A van or some sort of vehicle is required for collecting fish, etc. from the airport or railway station. I'd like to point out here that this is usually done late at night. Many a time I've gone to the airport to collect a batch of fish and by the time I've got back, examined the fish and put them in their respective tanks it has been 2.00 or 3.00 a.m. when I've climbed

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A SPAWNING OF *Pseudotropheus livingstonii*

by David R. Smith

THIS MALAWI CICHLID is known to reach a size of 12 cms. and is named after the famous Scottish explorer Dr. David Livingstone.

I have had my pair since July 1974 and I find them to be among the most peaceful of my Malawi Cichlids. The male fish of my pair is 8 cms. in size and the female is approximately 5 cms.

These fish are very colourful and are always willing to show themselves at all times, being amongst the first to come to the front of the tank at feeding times.

Both male and female have an overall body colour of deep gold interspersed with five or six irregular chocolate brown bars, one of which extends over the top of the head of the fish.

The male has a creamy blue colour extending over the whole of the lower jaw back to the gills. In the female, this part is coloured a creamy pink and this is the only sex difference, apart from size, that I have found in this fish.

The dark brown bars on both fish extend through the dorsal fins and the caudal fins are streaked with yellow and there is also a band of yellow running the length of the dorsal fin.

Both my fish have egg-spots, the male having three to the female's one.

When in breeding condition and when spawning, the male *P. livingstonii* takes on a bluish sheen which extends over his whole body with the creamy patch under his jaw turning a deep shade of purple.

I kept both fish in one of my main Malawi cichlid community tanks along with pairs of *P. zebra*, *Labeotropheus vellicans* and *L. trewavasae*.

Having tried, with more failures than successes, to spawn Malawi cichlid pairs in a tank by themselves using separators as the need arose, I have come to the conclusion that it is best to keep pairs in a community tank set-up as long as they are provided with plenty of rockwork in the form of caves and tunnels to allow the taking up of territories by the males, and to give the females the chance to hide away when the males

become too boisterous in their chasing.

A word of warning here: be sure to construct your rockwork in such a manner that the digging of pits by the fish will not collapse any of the rocks against the glass of the tank.

My fish are well fed at all times with as much variety as I can provide and this keeps them happy and does away with the need for any special conditioning foods.

My male *P. livingstonii* began displaying to the female late one afternoon just after I had completed a water-change and had fed them some bloodworms.

He started defending an area taking up almost half the 48 in. x 15 in. x 12 in. tank and all other fish were kept at a distance including a male *P. zebra*, normally the dominant fish in the tank.

Although vigorous in his displaying the male was not overtly vicious and the female, after some initial hesitancy, approached him and began to circle him as he quivered madly over a piece of slate.

Eventually the female began to lay her eggs and as the male fertilised them she picked them up in her mouth. Two or three eggs were laid at a time and the whole spawning took forty minutes.

When the spawning act was over the female moved off to a small cave in one corner of the tank and the male paid her no more attention.

I left the female in the main tank for an hour or two to enable the eggs to settle in the buccal cavity then I moved her to an 18 in. x 10 in. x 10 in. tank to enable her to brood her eggs in peace.

As the days passed the bulge under the female's jaw grew noticeably and I was not too surprised when, after sixteen days, she spat out 34 young which were all perfect replicas of the adults.

The young were ignored by the female and no after-brood care was given.

All but one of the young have survived and are now almost 2 cms. in length, eating voraciously, being as undemanding in their diet as their parents.



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

by Jack Hems

Please give me some information on *Apistogramma wickleri*.

This pygmy cichlid is from northern South America. Of the two sexes, the male is the larger and reaches about 3 in. It is a quarrelsome fish with its own kind, but may be kept in a community tank housing the larger livebearers, medium-sized characins, and the like, and, better still for safety, with fishes that frequent the middle and upper layers of the water. *A. wickleri* is a cave spawner and after the eggs hatch out, the fry are moved about to various depressions fanned in the sand.

Is it possible to keep brown discus in a community tank filled with ordinary tapwater?

Discus, all discus, flourish best when given a tank to themselves. Essentially discus are softwater fishes. Moreover, the water must be kept scrupulously clean and peaty acid.

Is it possible to purchase lime-free gravel from aquarium shops? I ask this question because up to now whenever I have tried to obtain lime free gravel, I have been told it is difficult to obtain or have been met with a puzzled looking stare.

Most reputable dealers sell lime free grit. If you continue to experience difficulty in obtaining a suitable compost for your aquarium, then I suggest you visit a good nursery specializing in calcifuges such as most cricas or, say, azaleas, which require a lime free grit in their potting compost.

I should like to know a lot more about the environment and behaviour of piranhas than I can find in Dr. G. S. Myer's *The Piranha Book*. What literature do you recommend?

I recommend that you visit local and public libraries and dip into books dealing with South America and Brazil in particular. It saves time if the books you

consult have an index, for then you can turn up entries on "fishes" or "piranhas." Books on South America by authors such as Peter Fleming and Willard Price contain much useful and out-of-the-ordinary information.

Please give me some information on the new aquatic fern called *Bolbitis heudeloti*.

B. heudeloti is a beautiful plant but annoyingly slow to grow. Its rootstock should be tied to a stone or piece of non-toxic wood and then left undisturbed. It may be months before a crozier-like frond will unfold. However, once established it will grow faster and look extraordinarily beautiful. It appears to flourish best in peaty water and a strictly tropical temperature. A reasonably good light is recommended.

I have a 24 in. by 12 in. by 12 in. tank housing four guppies, two platies, two cardinal tetras, one *Corydoras* catfish and a small loach. When the female guppies have young will the fry survive in my tank or must I set up a special tank for my guppy breeding?

Ideally guppies should be given a tank to themselves, that is for breeding. Yet provided your community tank is thickly planted, then a few youngsters of every brood will escape being eaten. Even a special tank for breeding guppies requires plenty of plants to afford shelter.

I am a beginner in tropical fishkeeping and have installed under-gravel filtration to keep my water clear of swirling sediment. What I should like to know is: how often should I change the water to keep it pure?

Providing you learn how to feed the fishes properly, that is to say do not give them too much dried food or meaty food at a time so that the bottom does not become loaded with excessive left-overs, then there

is no need to change the water for years. All the same, an occasional siphoning of the bottom is often worth the trouble. The water drawn off and thrown away should be replaced with clean rainwater collected in a non-metallic container such as a plastic bowl or bucket, or ordinary mains water boiled first and then cooled down to aquarium temperature.

I should appreciate some information on the care and breeding procedure, with special emphasis on raising fry without too many losses, of the dwarf gourami.

A well-lighted and thickly planted tank is recommended for this fish. Next, a temperature of about 75°(24°C) for normal maintenance, raising this to about 78°F (26°C) for breeding. After eggs have been placed in the bubble nest and the fry have hatched out (within the space of two days) see that as near an even temperature as possible is maintained for the next six weeks or so, and a close cover is kept on the aquarium to prevent cool air wafting across the surface. Feeding should be of microscopic live or prepared food and make certain that not too much food is given at a time, for the slightest pollution of the water will mean the death of most, if not all, of the fry.

A few weeks ago, I went into a dealer's shop and saw some brightly coloured freshwater fish which I was told belonged to the family of gobies. I bought three and they have settled down very well in my community tank, but spend a lot of time defending their lurking places under some rockwork against intruders. Please can you tell me anything about these gobies?

If you had mentioned the length of your fish, the coloration and general shape of the body and finnage perhaps I might have been able to identify them for you. As it is, all I can say is that a dozen or more gobies or goby-like fishes are known to the aquarist. Some of them are fin-nippers and aggressive, some of them are delicate and do not last long in the aquarium, not a few are specialized feeders or require salty water, and gobies in general are very diverse in appearance and size. If you care to write in again and give me more details about your fish, I may be able to give you some more helpful information.

As I was given to understand that some cichlids I bought thrived best in very soft water, I filled the tank I placed them in with distilled water. Imagine my surprise when they died. Please can you give me a reason?

Distilled water is lacking in everything except perhaps traces of copper picked up during the process of distillation. Therefore, it is best to pass it through peat which will give it some "body" and also remove the metallic salt which might be present. Better still mix distilled water with a small quantity of ordinary mains water before use. A half-and-half

mixture of tapwater and distilled water should be about right for most fish that favour a softish water.

I bought a fish called an elongate mbuna. Can you tell me the proper name of this fish and its requirements in the aquarium?

I suspect the fish you have is *Pseudotropheus elongatus*. The female of this species is pale blue, the male a darker blue with shadowy or inky black bars on the sides. The dark bars usually, if not always, appear when the fish is excited about something such as a change of environment or breeding. *P. elongatus* is an African cichlid from Lake Malawi. It is not to be trusted in an aquarium housing other smaller or similar-sized fishes and does best at a temperature of about 77°F (25°C) or higher. It will eat most foods including greenstuff such as algae, or a suitable substitute.

Please can you tell me if the fish formally known as *Gyrinocheilus aymonieri* is a member of the family *Cobitidae*?

This fish is not a member of the family *Cobitidae*. It is a member of the family *Gyrinocheilidae* and is represented by the single genus *Gyrinocheilus* which contains only a few species.

I found the article on the oscar in the May issue very interesting. Please can you tell me the maximum size of this fish, its requirements in the way of food and country of origin?

The fish commonly called the oscar grows to a length of about 12 in. It requires meat and the bulkier live foods such as earthworms, mealworms, tadpoles, small fishes, and the like, and ranges in the wild state over the middle and north-eastern parts of South America.

My firemouth cichlids have just spawned and I would like to know what food to introduce for the fry as soon as they break free from the eggs?

Firstly, forget all about food for the first few days. Newly hatched fry are usually moved to a depression, or depressions, fanned in the sand or grit covering the tank floor and the parent fish hover about the wriggling mass. On the seventh or eighth day after hatching out, however, the fry will be ready for food. I suggest micro-worms, brine shrimps or large infusorians for the first three days, after which the baby fish will be large enough to take sieved *Daphnia*, gnat larvae, cyclops and, perhaps, a fine grade of prepared food (or crushed flake food).

Could I keep baby oscars with angel fish?

Certainly not. Even baby oscars are fin-nippers and bullies and the long fins of angel fish would soon attract their unwelcome attentions. All the same, baby oscars may be kept for quite a time in a large tank housing a collection of short-finned and fast-moving fishes such as the heavy bodied barbs and other more peaceful and larger cichlids.

COLDWATER QUERIES

by Arthur Boarder

I intend to breed Chocolate orandas and would like to know the standards for showing this particular fish?

There are no special standards for this variety and so the fish will have to be shown in the Oranda class. This is, of course, if you can find an exhibition where this fish is catered for. Any type of Oranda such as normal colour; red-cap; chocolate or any other colour would be in one class. There are not many aquarist shows where a class is provided for the Oranda, but several varieties may have to compete, such as veiltails, orandas, lionheads, celestials, pearl scales and bubble-eyes. You might find a show with several classes for fancy goldfish including moors, but most small shows will have a class for common goldfish, one for shubunkins, one for fantails, one for moors, one for veiltails and the rest, such as comets and all the other varieties will have to fight it out between them. It is difficult to assess the value of an oranda if it has to compete with several other varieties and unless the judge has time to point up all the fishes in the class there is little for the exhibitor to go by.

Having found a show with a class for orandas you are still not out of the wood as at least three different societies have their own standards for this fish, which differ considerably in one case. The Federation of British Aquatic Society's standards require the fish to comply exactly with those for the veiltail except that the fish shall carry a hood which covers the head and gill-plates. The illustration for the oranda of the Goldfish Society of Gt. Britain shows a fish with a caudal fin forked, as against the straight based fin of the former society. Also the shape of the dorsal fin is quite different for these two fishes. Then there are the standards of the International Judges' Association which show the oranda as rather similar to those of the Federation, but again the dorsal fin is of a different shape. Why we have to have at least three different standards for the same variety beats me. It seems that some people must justify their existence as a separate society by introducing something different. They appear to bear no responsibility at all for the difficulties they present to the breeders of fancy goldfish.

Can you please tell me which water plants are suitable for a temperature of 60°-70°F., and what is the best medium for planting?

Any of the coldwater plants will grow in the water temperature stated and many of the tropical ones

as well. Most of the plants as used in cold tanks will appreciate a warmer water and grow far more quickly. As there is a fairly wide choice of coldwater plants from which to choose there is no need to use any of the tropical ones. Some useful plants are: *Vallisneria spiralis*, *Egeria densa*, *Lagarosiphon major*, *Ceratophyllum demersum*, *Elodea canadensis*, *Myriophyllum pinnatum*, *Eleocharis acicularis*, *Fontinalis gracilis*, and *Hygrophila* species. For a medium to small-sized tank there is no need to use any base compost other than the usual gravel-coarse sand type. In a fairly large tank it is advisable to use some loam or potting compost near the back of the tank, about two inches deep under the usual compost. This gives the plants a good start before the droppings of the fishes have become available as nutriment.

Although this list of plants is given it is not at all necessary to use more than two or three kinds in the average tank. For any tank under 24 × 12 × 12 in., I use *Vallisneria spiralis* and *Ceratophyllum demersum* only. The former grows well without getting out of hand and the latter only needs occasional pruning during the growing season. Even for a slightly larger tank the addition of some *Hygrophila* is all that is needed to make an attractive and healthy tank.

If a goldfish has had some damage to the tail through fin-rot, will the tail grow again? Also, I bought some fungicide for treatment. It is of an American make. What is the U.S. gallon as compared with the British gallon?

The damaged caudal fin will grow again once the disease is cleared. There may be a thickened joint where the mend occurs. It is a bit tricky to work out the equivalent capacity of the two gallons but the following formula will give you a guide: 1 cubic foot = 28.515 litres; 1 Imperial gallon = 4.544 litres and 1 U.S. gallon = 3.785 litres.

I had a small pond which I recently made a little larger, but on replacing the fish they all died within 48 hours. I replaced the fish with fresh ones and they all died soon after. I have replaced an old furred-up lead pipe with a copper one. Do you think this feed pipe could have caused the deaths of the fish as the pipe is only about three feet long?

As the pond is still rather small and the copper pipe is new I think that copper poisoning was the

cause of the death of the fish. It has been stated that as little as a fifth part of copper to a million parts of water can be fatal to some fishes.

I am thinking of purchasing a 3 ft. x 2 ft. tank and stocking it with small coarse fishes such as Roach, Perch, etc. Can you give me any advice before I start as to whether this project is a good one?

Although it is possible to keep small coarse fishes in an indoor tank, you will have to be more careful with your choice of fishes. The Perch is carnivorous and would attack any other small fish. The Roach is not the best fish for a tank as it is often attacked by fungus disease, although this may be due to careless handling of the fish when it is caught. You could have Rudd, Tench, Minnows and Gudgeon. The two last named are more at home in running water but could be kept as long as the water remained pure and the tank was not over-crowded. A tank with just a few small Perch would be the most attractive, as this fish is the handomest of the British coarse fishes.

There is a small ornamental pool inside our building and it is lined with marble tiles. Goldfish do not live in it. Can you explain why?

It is probable that the marble is giving off some free lime and this could be poisonous to the fishes. The pool may have to be lined with one of the liners, perhaps a Flexilene type as a coloured one could be used, even one with imitation pebbles on it.

We have found one or two goldfish in our pond with green algae-like substance hanging from their gill and mouths. What is this?

It seems that the fish have some fungus disease at the parts mentioned and this originally white fluffy substance has become stained by the green algae in the water.

In the grounds of our boarding school there is a pond which is about 15-20 feet wide and 35 feet long. It is fed from an inlet about 20 feet away. The pond is 4 feet deep but there is about 18 inches of black mud at the bottom. How can this be removed or is it possible to plant it up and if so with what plants? Should I redirect the water from running into the pond as it may come from the drainage from the grounds?

The pond is a fairly large one and so it will be a major task to remove the surplus mud. If the pond could be emptied of water by stopping the inflow and siphoning out, the mud could then be removed. A number of the boys with gum boots could have a ball scooping out the mud with buckets, etc. If

the removal of the mud presents too big a problem, I suggest that you plant it up well and the roots of the plants will tend to keep most of the foul matter from doing any harm. Water lilies will do well, and so will several other plants such as *Pontederia cordata*; *Butomus umbellatus* and *Sagittaria japonica*. Any reeds or rushes would do well if planted at the sides. There is no need to plant in containers, but just weight the root-stock heavily and throw in where the plant is needed. Once the water clears you can try a few fishes. Common goldfish will do for a start. If all goes well some other varieties can be added such as comets, shubunkins, fantails and golden orfe. You state that you would like to include Koi but I suggest that they may not do well, but in any case you might like to try one or two small ones to see how they exist. It may be as well to cut the water off from flowing into the pond as it may be harmful or it may be possible to arrange a type of filter at the pond side to tend to clean the water.

I have a tank 5 ft. x 2 ft. x 2ft., in which I want to keep a selection of fancy goldfish, such as moors, fantails, shubunkins, veiltails, red-cap orandas, chocolate orandas, lionheads, celestials and bubble-eyes. Can these fish stand a temperature of 70°F. in the summer and 55°F. in the winter, and could I have 26 fish of two inches in length?

Your tank should function well with the number of fish you state. Plant it up well with oxygenating plants and never give too much food at a time; rather feed three times a day with an amount which is soon cleared up. The fish will appreciate a summer temperature of 70°F, and the winter one will be quite safe. The fish should agree all right but if there is any breeding then you are likely to get many cross-breds. The firm I will recommend will send out by rail to all parts of the country.

I shall be grateful if you can put me in touch with anyone who can supply me with two pairs of Bristol shubunkins of exhibiton quality?

You will not find it an easy task to buy the fish you require. As you state that you have been to shows with no chance of getting the fish you require, you will no doubt have noticed that there are very few really good shubunkins about. Owners of the kind of fish you want are not likely to let such fish go. The best bet is to try to buy a number of very young fish (from a good breeder) of the type you need. It is not easy to pick the winners from very young fish and so you may get a couple of pairs which, if not actually winners, could certainly breed

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VIEWPOINT

by A. Jenno

THE saga of my garden pool misfortunes unfortunately continues. No sooner had I written last month's contribution and sent it off than the difficulties I had described worsened. The heavy accumulation of extra body-slime on the Koi developed quickly into fungus. The Orfe, Shubunkins and Goldfish were still unaffected, but the Koi were all lost, eight of different sizes. By the time I recognised the fungus for what it was, the fishes concerned were smothered with it, and although treatment was given to those I could catch, it was too late. Presumably the original body-slime condition allowed these fishes to succumb easily to the fungus because the other varieties in the pool, about thirty fishes, were not touched. The lesson learned from this is that I am now convinced that Koi are definitely more susceptible to this kind of trouble than are the other hardy coldwater fishes. Through all this bother the Orfe, especially, have continued to grow and have at least doubled their size since their introduction at about this time last year.

Several other pool-owners I have spoken to have experienced similar losses of Koi this springtime in various kinds of pool constructions. While I believe my own troubles were caused in the first place by a combination of lime from the concrete and last year's water not being changed, other people with smaller fibre-glass or plastic pools have lost fishes through bad water and probably overcrowding. A condition seems to occur in the early springtime to which Koi may be particularly sensitive. Water which has been undisturbed and adequately clean through the winter seems to go off very suddenly, perhaps as a result of increased sunshine and temperature. While this may not bother Goldfish, etc., it does seem to matter to the Koi.

The obvious point which then comes up for discussion is whether Koi are really suitable for the ordinary small garden pool at all. We are aware that specialist Koi-keepers use filtered pools and generally pay much more attention to water quality than is usually practised when other coldwater varieties are kept outdoors, and while I personally thought this to be only a worthwhile exercise for those really interested, it may be that *all* Koi need these facilities for successful life in small pools. Perhaps we are so used to the hardness of the common goldfish that we unjustly

consider any coldwater fish to be similarly capable of withstanding bad conditions.

Given the above arguments, it would seem that the trade must be at fault in displaying and selling Koi in the same way as Goldfish, so that the impression is given that they are simply a better coloured type of goldfish with a greater growth potential. It may be that we can concede a difference between Koi and other coldwater fishes which might equate to that between freshwater and saltwater tropical fishes in terms of the degree of environmental consideration needed in their keeping. Perhaps someone with more experience than myself would like to comment? The ordinary pool-keeper, who may be more of a gardener than an aquarist, is often entirely dependent for information upon trade sources who, during a sale, are unlikely to put the customer off the purchase by talking about stricter environmental requirements than occur in the usual garden pool. Many dealers also only buy the more expensive fishes to sell again and do not keep any themselves for any length of time, so these may not have the experience to speak with authority anyway. The series of articles by Mr. Zaczniuk, printed in this magazine last year, demonstrated the lengths to which serious Koi-keepers go, but what we need are some *minimum* standards for dabblers like myself and those where involvement is purely from the gardening aspect. Perhaps the British Koi-keepers Society could provide this kind of information?

* * *

With the further development of my fishhouse I have been able to experiment in the raising of large quantities of fry in rather crowded environments. Every aquarist, and especially those breeding egg-layers, will eventually encounter the problem of catering for a really large batch of fry from a single mating, and will initially wonder how he is to manage to grow on so many babies. In my case a pair of medium-sized Opaline Gouramies produced, by my estimation, between 600 and 800 young in a 10-gallon container. Everything went as normal, the parents were removed, and there was I with all these fry to look after. I find myself unable to cull or otherwise kill off baby fishes just because there are a lot of them so the traditional methods were out for a start. Two weeks of feeding with Liquifry and the consequent

growth brought matters to a head in the small spawning container.

The whole batch was moved to a 45-gallon aquarium (48 in. × 18 in. × 15 in.), set up to include a 3 inch deep biological filter 36 inches long, leaving the remaining base area bare for feeding. Two Algarde sub-gravel filters were used because of their $\frac{1}{2}$ inch lift tubes. The filter bed had been previously matured by other fishes. The fry grew well on brine shrimp, peas, liver and fine pelleted food. The aquarium was not filled completely at first, being too deep for such small fry, but each week about an inch of new water was added from the tap. This allowed dilution of the older water without siphoning, which would inevitably have removed some of the fry. Eventually, when the tank was full, the fry were big enough to avoid the siphon and individuals could be seen more easily during the operation.

After a few weeks some fry were very much larger than the majority and were actually big enough to eat the smallest of the remainder. Over a week the largest hundred were caught and put, in three groups, into 15-gallon aquaria with similar filtering systems and other environmental factors and feeding. The fry which had been moved immediately lost growth rate while most of those left behind developed more rapidly than before. After 12 weeks I now have the one hundred in the smaller containers at about an inch or so in size, while very many of the others in the big tank are now the same size and even larger. Thus we can draw some conclusions regarding the effect of the netting operation on the total batch.

The larger fishes originally moved suffered in subsequent growth from the move, but those left behind obviously gained from it. Some small proportion of the total number have hardly grown at all, but this is a usual occurrence and can be ignored here. The point is that if fishes are to be selected for retaining then I would incline towards the largest of those still in the original container. Taking this a step further, I wonder whether even better results would be obtained by spawning the fishes in the large aquarium in the first place. I have had similar occurrences with Swordtails. Recently, the largest 50 were separated from a batch of 200, all from a single dropping by a female, and eventually it was found that these 50 were smaller at maturity than the others who had not been interfered with. If all other factors are more or less equal then there is obviously a psychological and/or physical disturbance that takes place when fishes are moved which we, or myself at any rate, know little about. The beneficial effect, on the remainder of the population, of the removal of the currently larger specimens may be due to the subsequent reduction of Pheromone interference, i.e., the growth-inhibiting substances known to be released by some individuals in crowded situations, and which restricts the growth

of the other members of the shoal (see also "Viewpoint" July 1974).

It is possible then that aquarists who move their fry from one environment to another during their growing-up period may be inducing a series of "no-grow" stages into the fishes' lives whatever other conditions are like. The effect may be physical or psychological, or both, and so better results should be obtained by arranging for the spawning or birth of the fry to take place in a container large enough to grow up the whole brood. Where this is not convenient, such as in commercial breeding operations, then it would be best if only one move takes place, preferably early in the life of the fry before they take Brine Shrimp because then the subsequent stimulus from the live food may help them settle in new quarters more easily.

* * *

When my son expressed a desire to keep medium sized Cichlids and other similar fishes in a 48 in. × 15 in. × 15 in. aquarium installed in his bedroom, there was a need to avoid many of the problems usually inherent in keeping mixed Cichlid communities in close confinement. The environment would need to be virtually self-cleaning to eliminate too much water-changing and other inconvenient maintenance, the propensity of the type of inhabitants required towards damaging each other must be recognised, and the need for heavy feeding with meaty foods must be considered. Also, the finished appearance needed to be decorative.

To meet these conditions we assumed a reasonable similarity between this kind of fish and the commonly kept marine tropicals of the damsel group, and were thus able to borrow heavily from the published experiences of various marine aquarists to evolve an environment which later proved itself to be eminently suited to the keeping of the medium Cichlids and other fishes. Two twenty-three inch Algarde sub-gravel filters were installed under a flat two-inch gravel bed to give a good biological system capable of taking care of waste products and some probable overfeeding. These were supplied with the total air output of a large Rena pump. To minimise fighting, bullying and territorial aggression, it was obvious that plenty of hiding places and escape routes were needed. Five large slabs of Westmorland Stone were stood on end in a row along the gravel bed in a decorative manner, and such that practically the whole of the glass ends and back of the tank were covered top to bottom. This gave the appearance of a submerged rock face and was quite pleasant, especially after some green algae developed. Cracks and openings were left wherever the rocks came together and they were all tilted slightly back from the bottom so that a continuous passageway ran behind for the whole length

of the aquarium. This gave various combinations of entrances and exits, some of which were partially hidden by overlapping the rock edges. The gaps near the water surface were filled with a reasonably authentic plastic plant ("foxtail") for decoration. Finally, a further inch of gravel was added at the front of the rocks only, so as to make the refuges behind deeper by comparison.

The population of the aquarium was as follows; one pair each of Jewels, Kribensis, Convicts, and Festivum; two *Mystus* catfish, three Salvini, a male *Spilurum*, a large *Leporinus arcus*, and a Firemouth. From time to time other fishes came and went, my son's mind being of a changeable nature.

The provision of the rock passageways allowed any

threatened fish to escape easily, and in the case of the timid *Leporinus* and sometimes the *Festivum*, provided shelter from human external disturbances. The rather crowded population tended to subdue any territorial desires, and it was generally found that the fishes mixed and lived together very well. The combination of the biological filter and the large catfishes ensured a clean tank at all times. I was extremely pleased that a complete experiment, as this was, worked out so well. After about twelve months the aquarium won the North Warwickshire A.S. Home Aquaria competition, and with this victory my son's mind went to other things and the tank was converted to house a collection of barbs and tetras in the more usual planted environment.

W.Y.O.? (continued from page 136)

into bed. The freight charges for fish these days is also high and again is borne by the retailer. The following is a simple example for a week's trading. These are not true figures but are near enough for this purpose. Rent and rates—£40.00; heating, lighting, etc.—£10.00; feeding—£4.00; freight charges—£10.00; vehicle costs—£7.00; wages—£75.00. The total comes to £146.00. With the average customer spending £2.00 it will be seen that you require 73 customers per week just to recover this cost—and you haven't even paid for the goods they've bought yet! These overheads have to be met out of profits and not out of total sales. The above figures would be for quite a small shop and by no means do they cover the whole range of overheads. No, you won't see many fish dealers driving round in a Rolls-Royce!

"My own biggest complaint about the retail trade is the number of pet shops that have tanks put in and the owners don't have a clue about what they are doing and are absolutely incapable of giving advice. I personally went into one small shop and both the man and the woman behind the counter could not tell the difference between a male and female platy. I was asked to pick out a pair for a young customer who was buying his first fish. On another occasion a young boy walked out of a large shop in Edinburgh with a small tank under one arm. In the tank was a bag of gravel, a heater/stat, a pump and a filter. Believe it or not, in the other hand he had a bag of fish which were to go into the tank! If the aquarist wants good quality fish and sound, knowledgeable service then I'm afraid he must pay for it. Sorry for dragging on a bit but I'm afraid you picked a corker of a subject—one on which I could argue for hours. P.S. Believe me, I'm on the side of the customer but am willing to give credit where it is due!"

Photograph 1 shows the banded convict cichlid. What have been your experiences with this fish?

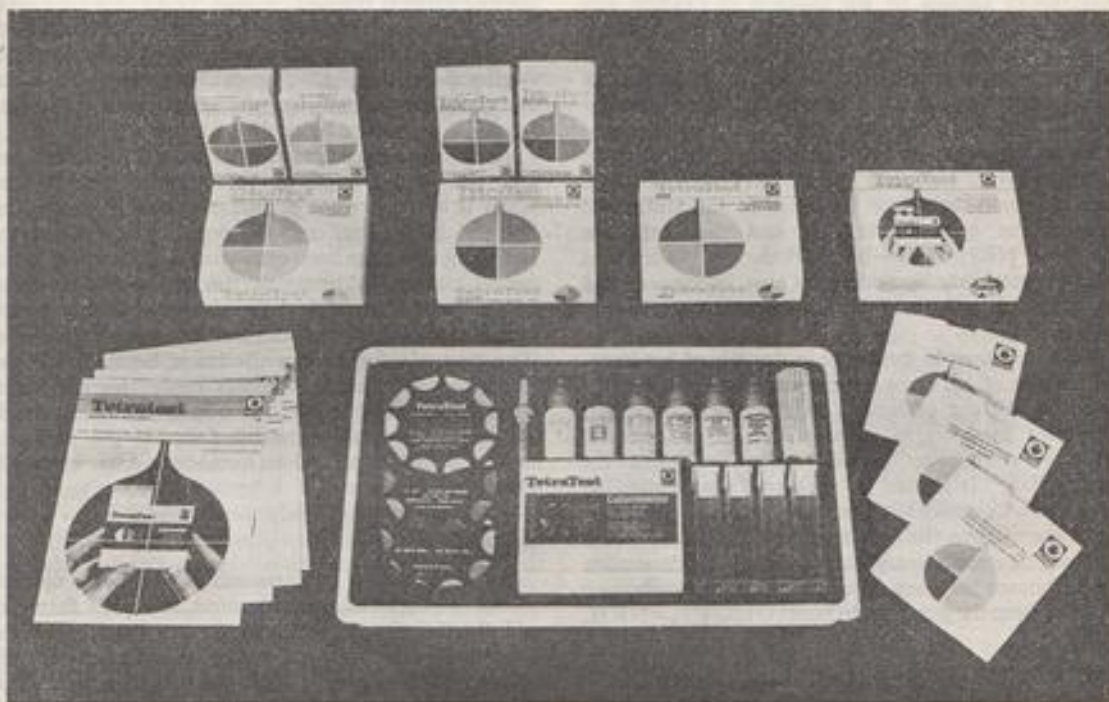
Photograph 2 shows a variety of plants that do quite well in harder water; and photograph 3 plants that do reasonably well in somewhat softer water; although most plants can adapt to their environment.

For a future feature please send me your opinions on the following. (1) What is your favourite motor filter? (2) Is a motor filter much or any better than a good, outside, air operated filter? (3) How safe are *Tubifex* as a food for discus? (4) What plants grow well with *Cryptocoryne* species? (5) Please send me details of your breeding experiences with species of sharks. Goodbye until next month.

COMMITTED AQUARISTS

Saturday, 10th May was the date for a "Unique" fish show. The venue?—One of Her Majesty's prisons! Wakefield top-security prison opened its doors to over 600 enthusiasts who had travelled to exhibit at the Unique Aquarist Society's open show. This must be the most exclusive club in the country, made up entirely as it is of a small number of long-term prisoners who all share in the running and the financing of the club. It is a tribute to the popularity of the show that so many societies from various parts of the country were represented. The Governor, Major M. Oldfield, M.C., president of the society, under whose auspices the show was held, presented the trophies at the end of the evening. Best society award went to the very successful Doncaster A.S., with Swillington A.S. also to the fore, their Mr. D. Stead winning Best Exhibitor award. The trophy for Best Fish in Show didn't travel too far—it was won, ironically, by one of the Unique Society's own members who entered a Scorpion fish. It should be mentioned, however, that every one of the 600 or so "fishy characters" who went to prison that day were happily allowed to leave at the end of the evening! After all, they had been a captive audience for the day!

PRODUCT REVIEW



Tetra Test Kits, for measuring the Hardness, pH and Nitrite content of the aquarium water, manufactured by Tetra Werke, Melle, Western Germany.

It is surprising how few aquarists really know the state of the water in which they keep their fish even though they are fully aware of the importance of its quality. Most will state that their water is crystal clear and that the fish are doing well, and only when a new fish is put into the tank does it sometimes show signs of great discomfort and die within a very short time. The dealer is usually blamed for this by having sold a diseased fish. Having carried out many free water analyses for my customers as part of the introduction of the TETRA TEST KITS I found that a great number of aquarists keep their fish in very unfavourable conditions and what usually killed the newly bought fish was not having been sold a diseased fish but rather a too sudden change of water quality.

The Nitrite content of the well established aquaria was generally satisfactory and the tests gave a very low reading. A high or even dangerously high reading was only found in recently set-up aquaria. It was quite a different story so far as hardness of the water was concerned. Some of the samples my customers

brought showed that the hardness of the water was as high as 30°DH, 40°DH or even 50°DH. This high level of hardness of the aquarium water is the result of evaporation over a period of many months or, in some cases, even years and not having topped up with a purified water, and also the neglect of regular and partial water change. The old and established stock of fish was slowly acclimatized and was capable of living in these conditions, but the newly bought fish had no chance. Most trouble in any aquarium can almost always be related to the water condition. It is of great importance to recognise and be able to correct improper water conditions before they can damage fish and plants in the aquarium.

To familiarize aquarists with the basic terms like hardness, pH and nitrite I will make use of and quote from the leaflet TETRA TEST, Aquarium Water Quality Control.

Water Hardness

Water hardness is a measurement of the amount of dissolved salts present in the water. Every type of water, except distilled water, contains such salts. Salts are chemical compounds of acids and chemical

elements. Carbon dioxide combined with chemical elements forms carbonates and bicarbonates, and the ratio of carbonates to bicarbonates varies according to the amount of free carbonic acid in the water. The bicarbonates formed by the reaction of calcium and magnesium with carbon dioxide make up the carbonate hardness of the water (KH). Salts such as calcium sulphate, which are formed by the combination of calcium and magnesium with other acids, account for the non-carbonate hardness (NKH). Together the carbonate hardness and non-carbonate hardness make up the general hardness (GH): $KH + NKH = GH$. Thus the non-carbonate hardness is the difference between the general hardness and the carbonate hardness: $NKH = GH - KH$. Both tap water and natural water vary according to area in general and the ratio of carbonate hardness to non-carbonate hardness.

Water hardness is measured in degrees of hardness. One degree of hardness (1° German Hardness) corresponds to 10 mg of lime (CaO) per litre of water. Carbonate hardness in an aquarium is an essential factor in setting up proper water conditions for tropical fish. It should be measured and controlled regularly. In most aquaria non-carbonate hardness rarely rises above the safe level of 5° German NKH and need be checked only occasionally. To determine non-carbonate hardness, merely subtract the carbonate hardness from the general hardness: $GH - KH = NKH$.

pH

The pH of water is a measurement of its acidity/alkalinity. pH 7 is neutral; lower pH values indicate more acid conditions, higher pH values more alkaline conditions. The pH of an aquarium can fluctuate greatly, even within the brief space of one day. Changes in pH are produced by two opposing chemical reactions:

1. ASSIMILATION, the process by which plants build starch from water and carbon dioxide, consume carbon dioxide and produce oxygen, making the water more alkaline.
2. RESPIRATION, the process by which animals obtain energy from carbohydrates in combustion with oxygen, consume oxygen and produce carbon dioxide, making the water more acid.

In most fresh water aquaria reaction number 1 predominates, and the water is somewhat alkaline. Aquatic plants and algae gradually consume carbon dioxide in the water, and the pH increases. Water which is above pH 9 is harmful to most tropical fish.

In their native habitats many tropical fish enjoy slightly acid water with a pH of 5.8-6.8. Normal tap water must be acidified to create healthy water conditions for these species. Peat filtering is the most common way to do this. Depending on the type of peat used, the pH value may sink to pH 4 or

lower, so continuous measurement and regulation of the pH during acidification is essential. pH values below 5.8 are dangerous for most tropical fish. Acidification should be immediately stopped as soon as the desired value is reached.

Because only relatively soft water can be acidified, it is necessary to regulate water hardness constantly during peat filtering. For example, only when the carbonate hardness is less than 3 German Carbonate hardness can water be acidified below pH 7.

In marine aquaria reaction number 2 predominates, and the water becomes more acid. Usually sea water is well protected against over-acidity by carbonate and borate buffers. But occasionally when the buffering effect has been exhausted a rapid acidification occurs, seriously damaging the mucous membranes of the fish. Germs find nourishment in the unprotected skin of fish, and the fish become sick and die. The best pH for marine species is between 8.1 and 8.4 with pH values above this range less dangerous than those below it. Water with a pH below 8.0 is extremely harmful to marine fish. If the pH of a tank sinks below pH 8.0 an immediate water change is absolutely necessary.

Nitrite

At pH 8, 5% of the ammonium-ammonia content of the water is in the poisonous ammonia form; at pH 9, 25% is in ammonia form. Because of the danger of ammonia poisoning, the higher the pH above 7, the more critical are problems such as overcrowding, improper feeding, insufficient water changes and decomposing material on the bottom of the tank.

Tetra Laboratories have conducted extensive tests on the harmfulness of nitrite. Some fishes including a few characins, can tolerate nitrite concentrations of more than 10 mg per litre of water for weeks. Guppies, on the other hand, die within a week at a nitrite concentration of more than 3 mg per litre, and Sword-tails cannot survive for more than a few days at a concentration of more than 9 mg per litre. Many delicate species show harmful effects at concentrations as low as 0.5 mg per litre. Regular measurement and control of the nitrite content is vital to ensure safe, healthy water conditions for your fish.

The following TETRA TEST KITS are now available: general hardness—for measuring the general hardness (80p), carbonate hardness—for measuring the carbonate hardness (80p), complete hardness—for measuring the general hardness and the carbonate hardness (£1.15), pH low range—for measuring the pH between 4.8 and 7.5 (90p), pH high range—for measuring the pH between 7.8 and 9.0 (90p), pH complete range—for measuring the pH from 4.8-9.0 (£1.25), and nitrite—for measuring the nitrite content in fresh water and sea water (£1.15).

For a more exact measurement of the pH and nitrite content of the water the Colormeter (80p) and the colour wheels for pH low range, pH high range and nitrite (£1.25 each) will prove to be a worthwhile buy. The TETRA TEST laborett (£7.35) contains all the indicator solutions, the Colormeter and the set of Colour Wheels. Every kit has full instructions which are easy to follow and aquarists are at least able to test their aquarium water quickly, accurately and quite cheaply.

The TETRA TEST KITS have been available on the Continent for very many years and I have found them a great aid for my hobby. I can recommend these kits to any hobbyist who is concerned about the well-being of his fish and in particular for hobbyists who keep and breed the more demanding varieties of tropical fish where water—the right quality of water—is often the key to success.

EBERHARD SCHULZE

THE ACARAS (continued from page 121)

acaras is largely waiting until they have reached a fair size and then comparing anal and dorsal fins of a given species. As a rule, male fish have larger anal and dorsal fins than females. In some species, the male's dorsal fin extends far back over the caudal fin. Another thing, when a male is in breeding condition the ordinary colours become brighter and sometimes different colours appear. Predictably, courtship and spawning means a change in disposition. All species resent other fishes approaching the spawning site and fight them off. In general, spawning takes place on a smooth surfaced stone, broad-leaved plants or even

on the bottom after the sand has been fanned or taken up in the mouth and moved away. Some stone spawners will sometimes choose to deposit their eggs on a small area of the vertical glass. *A. pulcher* usually spawns on a portion of the exposed floor of the tank. *A. hercules* is a secretive fish and when spawning is imminent it retires to some stone set in the shadiest part of the tank or seeks out a fissure between rocks in which to place its eggs. Then again, like some of the smaller cave spawners from Africa, it will sometimes favour a clay flower pot turned on its side.

COLDWATER QUERIES (continued from page 141)

such fish. Still, do not despair, write to the address I am enclosing and you should be able to get some excellent quality shubunkins.

I want to build a glass-fronted outdoor fish pond. What are the disadvantages of this proposal?

To build such a pond is a major task and as it would not be attractive to build it above ground level, it would entail the making of an ordinary concrete pond sunken into the ground with a glass let into one side. Then you would have to dig an inspection chamber with steps down and provide a pump to get rid of surplus rain water which would collect there. Then as soon as the water greened up, as it is likely to do, you would not be able to see more than a couple of inches into the tank or pond. Also the inside of the glass would get covered with algae and need constant cleaning. Your idea sounds grand in theory but I am afraid that in practice it would be very difficult to make a successful pond with the observation panel you require. Better to make an ordinary pond with a liner and have a good sized tank with a few fishes which you can watch in comfort.

I have recently constructed a garden pond, 6 ft. x 4 ft. by 20 in. with a liner. I would like to make a water-fall and will be glad if you can tell me which pump would be suitable?

I will enclose the address of a firm which deals in many types of pump and you can send for a catalogue. However, before you do so, you must realise that your pond is not very large and if you make a water-fall of about three feet or so high, then once you switch on the pump and it propels the water up and over the fall, a considerable amount of water will be taken from the pond and may drop the level so that the pond will not look well.

I have bought a Peacock-eyed bass and have been told that it is a coldwater fish. Is this so please?

The Peacock-eyed bass (*Centrarchus macropterus*) can be kept as a coldwater fish. It is found along the Eastern States of America and not from Japan as you state. It is like our native perch, being carnivorous and may be difficult to feed on other than live foods. The fish could be kept in a garden pond all through the year as long as the water did not freeze up too thickly.

From a Naturalist's Notebook

by Eric Hardy

OUR ONLY aquatic British butterfly, the marsh-fritillary, suffers a decline, like many bog-plants, with the drainage of land. The web in which its caterpillar winters may be flooded underwater for weeks without harming the larva. Likewise, the caterpillar of the extinct large copper survived long periods though 1968's flood nearly destroyed it at Woodwalton Fen. Unfortunately, the new Fontana £1.50 paper-back edition of E. B. Ford's important 1945 New Naturalist volume on *Butterflies*, while partly revising maps and text, still has some outdated distribution-maps. These often differ from the *Provisional Distribution Maps of Butterflies*, issued as a mimeographed publication by the Nature Conservancy's Biological Records Centre this year. The latter contain all records up to February 1975. The marsh-fritillary is in the former shown to be extinct in its Yorkshire, Lincolnshire, Norfolk, Cambridge and Midland haunts, whereas the Records Centre more cautiously marks them with records up to 1960. Post-1960 records are mostly in Wales, to Anglesey, the West Country east to Sussex and the Home Counties, with a number in north-west Cumbria, western Scotland and Ireland, plus one in Aberdeenshire.

The large copper's less glamorous continental subspecies *batavus* has been introduced to Woodwalton Fen in old Huntingdonshire, and a bog at Greenfield, Tipperary, in southern Ireland, has *rutilus*. It feeds on great water-dock, whereas marsh-fritillary feeds on devil's bit scabious and other dry land plants.

A note from the World Wildlife Fund mentions that 10 of the 11 races of the famous Galapagos giant tortoises now seem to have their survival assured. In Britain, the wet spring aided the breeding success of our natterjack toads by the Cabin Hill pool on Formby dunes, near Liverpool, and at the West Kirby-Red Rocks marsh on the Dee shore. At the latter, a scarce aquatic warbler, Cheshire's first great reed-warbler, appeared among the sedge-warblers in May after earlier grasshopper-warblers sang there on passage-migration.

Fish-foods have always been a field for research by amateur fish-keepers. The U.S. Bureau of Fisheries at Spearfish, South Dakota, have successfully fed rainbow trout with 25 and 50% of their diet dried ground sludge from paper-processing wastes, giving 43.3% crude protein and 9% fat. It was free from pathogenic bacteria. The dried sludge eaters were

fed with mixtures with herring-meal, which had slightly larger growth rates with 20% herring-meal and 25% sludge, than with 15% herring and 50% dried sludge; but greatest growth rate was from 32% herring-meal and no sludge addition.

Pilot experiments elsewhere showed the feasibility of using brine-shrimps to regulate the growth of algae which thrive in the phosphates and nitrates in sewage. The brine-shrimps are then used to raise fish and shrimps for the market and the fertiliser trade. *Chlorella* and *Tetraselmis* algae were first introduced to untreated sewage to reduce phosphates and nitrates, but before the algal growth became excessive and depleted the oxygen, brine-shrimps *Artemia salina*, were added to reduce it. Brine-shrimps survive 48 hours in 0.9% salt at 15 to 52°C, but are less tolerant of outside temperatures. They survive acidity of 6.4 to 8.3 pH., and are more tolerant of aerated than raw sewage. They reproduced in a sewage-algal medium.

Another system to the same end used algae and shellfish, catfish, goldfish and carp instead of brine-shrimps to purify sewage fit for swimming pools.

Research at the Ministry's hatchery tanks at Conway, North Wales, into the recently introduced large Pacific or Japanese oyster *Crassostrea gigas* found that it grows less rapidly than natives on several local algae food; but its spat were transplanted successfully to rafts at Menai Bridge and shore-traps at Tal-y-foel much earlier than previously. It withstood temperature-drops of 15°C, followed by periods of 7-10°, so that it should survive our winters. But spat had to be protected from shore-crabs by wire-cages.

Light was shown not only to influence the growth of algae, but their chemical content, cells growing heavier, but larger, with lower light. While the Pacific oyster prefers to feed on *Isochrysis* and especially *Chaetoceros* to *Tetraselmis*, and native oyster prefers *Isochrysis*, the burrowing clam called *Venerupis decussata*, the "palourde" of French and Spanish shellfish, introduced to the tanks from Irish stock, finds *Isochrysis* and *Tetraselmis* of similar food value. The latter has a very slow metamorphosis from spat to a transplanting size, despite feeding experiments with several algae. 24 families of its spat were bred from imported Irish stock, crossing six females with each of four males for 1,000 larvae from each family, reared in 1 litre beakers through their metamorphosis. The resulting spat were then grown on, isolated in a 625 litre recircula-

tion system, until their 120th day, when they were transferred to an ambient temperature open-flow system. It is suggested that the condition of the females prior to spawning may have more influence than genetic factors upon the growth of their families.

Cold spring water temperatures slowed down the summer growth of hatchery-reared oyster-spat. The usual fresh mussel and fresh shrimp diet in lobster-rearing tanks were similar in results to feeding with a Japanese diet of dried squid, shrimp-meal and petroleum-yeast fed as dried pellets, or made into a paste with guar-gum or a jelly with agar; but over longer periods the Japanese concentration produced more deaths. In their recently published review of shellfish research at the Ministry's laboratories, P. R. Walne and P. C. Wood still recommend hand-pulling to limit the spread of the Japanese seaweed *Sargassum muticum* introduced by ships' ballast-water into the Solent in the early 1970s. Complete eradication now seems doubtful, as it extends below low water from the Isle of Wight to Portsmouth, Langstone and Chichester harbours. Portsmouth Polytechnic biologists are trying to alter its hormone balance so that it remains infertile, without producing spores.

After reading the Ph.D. theses of a number of U.S. university graduates, I felt that any skilled amateur could often have done as much with similar grants and time, for some of their "revelations" are already known, but wrapped in a language which blinds one with science. For instance, one doctorate was gained at Georgia for listing water-plants in 37 artificial ponds and discovering the highest number in the oldest, which also had most perennial and woody plants (the latter being least in the youngest pond and

always fewer than non-woody plants, which declined after the first peak of establishment. He correlated silting with age, but varied with pond differences. All of which can be read up in most beginners' books on the ecology of aquatic plants.

Another from Georgia just listed 491 aquatic ferns and flowering plants in the rivers, pools, hot springs and artificial dams in Rhodessa, calculating that these form 9% of the total known flora. Differences in habitat rather than geography controlled their distribution, rivers (the largest habitat) having most species and pans (the smallest habitat) the least. Who would have thought that?

At Indiana, a researcher related how male *Volvox*, the common pond flagellate, secrete a hormone which produces sexual individuals in the following generation of an asexual stock, and affects their potency. Only that the original strains were from Japan! Another from Georgia worked on the influence of proteins and nucleic acid on the asexual development of *Volvox*, using radioactive labels. She found R.N.A. synthesis highest at the beginning of the light-cycle, increasing with the maturation of daughter colonies and being low during division and darkness.

At North Dakota, the study of temperature and salinity effects on osmotic adjustment by catfish (*Ictalurus*) and rainbow (steelhead) trout (*Salmo gairdneri*) found these affected warm-adapted catfish more than cold-adapted fish. The adaptation of the trout to saltwater caused an inability to excrete ammonia, increasing urea-levels by its conversion to less toxic substance. Freshwater adapted trout have excellent osmotic-regulation, but saltwater fish increased tissue-water in coldness.

BOOK REVIEW

Aquarium Fishes in Colour by J. M. Madsen, published in the Blandford Colour Series by Blandford Press at £2.40.

In keeping with other books in this series, this is primarily an identification handbook and in this category it succeeds admirably. Some 450 different species of tropical freshwater and marine fishes are described and are superbly illustrated by Kjeld Warthoe Sorensen whose painstaking attention to detail and artistic brushmanship are excellently reproduced. The book is in two main sections; the first comprises a comprehensive introduction which contains much concentrated information about aquarium maintenance, fish anatomy and function, the senses and how to identify fishes. Then follow the illustrations which are so arranged that several species of one genus appear on the same page, each species being numbered

and separately named in a key at the foot of the page. The second part of the book describes all species illustrated in numerical order to fit with the illustrations. Each description includes geographical origin, size, water and food requirement and, where possible, breeding notes.

Among the 450 species, cichlids are well represented with ten from Lake Malawi, seven from Lake Tanganyika as well as thirty one from elsewhere. Killifish, too, receive good coverage and around forty species are featured.

The marine section is especially useful to the tyro who is justifiably confused by the *Amphiprion* species, for example or by the complexities arising from similarities of colour and patterning in some of the juvenile angel species as opposed to their great diversity in this respect when in their adult livery.

ANGELS

by Colin Adams (age 16 years)

I HAVE OFTEN been tempted to buy a few angel fish, but have always been under the impression that they were difficult to keep and choosy about food. Some people say they will only accept live food.

After finding out more about them I decided to go ahead and get some. I found that my dealer's best angels were aquarium-bred and were fed on dried food as well as live food from an early age, which is most helpful as I do not live close to a constant supply of live food, such as *tubifex* and *daphnia*.

I bought two silver angels, one somewhat larger than the other. They settled in quickly and were eating live *daphnia* that night. As these fish seemed to be doing all right, I bought four more. They soon started to feed well, and became very tame. These six angels stayed in a 24 in. x 10 in. x 10 in. tank for about four months. They were then moved to a 48 in. x 12 in. x 15 in. tank. This was planted with Amazon sword, *cryptocoryne* aponogetons and *vallisneria*. It was illuminated by a 2 ft. Gro-Lux in the centre and two tungsten 40 watt bulbs, one at each end. The fish began to grow at an enormous rate.

After three to four months, I noticed that two of the fish were getting aggressive with the other occupants of the tank. Between them they guarded and cleaned an Amazon sword leaf. This continued for about two days; then one night one of the fish decided to spawn with a different partner. This change happened quickly.

The two angels spawned that night on an Amazon sword leaf. The other fish were not allowed near, with the exception of the original angel which, I think, was another male. All three guarded the eggs but by the next morning all the eggs had been eaten.

The next spawning took place about ten weeks later, with the same result, but without the help of the third fish.

On the third attempt, the male didn't fertilize the eggs. Soon after this the fish became ill, with a fungus which affected the eyes and also the fins. Four of them died, but I was lucky, the original spawning pair survived. These two made a full recovery.

About eight weeks later they spawned again, on an Amazon sword leaf. I removed the leaf with the eggs from the parents' tank; they hatched out but not many became free-swimming. All were dead within twelve days.

They spawned again eight weeks later. This time I left the eggs with the parents. They looked after them, and moved them to a fresh leaf about four times a day. The eggs hatched, and the fry became free-swimming after seven days. The parents spent a whole day trying to put the fry back onto a leaf, but were forced to give up in the end. They continued to guard them and when any of them swam away from the shoal, the male would take it into his mouth and blow it into the centre of the shoal. The male did most of the work. The female only helped when too many wandered away for the male to manage.

At this stage I fed them on Liquifry. After three days I gave them brine shrimp and crushed dried food soaked in water for an hour. I found that the fry would eat brine shrimp with no trouble, but I think they found the dry food too hard unless soaked.

The fry grew fast and at three weeks I gave them chopped white worms and *tubifex*.

I had to leave a light on continuously as the parents collected up mouthfuls of fry every time it was switched off. This damaged them and quite a number were lost in this way.

When the fry were about six weeks old I began

to feed them four times a day instead of eight times, but at each feed I gave them more.

At this stage the fry were really beginning to look like angels, with fully developed fins and the usual black stripes running vertically down the body. The rate of growth is now slowing down, but they still eat well. Now I have a large shoal of angels in a once almost empty aquarium.

Notes:

The water was not filtered. There was only a partial change of water every week when I siphoned off the dirt from the bottom of the tank. The fresh-water was ordinary tap water at the same temperature as the aquarium which is maintained at 79°F.

The pH, which is 7.4 was not altered during or before breeding.

Pimelodella pictus

THE UNLIKELY ONE

By M. Delaney

THIS IS A South American catfish, belonging to the family Pimelodidae. It is found in the rivers of Columbia and Peru.

When originally introduced into the aquatic hobby in 1964, it was named *Pimelodella angelicus*. This was due to the fact that its body colouration was exactly the same as the African catfish, *Synodontis angelicus*, but in reverse. Later, however, Dr. L. Schultz renamed it *Pimelodella pictus*. Although *Pimelodella pictus* belongs to the family Pimelodidae, it is very uncharacteristic of this family.

First, unlike the other Pimelodids, it is a small fish attaining a size of 12 cm. The majority of Pimelodid grow to at least 30 cm. Secondly, it is a peaceful fish, never harming any fish, even those smaller than itself. Alas, this can't be said for its relatives such as *Pseudoplatystoma fasciatum*, which when full-grown could devour a 30 cm. Oscar! Thirdly, it is not sedentary or nocturnal in habits, and constantly swims from one end of the aquarium to the other, hardly ever relaxing. Even when the lights are turned out, its glistening, silver body can still be seen darting about. Fourthly, they are a shoaling fish, unlike their larger relations who hunt their food on their own, and only come together to breed. Finally, they are relatively cheap, as Pimelodid catfish usually cost from £5 upwards, whereas

Pimelodella pictus cost from £2 upwards.

Pimelodella pictus need a large aquarium, as a shoal must be kept, because when kept on their own they are fairly nervous. A shoal of four fish is sufficient to keep them happy. The aquarium should have a dark bottom, and should have a free swimming space for them in the front of the tank. They aren't fussy about water requirements so long as pH and hardness are not taken to extremes, and the temperature should be about 75°F.

The overall body colour is silver with dark brown or black blotches. Measuring up to 4 mm. in diameter, these irregular blotches are largest between the adipose and dorsal fin and smallest behind the gill-cover. These blotches extend to the fins. In the dorsal, they form broken lines on the dorsal rays. On the caudal they form thick diagonal lines. The caudal is forked. The body is slender and smooth and the underside is plain silver. There are three pairs of barbels. The maxillary barbels extend to behind the adipose fin. The second pair extend to behind the ventral fins. The third pair extend downwards, and just reach the gravel.

Unfortunately, sex distinctions and breeding habits are, as yet, unknown, but perhaps some lucky aquarist may find the way to make this entertaining catfish more plentiful and more popular.

News

from AQUARISTS' SOCIETIES

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

ENTRIES for the **Coventry Pool and Aquarium Open Show** totalled 759, more than 100 up on last year, and included 85 in the new nine-class coldwater section run by the Association of Midland Goldfish Keepers. The best fish award went to T. Roberts, of Birmingham.

In a class of Bristol shubunkins of outstanding quality, Coventry's A. Brown did well to take second and fourth; and D. Easingwood, the club secretary, had the first three in the fantail class. Thirds by D. Denny's raintail and A. Brown's goldfish were the other home successes.

Best tropical fish was a characin from G. Roberts (North Staffs); and the best killifish award went to D. Harding (Leicester). D. White, of Bedworth, took the livebearer brood award, and Mr. and Mrs. G. Cox, of Nuneaton, had the best egg-layer brood.

Coventry winners included R. Cleaver with anabantids and Mrs. D. Keeble in the decorated jar class. F. Hirst's killifish were second, and A. Simmons had second with his molly.

April table show results were: A.V. Anabantid: 1, P. & C. Hinde; 2 and 4, R. Cleaver; 3, E. Keeble. A.V. Barb: 1, A. Nash; 2 and 3, B. & F. Hirst; 4, A. Simmons. A.V. Catfish: 1, A. Nash; 2, E. Keeble; 3 and 4, A. Simmons. A.V. Livebearer (pairs): 1, 2 and 4, B. and F. Hirst; 3, R. Cleaver. A.V. Loach: 1 and 4, E. Keeble; 2, R. Cleaver; 3, P. and C. Hinde. A.V. Rasbora: 1, R. Cleaver; 2, B. and F. Hirst; 3, A. Nash; 4, A. Simmons.

MEMBERS attending the March meeting of the **Ilford & District Aquarist's and Pond-keeper's Society** (P.B.A.S. Affiliated) were entertained by the well-known Killifish keeper, Mr. T. Glass. His talk, entitled "Killifish from start to finish," was arranged around an excellent collection of colour slides depicting over one hundred different species of egg-laying toothcarps and various views of his killifish tanks and spawning set-ups. Table shows for A.V. Livebearer, loach and Labeo produced a good entry and the Best Fish in Show award was won by W. Hart.

Towards the end of the month Ilford held the first of the proposed six-monthly "Aquatic Forums." The subject chosen for this inaugural meeting was "The Home Aquaria" and members heard short talks on equipment, rocks, gravel and aquarium furniture, design, plants, and planting techniques. The audience were invited to try their hands at arranging the rocks and gravel in a variety of aquariums.

In April M. Brill gave a talk, illustrated by living specimens, on **Pond Life** to be found in local ponds. This was preceded by a quiz in which members were invited to identify thirty different aquatic creatures. The table show award for the Best Fish went to W. Hart. The Society

meets once per month, usually the second Monday, at the Putwell Cross Library, Barking-side High Street, Ilford, Essex and details may be obtained from the Secretary—M. Shadrack, 61, St. Barnabas Road, Woodford Green, Essex.

DURING April the **Leamington and District A.S.** enjoyed an evening out, a thoroughly absorbing talk by Mr. Harold Cotton on the analysis of water and there was also a table show the results being as follows: A.V. Under 3 in.: 1, 2, and 4, Mr. and Mrs. Chamberlain; 3, C. Chamberlain. Catfish: 1 and 3, Mr. and Mrs. Chamberlain; 2, C. Chamberlain, 4, C. W. Stoodley. In addition to the table show there was a talk on the garden pond by D. Denny.

The society meet on the first and third Tuesday of each month at the Trinity Hall, Trinity Street, Leamington Spa at 8 p.m. and new members can be assured of a warm welcome.

TWO interesting talks were given at the May meeting of the **Horsforth & District A.S.** One by P. Smith, on how to make an all glass tank, which he also demonstrated by making it, step by step, and secondly, a talk on **Marines** by M. Barker. This concerned his visit to a marine fish house, and his own experiences on keeping marines. The results of the table show, were as follows: Specified Class: 1, P. Smith; 2, Joyce Dickinson; 3, S. Gorn. A.O.V. Class: 1, S. Gorn; 2, A. Hardcastle; 3, K. Agar. Junior A.O.V.: 1 and 3, S. Newcome; 2, C. Wood. Junior Specified: 1 and 3, C. Wood; 2, S. Newcome. Best in Show: S. Gorn.

A **MINI-Aquarium** by the Club members also judged by the members themselves was enjoyed by the members at the May meeting of **Brighton & Southern A.S.** In addition there was a demonstration of glass cutting by R. Houghton in which the members joined. To complete the evening there was a table show of N.B.M. (Breeders Pairs). Result: 1, R. Houghton, 2, T. Ramshaw, 3, R. Sayers, 4, W. Whitehouse. N.O.T. (Breeders Pairs): 1 and 4, R. Cannon; 2 and 3, B. Sayers. Judge P. Castle from North Kent.

The chairman B. Rice announced that the society has a membership of 95. For anyone wishing to join, the meetings are held on the first Monday of the month at K.T. Club, Franklin Road, Portlisle, Sussex. The Open Show and Exhibition is on Sunday 20th July at St. Barnabas Hall, Sackville Road, Hove, Sussex. Enquiries to secretary M. Rooney, 41, Kings Road, Southwick.

The report from the **Peterborough Fish-keepers Association** May meeting was as follows: Annual General Meeting. Election of officers: chairman, J. Butler; secretary and treasurer, C. A. Brakes; show secretary, R. Walden; committee: K. Faulkner, K. M. Fox, R. Butler, R. Fairchild, S. Ward. Champion of champions: 1, R. Walden, 2, J. Butler; 3, K. M. Fox. Judges for C of C: Mr. and Mrs. Mick Barnes, Spalding. Club points for the year: K. M. Fox 116; J. Butler 63; C. A. Brakes 48; S. Ward 49; C. Callaghan 25; R. Fairchild 21; R. Walden, 10; G. Goodale 10; I. Bridgen 5.

CHANGES of officers of the **Tonbridge & District A.S.** are as follows: chairman, J. Bellingham; vice-chairman, D. Puchard; treasurer, D. Baker; secretary, Mrs. J. Feast, 19, Hardley Road, Sevenoaks, Kent TN13 1XX.

DURING the evening at the **Lincoln & District A.S.** monthly meeting Mr. and Mrs. Charles Sellers were presented with a silver badge from the Yorkshire Association of Aquarist Societies. The silver badge was for winning over fifty first prizes at Open Shows. The presentation was made by the chairman of the Yorkshire Association of Aquarist Societies Mr. Greg Sibson.

On behalf of the society illuminated addresses were given to Mr. H. Kuhn, the president, and Mr. and Mrs. Charles Sellers. These were presented by the chairmen, Mr. J. Woodliffe. Even though the attendance at the Being and Buy Sale was not as other years it was proved to be a success.

COMMITTEE members of the **Wythenshawe & District A.S.** since March last are as follows: E. Hampson, chairman; P. Croughton, secretary; 37, Mayfield Grove, South Reddish, Stockport; A. T. Bolan, treasurer; S. Barratt, show secretary; P. Squirrel, publicity secretary.

THIS year the **East London Aquatic and Pondkeepers Association** have had some very good and well supported table shows with table shows forthcoming during the rest of the year. The association have also fixed a social evening in June.

The April meeting of the **Bristol A.S.** was taken up by a slide show on Fish Photography. This proved quite popular and several of the younger members experimented with a camera and flash brought along for the evening. An auction was also held in aid of society funds, several lots of fish being sold. The society meets on the second Monday of the month at the Bishopston Parish Halls at 7.30 p.m. Visitors and new members always welcome.

ENTRIES at the **Rhondda A.S.** open show totalled 452 and the results were as follows: Class Ag: 1, W. Evans (Rhondda); 2, P. Thomas (Swansea); 3, T. Chick (Rhondda); 4, Mr. & Mrs. Guthrie (Barry). Class Ba: 1, D. Iles (Rhondda); 2, A. Phillips (Rhondda); 3, R. Brown (B. Gwent); 4, J. Edward (L. Major). Class C: 1, M. Strange (Basingstoke); 2 and 3 C. Harding (Cardiff); 4, H. Chick (L. Major). Class Cx: G. Turner (Cardiff); 2, J. Webber (Barry); 4, M. and H. Williams (Rhondda); and R. Satterley (N. Gwent). Class Da: 1, G. Best (Swansea); 2, P. Thomas (Swansea); 3 and 4, E. Davies (Port Talbot). Class Db: 1, M. Strange (Basingstoke); 2, C. Turner (Cardiff); 3, E. Jones (Port Talbot); 4, J. Webber (Barry). Class Dv: 1, M. Strange (Basingstoke); 2, J. Egan (Port Talbot); 3, P. and S. Dewland (Rhondda); 4, T. Gardner (Cardiff). Class Ea: 1, W. Evans (Rhondda); 2, C. Harding (Cardiff); 3, C. and J. Richards (Sudbury); 4, T. Chick (Rhondda). Class Eb: 1, P. Thomas (Swansea); 2, E. Jones (Port Talbot); 3 and 4, D. Warmant (Cardiff). Class F: 1, M. Strange (Basingstoke); 2, G. Best (Swansea); 3 and 4, C. Morrison (Port Talbot). Class G: 1, G. Williams (Independent); 2 and 3, J. Edwards (L. Major); 4, Mr. and Mrs. Guthrie (Barry). Class H: 1 and 2, M. and H. Williams (Rhondda); 3, A. Smith (Rhondda); 4, A. Horst. Class J: 1 and 4, C. Turner (Cardiff); 2, P. and S. Dewland (Rhondda); 3, G. Best (Swansea). Class K: 1, M. Strange (Basingstoke); 2, G. McHay (Sudbury); 3, T. Chick (Rhondda); 4, D. Warmant (Cardiff). Class L: 1, P. Thomas (Swansea); 2 and 3, R. Williams (Rhondda); 4, C. Short (Newport). Class M: 1, H. Chick (L. Major); 2, R. Flager, 3, D. Warmant (Cardiff); 4, P. Thomas (Swansea). Class N: 1, A. Phillips (Rhondda); 2, M. Strange (Basingstoke); 3, G. McHay (Sudbury); 4, C. Turner (Cardiff). Class O: 1, M. and H. Williams (Rhondda); 2 and 4, T. Chick (Rhondda); 3, N. Sheppard (N. Gwent). Class P: 1, Mr. and Mrs. Guthrie (Barry); 2, G. Lewis (L. Major); 3, J. Parkin (Swansea); 4, M. and H. Williams (Rhondda). Class K:

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1, 2, 3 and 4, K. Williams (Rhondda). Class R, 1 and 2, A. Wallace (Barry); 3, C. Turner (Cardiff); 4, G. Lewis (L. Major). Class S: 1, N. and C. Bowles (Rhondda); 2, P. and S. Dewland (Rhondda). Class Sq: 1, 2 and 3, P. and S. Dewland (Rhondda); 4, A. Smith (Rhondda). Class T: 1, M. Strange (Basingstoke); 2, C. Morrison (Port Talbot); 3, P. Thomas (Swansea); 4, J. Edwards (L. Major). Class U: 1, 2 and 4, C. Rupert (Port Talbot); 3, R. Rich (Basingstoke). Class V: 1, R. Rich (Basingstoke); 2, 3 and 4, C. Rupert (Port Talbot). Class W: 1, D. Warneant (Cardiff); 2, C. Morrison (Port Talbot); 3 and 4, G. Best (Swansea). Class Wa: 1, 2 and 4, C. Rupert (Port Talbot); 3, T. Chick (Rhondda). Class X-Bm: 1 and 2, M. Strange (Basingstoke); 3, C. Harding (Cardiff); 4, G. Lewis (L. Major); 4, D. Warneant (Cardiff). Class X-Qt: 1 and 2, C. Morrison (Port Talbot); 3, A. Smith (Rhondda); 4, C. Turner (Cardiff). Class B-M: 1, K. Williams (Rhondda); 2, A. Weller (Newport); 3, M. Iles (Rhondda); 4, S. Gardner (Cardiff). Class P-Ty: 1 and 3, N. Sheppard (N. Gwent); 2, A. Dewland (Rhondda); 4, M. Iles (Rhondda). Class Y: 1, M. Strange (Basingstoke). Class Z: 1, C. Turner (Cardiff); 2, J. Edwards (L. Major); 3, D. Warneant (Cardiff); 4, A. Smith (Rhondda). Most number of points: M. Strange (Basingstoke). Best fish in show: M. Strange (Basingstoke). Most number of points (Rhondda): K. Williams.

RESULTS of the annual open show of the Bournemouth A.S. were as follows: Class B: 1, Mrs. P. Newbury (Gosport); 2 and 3, R. F. Adams (Salisbury); 4, T. Burvill (Basingstoke). Class Ca: 1 and 3, C. Turner (Cardiff); 2, Mrs. P. Newbury (Gosport); 4, B. Watkins (Bournemouth). Class C: 1, Mrs. P. Newbury (Gosport); 2, K. S. Dowell (Havant); 3, C. Turner (Cardiff); 4, M. Medway (Weymouth). Class D: 1, M. J. Turner (Bournemouth); 2, G. M. Fox (Dorchester); 3, A. F. Bligh (Hfracombe); 4, C. Turner (Cardiff). Class D: 1, R. F. Adams (Salisbury); 2 and 4, B. Riste (Chard); 3, J. R. Pierce (High Wycombe). Class E: 1, D. Warneant (Cardiff); 2, R. P. Adams (Salisbury); 3, G. M. Fox (Dorchester); 4, Mrs. K. Paul (Hfracombe). Class F: 1, P. Brown (Southampton); 2, A. E. Weaire (Southampton); 3, R. Cox (Bournemouth); 4, N. Walker (Bournemouth). Class G: 1 and 2, M. Medway (Weymouth); 3, B. S. Dalley (Weymouth); 4, C. Turner (Cardiff). Class H: 1, 2 and 3 and joint 4th: Mr. Taylor; 4, T. Watson (Havant). Class J: 1, R. J. Hard (Haslemere); 2, M. Medway (Weymouth); 3, Mrs. P. Newbury (Gosport); 4, A. Chaplin (Basingstoke). Class K: 1, R. Onslow (Kingsclere); 2, Mrs. P. Newbury (Gosport); 3, J. Edwards (Llanwit Major); 4, Mr. & Mrs. Bebb (Bournemouth). Class L: 1, H. Armitage (Havant); 2, A. E. Weaire (Southampton); 3, R. F. Adams (Salisbury); 4, B. Riste (Chard). Class M: 1, T. Burvill (Basingstoke); 2, J. Hodder (Weymouth); 3, Mrs. P. Newbury (Gosport); 4, R. Onslow (Kingsclere). Class N: 1, R. Matley (Bournemouth); 2, T. Burvill (Basingstoke); 3, M. Medway (Weymouth); 4, Mr. & Mrs. Bebb (Bournemouth). Class O: 1, A. Chaplin (Basingstoke); 2 and 3, Mr. & Mrs. Bebb (Bournemouth); 4, D. A. Barnham (Taunton). Class Q: 1 and 2, J. R. Pierce (High Wycombe); 3, G. M. Fox (Dorchester); 4, Mr. & Mrs. Bebb (Bournemouth). Class R: 1, M. Carter (Southampton); 2, C. Turner (Cardiff); 3, J. V. Jeffery (Bournemouth); 4, Mrs. P. Newbury (Gosport). Class S: 1 and 3, Mr. & Mrs. Bebb (Bournemouth); 2, P. R. Dewland (Rhondda); 4, M. Bowles (Rhondda). Class T: 1, A. E. Weaire (Southampton); 2, K. S. Dowell (Havant); 3, M. Carter (Southampton); 4, T. Burvill (Basingstoke). Class U: 1 and 4, B. Coombes (Bournemouth); 2 and 3, J. V. Jeffery (Bournemouth). Class U: 1, J. Hodder (Weymouth); 2, D. S. Langdon (Yeovil); 3 and 4, D. S. Langdon (Yeovil). Class W: 1, J. V. Jeffery (Bournemouth); 2, D. Warneant (Cardiff); 3, B. Riste (Chard); 4, R. and N. Burvill (Basingstoke). Class X-B: 1, Mrs. P. Newbury (Gosport); 2, J. G. Dickinson (Havant); 3, R. Onslow

(Kingsclere); 4, Mr. & Mrs. Bebb (Bournemouth). Class X-O-T: 1, W. West (Salisbury); 2, A. E. Weaire (Southampton); 3, C. Turner (Cardiff); 4, M. J. Turner (Bournemouth). The F.B.A.S. Perpetual Trophy for Class J was awarded to R. J. Hard of the Haslemere A.S. The Best Coldwater fish in the show was awarded to J. Hodder, of Weymouth A.S., and the best Tropical fish in the show, together with the best fish in the show award was awarded to Mrs. P. Newbury of Gosport A.S.

MEMBERS of the Stroud A.S. at the May meeting were given a talk on coldwater fish keeping by Mr. Powell of Yate. Table Show was for Gouramis the winners being: 1, C. Hodges; 2, L. Minchin; 3, C. Whitaker. Meetings are held on the second Tuesday of the month at Uplands Sunday School—Stroud, Gloucestershire, 7.30 p.m.

IN March, Mr. D. Mills of Ealing gave an informative talk on filtration to the Bracknell A.S. Members were particularly interested in his efforts at constructing his own exterior filter from polythene. Annual closed show results were as follows: Class B: 1 and 2, P. and G. Woolford. Class C: 1, L. Jones; 2, P. and G. Woolford; 3, P. Sharp. Class D: 1, L. Jones. Class E: 1 and 4, P. Sharp; 2, E. Pankhurst; 3, P. and G. Woolford. Class F: 1, L. Jones. Class G: 1 and 2, P. and G. Woolford; 3, N. Jordan. Class H: 1, P. and G. Woolford. Class K: 1, P. and G. Woolford; 2, L. Jones. Class L: 1, L. Jones. Class O and P: 1 and 2, L. Jones; 3, P. and G. Woolford; 4, P. Sharp. Class R: 1 and 2, P. Sharp; 3, E. Pankhurst. Class S: 1, E. Pankhurst; 2, P. and G. Woolford. Class UVW: 1, L. Jordan; 2, N. Jordan.

The Ted Scarrot Memorial Trophy for Best Fish in Show was won by L. Jones with a male topwater Guppy. Judging was by F.B.A.S. "A" Class, Adrian Blake of Basingstoke.

TABLE Show results at the May meeting of the Bournemouth A.S. were as follows: A.V. Barb: 1, Mr. Chatfield; 2 and 3, Mrs. Bebb; A.V. Catfish/Loach: 1, Mr. Turner; 2, Mr. Jeffery; 3, Mr. Gibbs; O.B. Pairs Guppy: 1, Mrs. Bebb; 2 and 3, Mr. Chatfield.

MEMBERSHIP is on the increase at the Uxbridge A.S. The meetings are being well attended and activities well supported. This year the programme has included F.B.A.S. Tape/Slide lectures. K. Purbrick on Characina, P. Tomkins on Labryrinths, a bring and buy sale and a very successful dance. No open show will be held this year but an exhibition on fish-keeping will be on display in the Town Hall Park, Hayes, Middlesex on Saturday 12th July. This is in conjunction with the Hayes Carnival. Meetings are held fortnightly on a Wednesday at Brookside Pavilion, Brookside Road, Hayes, commencing at 8.0 p.m. All new members are very welcome.

RESULTS of the Port Talbot A.S. Open Show were: Class Ad: 1, G. M. Foursacre; 2, P. Thomas. Class B: 1, Mr. and Mrs. Doré; 2, M. Bishop; 3, Mrs. J. Hawkings; 4, J. Egan. Class Ba: 1, R. E. Brown; 2, J. Edwards; 3, Mr. and Mrs. Guthrie; 4, W. B. Rice. Class C: 1, D. R. Warneant; 2, Mr. and Mrs. Williams; 3 and 4, C. Turner. Class Ca: 1, H. Chick; 2 and 3, R. Newton; 4, C. Turner. Class Db: 1 and 2, C. Turner; 3, J. Egan; 4, M. John. Class Da: 1 and 4, J. M. Morris; 2, P. Thomas; 3, G. Berryman. Class D: 1, J. Egan; 2, W. B. Rice; 3, Mr. and Mrs. Williams; 4, Mr. and Mrs. Doré. Class H: 1 and 2, Mr. and Mrs. Williams; 3, M. Smith; 4, P. Merritt. Class G: 1, J. Edwards; 2, C. Turner; 3, P. Merritt; 4, Mr. and Mrs. Guthrie. Class L: 1, P. Thomas; 2 and 3, K. Williams; 4, H. Chick. Class J: 1 and 4, C. Turner; 2, W. G. Best; 3, J. M. Morris. Class K: 1, H. Chick; 2, D. R. Warneant; 3, Mr. and Mrs. Doré; 4, R. Perkins. Class P: 1, 3 and 4, C. Morrison; 2, G. Lewis. Class Ea: 1, R. Newton; 2, A. Chick; 3, T. Edwards; 4, M. John. Class O:

1 and 3, R. Newton; 2, B. Purdy; 4, V. Lewis. Class P: 1, 3 and 4, M. Bishop; 2, G. Lewis. Class P: 1, 3 and 4, K. Williams; 2, A. and M. Smith. Class E: 1 and 2, D. R. Warneant; 3, E. Morgan; 4, E. Jones. Class R: 1 and 2, M. Bishop; 3, J. Egan; 4, Mr. and Mrs. Foursacre. Class S: 1, 2 and 4, Mr. and Mrs. Dewland; 3, M. John. Class M: 1, H. Chick; 2, R. Newton; 3, C. Turner; 4, D. R. Warneant. Class T: 1 and 4, A. and M. Smith; 2, J. Edwards; 3, C. Turner. Class XBM: 1, P. Rushbrook; 2, P. Merritt; 3, M. Bishop; 4, B. Purdy. Class XOT: 1, C. Turner; 2, 3 and 4, C. Morrison. Class N: 1, C. Turner; 2, Mr. and Mrs. Dewland; 3, T. Edwards; 4, K. Williams. Class U: 1, 3 and 4, C. Rupert; 2, Mr. and Mrs. B. Foursacre. Class V: 1 and 2, C. Rupert; 3, R. Rich; 4, Rudland and Green. Class W: 1, 3 and 4, C. Rupert; 2, D. R. Warneant. Best fish in show: H. Chick. Best member's fish: C. Morrison. Highest aggregate points: C. Turner, Cardiff. Highest aggregate members: C. Rupert.

AT the annual general meeting of the Rhondda A.S. the committee elected was: chairman: R. Smith, vice-chairman: M. Bowles, Treasurer: A. Ceyer, Secretary: D. Richards, minute secretary: T. Chick, trophy secretary: W. Evans, show secretary: A. Smith. Assst. show secretary: S. Dewland. Results of the Table Show were: Furnished Jar: 1 and 3, J. Edwards; 2, A. Smith; 4, M. Bowles. K.O.: 1, Mr. and Mrs. P. Dewland. Most number of points for year: Mr. and Mrs. P. Dewland.

SPRAKER at the March meeting of the Yate and District A.S. was Mr. B. Sellick of Bristol University who is also a committee member of the British Cichlid Association.

He gave a talk on "Coloration and Communication of Fishes", with the help of slides. The talk was very interesting, and very well put over and is recommended to other clubs as a very good programme.

There was a good attendance of sixty and this included twelve prospective new members. The club meets every first Monday of every month at the "Half Moon" Coalpit Heath, Bristol, 7.30 p.m.

The following committee was elected at the 44th annual general meeting of the Croydon A.S.: chairman: A. J. Smith, vice-chairman: M. Cook, secretary: L. Derrick, 5 Glenborough Avenue, Croydon, Surrey. Assistant secretary: Mrs. S. Dryden, show secretary: D. Pope, 11 D. Enmore Avenue, S. Norwood, SE 25. Assst. show secretary: K. Dryden, treasurer: H. R. Smith. Other committee members: J. Brown, D. Day, R. Nurse.

The society hold their meetings at the Woodside Social Club, Enmore Road, S. Norwood, on the second and fourth Tuesday in each month at 8 p.m.

THE New Forest A.S. (Affiliated to F.B.A.S.) held their Annual General Meeting recently. The results of the Annual Points Trophy Competition were: Tropical: 1, J. Jeffery; 2, R. Travers; 3, A. Paulley and B. Higginson. Coldwater: 1, 2 and 3, L. Menhennet.

Officers elected were as follows: secretary: R. Travers, 6 Auckland Avenue, Brockenhurst, Hampshire SO4 7RS, chairman: A. Paulley, treasurer: T. Barnes, show secretary: G. Edwards. Results of the Championship Table Show was: Tropical: 1, J. Jeffery; 2, R. Travers, 3 and 4, M. Aust. Coldwater: 1, 2 and 3, L. Menhennet.

Information about membership of the Society

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may be obtained from the Secretary: R. Travers, 6 Auckland Avenue, Brockenhurst, Hampshire SO4 7RS.

A total of 646 entries were benched for the Bridlington & District A.S. annual open show, and this was an extremely large increase over the previous years. The results were as follows: Best in Show: J. A. Whiteley (Aireborough). Exhibitor with the most points: McCordie and Kirk (Castelford). Fishes with the most entries, Special Award: N. Blenkin (Bridlington). Society with most points: Doncaster A.S. Guppies: 1, 2 and 3, D. and M. Laycock (Sheaf Valley); Flashes: 1, Mr. and Mrs. Green (Castelford); 2, Mr. and Mrs. Povey (Sheaf Valley); 3, Mr. and Mrs. Emerson (Castelford); 2, Mr. Reeve (Eboracur); 3, Mr. and Mrs. Mollies (S. Humberdale). Swordtails: 1, 2 and 3, N. Blenkin (Bridlington). A.O.V. Livebearer: 1, J. A. Whiteley (Aireborough); 2, Mr. and Mrs. Peasey (Doncaster); 3, Mr. Jackson (Doncaster). Characins (Small): 1, Mr. and Mrs. Richardson (Scarborough); 2, D. and M. Laycock (Sheaf Valley); 3, Mr. and Mrs. Chester (Retford). Characins (Large): 1 and 2, Mr. and Mrs. Ottowell (Retford); 3, Mr. and Mrs. Roberts (Doncaster). Barbs (Small): 1, Mr. and Mrs. Emerson (Castelford); 2, Mr. and Mrs. Green (Castelford); 3, Mr. and Mrs. Daines (Doncaster). Barbs (Large): 1, M. Jordan (Bridlington); 2, Mr. and Mrs. Tyson (S. Humberdale); 3, Mr. and Mrs. Roberts (Doncaster). Cichlids (Small): 1, Mr. and Mrs. Chester (Retford); 2, McCordie and Kirk (Castelford); 3, N. Blenkin (Bridlington). Cichlids (Large): 1, Mr. and Mrs. Richardson (Scarborough); 2, I. Taylor (Bridlington); 3, K. Williams (Bridlington). Angels: 1, Mr. Carrick (Scarborough); 2 and 3, N. Blenkin (Bridlington). Malawi (Rift Valley) Cichlids: 1, 2 and 3, Mr. and Mrs. J. Scull (Goole). Fighters: 1, Mr. Thorpe (Doncaster); 2, Mr. and Mrs. Lake (S. Humberdale); 3, Mr. and Mrs. Snowden (York). Anabantids (Small): 1, McCordie and Kirk (Castelford); 2, G. Gillespie (Castelford); 3, Mr. Blundell (Doncaster). Anabantids (Large): 1, Mr. and Mrs. Blades (Bassetlaw); 2, K. Lancashire (Doncaster); 3, M. Jordan (Bridlington). Egg-laying Toothcarps: 1, Mr. and Mrs. Blades (Bassetlaw); 2, Mr. and Mrs. Greenwood (Immingham); 3, Mr. Guy (Doncaster). Corydoras and Brochis: 1, Mr. and Mrs. Emerson (Castelford); 2, Pete and Sylvia (Bridlington); 3, N. Blenkin (Bridlington). Loaches: 1, Mr. and Mrs. Binns (Scunthorpe); 2, Mr. Cornforth (Bradford); 3, P. Northrop (Bridlington). A.O.V. Catfish: 1, Mr. and Mrs. Scott (Castelford); 2, Mr. Blundell (Doncaster); 3, N. Carr (Doncaster). Sharks and Pikes: 1, Miss S. Clarke (Aireborough); 2, Mr. Darragh (Goole); 3, D. Sudgen (Bradford). Rasbora: 1, Mr. Blundell (Doncaster); 2, Pete and Sylvia (Bridlington); 3, Mr. and Mrs. Richardson (Scarborough). Danios and Minnows: 1, Mr. and Mrs. Richardson (Scarborough); 2, Miss J. Peacock (Bridlington); 3, Mr. and Mrs. Roberts (Doncaster). Pairs Livebearers: 1, Mr. and Mrs. Peasey (Doncaster); 2, N. Blenkin (Bridlington); 3, McCordie and Kirk (Castelford). Pairs Egg-layers: 1, Mr. and Mrs. Binns (Scunthorpe); 2, McCordie and Kirk (Castelford); 3, Mr. and Mrs. D. Caldwell (Scunthorpe). Breeders Livebearers (1-10): 1, Mr. Blundell (Doncaster); 2, McCordie and Kirk (Castelford); 3, Mr. and Mrs. Emerson (Castelford). Breeders Livebearers (11-20): 1, Mr. and Mrs. Povey (Sheaf Valley); 2, Mr. and Mrs. Scott (Sheaf Valley). Breeders Egg-layers (1-10): 1, Mr. Jackson (Doncaster); 2, Mr. and Mrs. Fletcher (Doncaster); 3, Mr. and Mrs. Scott

(Sheaf Valley). Breeders Egg-layers (11-20): 1, Mr. Darragh (Goole); 2, Mr. and Mrs. Peasey (Doncaster); 3, Mr. and Mrs. Fletcher (Doncaster). A.V. Female Egg-layer: 1, Mr. and Mrs. Fletcher (Doncaster); 2, Mr. and Mrs. Peasey (Doncaster); 3, Mr. Rutland (Goole). A.V. Female Livebearer: 1, McCordie and Kirk (Castelford); 2, Mr. Jackson (Doncaster); 3, Mr. and Mrs. Riley (Leeds P.O.). A.O.V. Tropical: 1, Mr. and Mrs. Binns (Scunthorpe); 2, McCordie and Kirk (Castelford); 3, Mr. Bellard (Hull). Juniors, A.V. Special Award: 1, M. and T. Holmes (Castelford); 2, G. Parkin (Keighley); 3, N. O'Donnell (Independent). Furnished Mini Jars: 1, Mr. and Mrs. Chester (Retford); 2 and 3, Pete and Sylvia (Bridlington). Common Goldfish: 1, G. Frisby (Hull); 2, Mr. and Mrs. North (Hull); 3, Master D. Frisby (Hull). Fancy Goldwater: 1, 2 and 3, C. Whitney (Accrington). Shubunkins: 1 and 2, C. Whitney (Accrington); 3, Mr. Gregory (Scarborough). A.O.V. Goldwater: 1, Mr. and Mrs. Blades (Bassetlaw); 2 and 3, Mr. and Mrs. Woods (York).

FOR their May meeting Llantwit Major A.S. held a table show. The results were as follows: Class OP: 1 and 2, R. Newton; 3 and 4, G. Best; 5, N. Haley. Class KO: 1 and 2, B. Lloyd; 3 and 4, G. Lewis.

While the judging was in progress members were entertained with a lecture on Guppies by R. S. Wigg, one of the leading authorities on this subject in Wales. This proved to be extremely interesting by the number of questions asked by members present. Mr. Wigg is largely responsible in improving the strain locally.

ENTRIES for the Corby and District A.S. open show totalled 418 and the results were as follows:—Class B: 1, P. Butt (Northampton); 2, W. E. Neville (Grantham); 3, Mrs. Cruikshank; 4, W. and S. (Banbury). Class C: 1, M. Strange (Basingstoke); 2, P. Moye (Sudbury); 3, K. Usher (Doncaster); 4, D. Page (Corby). Class Cb: 1, M. Strange (Basingstoke); 2 and 3, G. Lucas (Sudbury); 4, R. Elliot (Cadas). Class Cr: 1 and 2, P. Moye (Sudbury); 3, M. Netherell (Riverside); 4, M. Walden (Peterborough). Class D: 1 and 2, M. Netherell (Riverside); 3, V. Wyatt (Northampton). Class Ds: 1, K. Usher (Doncaster); 2, C. Batten (Cadas); 3, Mr. and Mrs. Crew (Wadas); 4, T. Chambers (Wadas). Class Dc: 1 and 2, M. Chambers (Wadas). Class Dd: 1 and 4, P. Chambers (Wadas). Class De: 1 and 4, T. Chambers (Wadas); 2, P. Moye (Sudbury); 3, B. White (Bletchley). Class E: 1, G. M. Allen; 2, N. Coleman (Wadas); 3, Mr. and Mrs. Crew (Wadas); 4, W. and S. (Banbury). Class F: 1, K. Usher (Doncaster); 2, D. Bichenor (Wadas). Class G: 1, I. Fuller (Uttoxeter); 2, M. Netherell (Riverside); 3, S. A. Lucas (Sudbury); 4, Mr. and Mrs. Campbell (Cadas). Class H: 1, Mrs. Cruikshank; 2, L. J. Brazier (Sudbury); 3, M. Netherell (Riverside). Class I: 1, I. Brazier (Sudbury); 2, W. and S. (Banbury); 3, R. Wilson (Corby); 4, M. Crew (Wadas). Class K: 1, P. A. Moye (Sudbury); 2, M. Strange (Basingstoke); 3 and 4, R. Elliot (Corby). Class L: 1, S. Elliot (Cadas); 2, P. A. Moye (Sudbury); 3, K. Usher (Doncaster); 4, S.M.I.N. (Nuneaton). Class M: 1 and 4, B. Elliott (Cadas); 2, L. J. Brazier (Sudbury); 3, I. Fuller (Uttoxeter). Class N-B-M: 1 and 3, D. Bichenor (Wadas); 2, C. and J. Richards (Sudbury); 4, T. Chambers (Wadas). Class N-O-T: 1, 2 and 3, K. Usher (Doncaster); 4, S.M.I.N. (Nuneaton). Class O: 1 and 2, Mr. and Mrs. Humphrey (Corby); 3, A. J. Waldman (Sudbury); 4, T. Cruikshank. Class Q: 1, Mr. and Mrs. Crew (Wadas); 2, K. Usher (Doncaster); 3, P. A. Moye (Sudbury); 4, A. J. Waldman. Class R: 1, I. Fuller (Uttoxeter); 2 and 3, L. W. Poole (Banbury); 4, A. and J. Waldman. Class S: 1, I. Fuller (Uttoxeter); 2, R. Balham (Corby); 3, T. Chambers (Wadas); 4, P. Moye (Sudbury). Class T: 1 and 2, K. Usher (Doncaster); 3, A. Onslow (Loughborough); 4, Mr. and Mrs. Humphreys (Corby). Class U: 1 and 2, Mr. and Mrs. Crew (Wadas); 3, B. White (Bletchley);

4, S. Elliott (Corby). Class V: 1, G. and M. Allan. Class X-B-M: 1 and 2, M. Marsden (Corby); 3, Mr. and Mrs. Crew (Wadas); 4, M. Strange (Basingstoke). Class X-O-T: 1, 2 and 3, K. Usher (Doncaster); 4, S.M.I.N.

SINCE the annual general meeting the East Dulwich A.S. have had an interesting and varied programme. There have been two talks, one by F. Tompkins on Breeding, and the other by J. Lambourne with his slide show on Catfish. There has also been a "being and on Catfish" sale which yielded a nice profit to the club.

The first table show of the new season produced the following results: Barbs: 1, Doris Winder; 2, J. Callaghan; 3, R. Callaghan; 4, R. Vaughan. Catfish: 1, D. Winder; 2 and 4, B. Light; 3, Doris Winder.

An interesting evening was had by all when we visited Croxson and District A.S. in May for an inter-club table show, which was won by the home club.

Owing to moving house in the near future the secretary, N. Swale has been forced to give up office. The club wishes to thank him for his services and efforts. The new secretary is R. Callaghan, 22 Veda Road, Lewisham, London, S.E.13, Tel.: 01-690 9950.

THERE was a record number of 597 entries for the Stockton-on-Tees A.S. annual open show. The Best Fish in Show award was won by K. Greenley (Billingham Half Moon). Results were as follows:—Furnished Aquaria: 1, Mr. and Mrs. Kane (S.T.A.S.); 2, Mr. and Mrs. Saunders (Stockton); 3, Mr. and Mrs. Wood (Stockton); 4, P. Jones (Stockton). Furnished Jars: 1, C. Robinson (Stanley); 2, Mrs. Surtees (Billingham); 3, Mr. and Mrs. Saunders (Stockton); 4, M. Lister (Stanley). Large Barbs: 1 and 2, C. Robinson (Stanley); 3, Mr. and Mrs. Duffill (Redcar); 4, E. Hall (Stanley). Small Barbs: 1, F. Holmes (Castelford); 2, M. Clark (Independent); 3, K. Greenley (Half Moon); 4, Mr. and Mrs. Lamb (Redcar). Large Characins: 1, Shearer (Redcar); 2, S. Hay (Hartlepool); 3, Mr. and Mrs. Lamb (Redcar); 4, E. Duncanson (Priory). Small Characins: 1, M. Aylesbury (Redcar); 2, F. Myers (Independent); 3, Mr. and Mrs. Jackson (Redcar); 4, M. Bottomley (Hartlepool). Large Cichlids: 1, J. Quantrell (Priory); 2, Mr. and Mrs. Lamb (Redcar); 3, Mr. Kidd (Killingworth); 4, J. Watson (Hartlepool). Small Cichlids: 1, G. Walker (Castelford); 2 and 4, Mr. and Mrs. Jackson (Redcar); 3, N. Lynch (Stanley). Rift Valley Cichlids: 1 and 2, G. Liddle (Bimbi); 3, R. Atherton (Hartlepool); 4, P. Newton (Hartlepool). A.V. Fighter: 1, M. Dudley (Hartlepool); 2, P. Hope (Hartlepool); 3, Mr. and Mrs. Wood (Stockton); 4, Mr. and Mrs. Dickson (Independent). A.V. E.L.T.C.: 1, 2 and 4, B. Prytherch (Ashington); 3, L. Walker (Independent). A.O.V. Labyrinth: 1, M. Cox (Zenith); 2, Mr. Sneddon (Hartlepool); 3, Mr. and Mrs. Saunders (Stockton); 4, A. Redford (Priory). A.V. Tropical Catfish: 1, Mr. and Mrs. Saunders (Stockton); 2, H. Garthwaite (Hartlepool); 3, L. Collins (Stockton); 4, Mr. and Mrs. Holmes (Castelford). Corydoras and Brochis: 1, Mr. and Mrs. Saunders (Stockton); 2, D. Turnbull (Bimbi); 3, Mr. and Mrs. Emerson (Castelford); 4, H. Garthwaite (Hartlepool). Danio-W.C.M.M.: 1, A. W. Redford (Priory); 2, D. Rodham (Zenith); 3, O. Fenwick (N.G.L.S.); 4, Mr. and Mrs. Holmes (Castelford). Rasbora: 1, D. Lawrence (Redcar); 2, R. Goodchild (Zenith); 3, Mr. Ryan (Billingham); 4, Mr. and Mrs. Richardson (Scarborough). Loach: 1, D. Turnbull (Bimbi); 2, Mr. King (Independent); 3, J. Taylor (Stockton); 4, Mr. and Mrs. McCartney (Half Moon). Sharks and Labors: 1, K. Greenley (Half Moon); 2, M. Moreland (Stockton); 3, Mr. Hall (Billingham); 4, Mr. and Mrs. Lamb (Redcar). Breeding Pairs (Egg-layers): 1, F. Holmes (Castelford); 2, N. Wainwright (Hartlepool); 3, J. Aylesbury (Redcar); 4, T. Hope (Hartlepool). Breeding Pairs (Livebearers): 1, R. S. Dawson (Hartlepool); 2, J. Chamberlain (Hartlepool); 3, Mr. and Mrs. Holmes (Castelford); 4, F. Myers (Independent). A.V. Guppy: 1, R. Atherton (Hartlepool); 2, W. Walton (Priory); 3, M.

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Hope (Washington); 4, J. Emerson (Castleford).
 Swordtail: 1 and 4, N. Blenkin (Bridlington);
 2, Mr. and Mrs. Jackson (Redcar); 3, Mr. and
 Mrs. Kennedy (Half Moon). A.V. Platy:
 1, W. Mooney (Stockton); 2, Mr. and Mrs.
 Kane (Billingham); 3, Mr. Kidd (Killingworth);
 4, Mr. and Mrs. Lamb (Redcar). A.V. Molly:
 1, S. Hay (Hartlepool); 2, Mr. and Mrs. Wood
 (Stockton); 3, N. Blenkin (Bridlington); 4, Mr.
 and Mrs. Lamb (Redcar). A.O.S. Live-
 bearer: 1, R. Daly (N.G.L.S.); 2, P. Wright
 (South Shields); 3, Mr. and Mrs. Dorner
 (Redcar); 4, Mr. and Mrs. Richardson (Scar-
 borough). A.V. Coldwater: 1, M. Potts
 (South Shields); 2, Mr. and Mrs. Craggs
 (Stockton); 3, T. Hope (Hartlepool); 4, Mr. and
 Mrs. Kane (Stockton). Breeders (Egg-layers):
 1, E. Prytherch (Ashington); 2, N. Lynch
 (Stanley); 3, Mr. Walker (Independent); 4, J.
 Chamberlain (Hartlepool). Breeders (Live-
 bearers): 1, R. Daly (N.G.L.S.); 2, Mr. and Mrs.
 Dorner (Redcar); 3, D. Chamberlain (Hartle-
 pool); 4, Mr. and Mrs. Richardson (Scar-
 borough). A.V. Marine: 1, M. Middlemast
 (Stanley); 2, M. Harrison (Billingham); 3, Mr.
 Ryan (Billingham); 4, S. Smith (Stockton).
 A.O.S. Tropical Egg-layer: 1, L. Collins
 (Stockton); 2, D. Turnbull (Bimbi); 3, Mr. and
 Mrs. Duffell (Redcar); 4, G. Liddle (Bimbi).
 Junior Section: 1, R. McCartney (Half Moon);
 2, G. McGuire (Hartlepool); 3, M. Lister
 (Stanley); 4, J. Emerson (Castleford).

MEMBERS OF Blaenau Gwent Fish Club
 entertained the North Gwent A.A. in May when
 a slide show was given by D. R. Warrameant
 and C. Turner. This was enjoyed by all
 present. Also in May a lively discussion took
 place and arrangements were made for a trip to
 Bristol. Meeting dates in July have been fixed
 for the 8th and 22nd, when a slide show, and
 also a discussion evening are planned. Members
 meet at the Blaenau Gwent Working Men's
 Club, Lewis Street, Cwmillery, Abercillery,
 and members are always welcome. The
 secretary's address is B. Phelps, 28 Woodland
 Drive, Trisnant, nr. Cwmelin, Mon.

THE Suffolk Aquarist and Pondkeepers
 Association held their annual general meeting
 on 12th May. The president gave a short talk
 and this was followed by the election of the
 committee. Those elected were: chairman, R.
 Smith; secretary, K. Cocker; treasurer, M.
 Thurlow; show secretary, V. Green; P.R.O.,
 K. Cook; newsletter editor, B. Mole. I.A.P.A.
 representatives would be Mr. and Mrs. Card
 and K. Cocker. The society had won an inter-
 club quiz and the rest of the club formed a team
 to play the "inter-club quiz team" in a fish quiz.
 The former were victors by 61 points to 31
 points.

OPEN show results of the Workshop Aquarist
 & Zoological Society were as follows: Sword-
 tails: 1, D. and P. Birdall (Aireborough);
 2, N. Blenkin (Bridlington); 3, M. Johnstone
 (Grantham). Guppies: 1 and 2, Mr. and Mrs.
 Chester (Retford); 3, Master J. Emerson
 (Doncaster). Mollies: 1, A. Hopkinson
 (D.D.A.S.); 2, Mr. and Mrs. Norton (South
 Humberstone); 3, Mr. and Mrs. Stephenson
 (Sherwood). Flaties: 1, Mr. and Mrs. Povey
 (Sheaf Valley); 2, Mr. and Mrs. Holmes
 (Castleford); 3, W. Perkins (Workshop). Small
 Barbs: 1, Mrs. Nightingale (Don Valley);
 2, McArdle and Kirk (Castleford); 3, Mr. and
 Mrs. Stanton (Sheffield). Large Barbs: 1, Mr.
 and Mrs. Cohen (Pontefract); 2, T. Nicholson
 (Sherwood); 3, B. Chapman (Long Eaton).
 Small Characins: 1, Mr. and Mrs. Fletcher
 (Doncaster); 2, D. and M. Laycock (Sheaf
 Valley); 3, Miss A. Jackson (Workshop). Large
 Characins: 1, Mrs. B. Booker (Morecambe Bay);
 2, Mr. and Mrs. Ottowell (Retford); 3, Mr. and
 Mrs. Roberts (Doncaster). Egg-laying Tooth-
 carps: 1 and 2, G. White (Scunthorpe & Dist.); 3,
 Mr. and Mrs. Blades (Creswell). Danios, Ras-
 boras and Minnows: 1, Mr. and Mrs. Cosley
 (Doncaster); 2, D. and M. Laycock (Sheaf Val-
 ley). 3, Mr. and Mrs. Emerson (Castleford).
 Sharks and Poises: 1, T. Nicholson (Sherwood);
 2, Mr. and Mrs. Holmes (Castleford); 3, Mr.
 and Mrs. Emerson (Castleford). Catfish and
 Loach: 1, Mr. and Mrs. Holmes (Castleford);

2, McArdle and Kirk (Castleford); 3, Mr. and
 Mrs. Binns (Scunthorpe Museum). Dwarf
 Cichlids: 1, Mr. and Mrs. Sellers (Lincoln);
 2, D. Picken (Workshop); 3, Mr. and Mrs.
 Lake (South Humberstone). Large Cichlids:
 1 and 2, Mr. and Mrs. Sellers (Lincoln);
 3, T. and K. Douglas (Hull). Fighters:
 1, 2 and 3, L. Smith (Castleford). A.O.V.
 Anabantids: 1, Mr. and Mrs. Stephenson
 (Sherwood); 2, McArdle and Kirk (Castleford);
 3, Mr. and Mrs. Roberts (Doncaster). A.O.V.
 Tropical: 1, Mr. and Mrs. Calkon (Scunthorpe
 Museum); 2 and 3, McArdle and Kirk (Castle-
 ford). Junior A.V. Tropical: 1, Miss A.
 Chester (Retford); 2, Master S. Osterwell
 (Retford); 3, Master S. Neville (Grantham).
 Pairs (Egg-layers): 1, McArdle and Kirk
 (Castleford); 2, Mr. and Mrs. Holmes (Castle-
 ford); 3, P. Wheatley (Derby Regent). Pairs
 (Livebearers): 1, B. Jackson (Doncaster); 2,
 D. and P. Birdall (Aireborough); 3, Mr. and
 Mrs. Clarke (Workshop). Breeders (Live-
 bearers): 1, H. Thorpe (Doncaster); 2, Mr. and
 Mrs. Povey (Sheaf Valley); 3, D. and P.
 Birdall (Aireborough). Breeders (Egg-layers):
 1-10; 1, Mr. and Mrs. Scott (Sheaf Valley);
 2, Mr. and Mrs. Cohen (Pontefract); 3, Mr.
 and Mrs. Fletcher (Doncaster). Breeders
 (Egg-layers 11-20): 1, Mr. and Mrs. Peasey
 (Doncaster); 2, Mr. and Mrs. Fletcher (Don-
 caster); 3, N. Carr (Doncaster). A.V. Cold-
 water: 1, Mr. and Mrs. Blades (Creswell);
 2, Mrs. G. Frisby (Hull); 3, Mrs. North
 (No Soc.). Furnished Mini Jar: 1, A. Masson
 (Workshop); 2, T. Bullock (Derby Regent);
 3, R. Hall (Derby Regent). Novelty Mini Jar:
 1, A. Masson (Workshop); 2, T. Reid (Workshop);
 3, Mr. and Mrs. Clarke (Workshop). Best
 Fish in Show: Mrs. B. Booker (Morecambe
 Bay).

SPEAKER at the May meeting of the
 Gloucester Fishkeeping and Social Club
 was Mr. B. R. Goll from Evesham. His
 talk was about all types of fish foods including
 flaked foods, fresh and live. This was a most
 interesting and entertaining talk and was much
 appreciated by his audience who took every
 opportunity to express their own views upon
 the subject.

All prize cards for the month's table show
 were won by Mr. J. Bartlett.

OFFICERS elected at the Darlaston &
 District A.S. annual general meeting were as
 follows: chairman: F. Whitehouse, vice-chair-
 man: T. Lowe, Secretary: A. Horne, 223
 Wolverhampton Road West, Bentley, Walsall.
 Show secretary: D. Rickiss, assistant show
 secretary: S. Whitehouse, treasurer: M. Nixon,
 publicity: H. Hemmings, librarian: J. Hard-
 wicke. Club meetings are held every fourth
 Tuesday of the month 8.0 p.m. at the Progres-
 sive Club, Church Street, Darlaston. New
 members and visitors will be made welcome.

MEMBERS OF Blaenau Gwent Fish Club,
 would like to take this opportunity to thank
 Mr. Purdy for acting as Auctioneer at their
 recent successful bring and buy. Also many
 thanks to D. R. Warrameant for the generous
 gift of an orbipod (Barb) for the exhibition
 tank at their meeting place and to D. R. Warrameant
 and C. Turner, for the excellent slide
 show and talk in May.

A successful first open show was held by
 Newcastle T.F.S. at the beginning of June.
 The Show was a success and there were 332
 entries. Results: Furnished jars: 1, Mr.
 Lister; 2 and 3, Kane Family. Barbs (Large):
 1 and 2, C. Robinson; 3, Mr. Scott. Barbs
 (Small): 1, N. Lynch; 2, D. Wilson; 3, D.
 Lawrence. Characins (Large): 1, J. Ovington;
 2, J. Taylor; 3, S. Hay. Characins (Small):
 1, E. Hodgson; 2, D. Lawrence; 3, J. Foster.
 Angels: 1, S. Hay; 2, A. Malthouse; 3, Mr. and
 Mrs. Laydon. Cichlids (Large): 1, P. Askew;
 2, W. Kidd; 3, I. Patterson. Cichlids (Small):
 1, Mr. Forest; 2, P. Myers; 3, Mr. and Mrs.
 Brewster. Rift Valley: 1, Mr. Dudley; 2, R.
 Atherton; 3, H. Fall. A.V. Labyrinth: 1,
 M. Sneddon; 2, Mr. Marshall; 3, Mr. Lister.

Mollies: 1, S. Hay; 2, S. Bottomley; 3, M.
 Orange, Jr. A.O.V. Livebearer: 1,
 2 and 3, P. Wright. Breeding Pairs (Live-
 bearer): 1, P. Wright; 2 and 3, P. Myers. A.V.
 Fighter: 1 and 2, R. Foster; 3, B. Jackson.
 E.L.T.S.: 1, 2 and 3, B. Prytherch. Tropical
 Catfish: 1, H. Garthwaite; 2, M. Lister; 3, T.
 Nixon. Cory and Brochis: 1, H. Garthwaite;
 2, D. Hulme; 3, A. Malthouse. Rasbora:
 1, P. Askew; 2, Mr. and Mrs. McKenzie.
 Danio: 1 and 2, P. Myers; 3, J. Duffell. Loach:
 1, A. Costin; 2, H. Garthwaite; 3, D. Turnbull.
 A.O.V. Tropical: 1, A. Costin; 2, L. Southall;
 3, J. Duffell. Labo: 1, Mr. Moreland; 2, Mr.
 Dudley; 3, Mr. and Mrs. Wright. Breeding
 Pairs (Egg-layers): 1, J. Foster; 2, M. Halman;
 3, B. Harradford. Guppies: 1, R. Bottomley;
 2, B. Howard; 3, Mr. Hope. Swordtails: 1,
 B. Jackson; 2, Mr. Hepple; 3, Mr. and Mrs.
 Monk. Platy: 1, Mr. Dudley; 2, Kane Family;
 3, T. Marshall. A.V. Coldwater: 1 and 2,
 H. Potts; 3, T. Marshall. Breeders Class
 (Livebearer): 1, N. Lynch; 2, P. Wright; 3, Mr.
 and Mrs. Sowerby. Breeders Class (Egg-layer):
 1, P. Wright; 2, Mr. Baynton; 3, P. Wright.
 Plants Class: 1 and 3, G. A. Liddell; 2, Mrs.
 Surtees.

THE Spalding and District Aquarist Club
 will meet at 7.30 p.m. on Thursday, 4th August
 at Pulney Church Hall, Spalding to hear a talk
 given by Mr. E. A. Allen of the British Koi-
 keepers' Society. Mr. Allen will speak about
 keeping Koi and the methods of pond-construction
 and water-filtration and these will be
 illustrated by slides. Non-members wishing
 to attend the meeting should contact Mr. M.
 Barnes, 32 Windsor Road, Spalding, Lincs.

THE Midland Aquarist League held their
 first show of the season in May. As the
 League were late in getting under way this year
 it was decided to stage fewer but larger shows,
 and this has proved more interesting. 142
 entries were received in the Inter-Society
 Classes and although this was good, it was 26
 entries short on what was expected.

Although the Open Classes attracted entries
 from as far afield as Lancashire only 85 were
 benched in the six classes. Winners: A.V.
 Characin: 1, Mr. Nightingale (T.K.A.G.); 2,
 F. Hirst (Coventry); 3, P. Smith (B.A.W.S.);
 4, Mr. Nicholson (G.A.S.); A.V. Cichlid:
 1, T. Redfern (Hinckley); 2, Mr. Nightingale
 (T.K.A.G.); 3, C. Horton (G.A.S.); 4,
 S.M.L.N. (Nunston). A.O.V. Tropical: 1 and
 3, Mr. Nightingale (T.K.A.G.); 2, T. Parry
 (Loughborough); 4, D. White (Bedworth).
 Single Tailed Goldfish: 1 and 2, C. Pratt
 (Bedworth); 3 and 4, H. Brakes (Leicester).
 A.S.J. Egg-layer Pairs: 1, E. Sandcock (G.A.S.);
 2, T. Parry (Loughborough); 3, S. Whitehouse
 (Darlaston); 4, C. Pratt (Bedworth). Danio
 and W.C.M.M.: 1, S. Bostock (Loughborough);
 2, Mr. and Mrs. Burton (B.A.W.S.); 3, R.
 Cleaver (Coventry); 4, H. S. Bostock (Lough-
 borough). A.V. Barb: 1, A. Simmons (Coventry);
 2, Mr. Lee (Bedworth); 3, Mr. and Mrs.
 Short (Hinckley); 4, J. Salisbury (Bedworth);
 5, D. White (Bedworth); 6, B. Chitenden
 (Leamington). A.V. Anabantid: 1, Mr. and
 Mrs. Chamberlain (Leamington); 2 and 4, R.
 Cleaver (Coventry); 3, P. and C. Hind (Coventry);
 5, J. Salisbury (Bedworth); 6, C. Pratt
 (Bedworth). A.V. Loach: 1, Mr. Keeble
 (Coventry); 2 and 6, R. Cleaver (Coventry);
 3, Mr. and Mrs. Chamberlain (Leamington);
 4, T. Parry (Loughborough); 5, Mr. and Mrs.
 M. Short (Hinckley). Livebearer (Pairs):
 1 and 2, Mr. and Mrs. Short (Hinckley); 3 and
 4, L. Somerville (Loughborough); 5, E.
 Sandcock (Goodyers Rod); 6, Mrs. Moore
 (Bedworth). A.V. Catfish: 1, D. White
 (Bedworth); 2, A. Nash (Coventry); 3, S.
 Lindsey (Loughborough); 4 and 5, Mr. and
 Mrs. Short (Hinckley); 6, C. Pratt (Bedworth).
 A.V. Rasbora: 1 and 2, Mr. Bremhall (Goodyers
 End); 3 and 4, Mr. and Mrs. Short (Hinckley);
 5, D. White (Bedworth); 6, J. Salisbury
 (Bedworth). Best in show: Mr. Keeble
 (Coventry)—Kuhli Loach 814 pts. Total of
 142 entries. League position after first show:
 1, Coventry Pool & A.S. 36 pts; 2, Hinckley
 A.S. 29 pts; 3, Bedworth A. & P.S. 24 pts;
 4, Loughborough & D.A.S. 14 pts; 5, Goodyers

End 13 pts; 6, Leamington & D.A.S. 11 pts; 7, Rugby Fishkeepers nil.

Officials elected at the last delegates meeting: chairman: T. Parry (Loughborough & D.A.S.), Secretary: F. Underwood (Bedworth & P.S.), 59 Warwick Road, Kenilworth, Warwickshire, Treasurer: G. Hayes (Hinckley A.S.).

THE Stratford & District A.S. are holding their open show in conjunction with Salford Show. This is a two day annual show with exhibitions and competitions in many fields of hobbies. The fish show will be held on the 31st of August, Sunday and benching will be between 11.00 a.m. and 1.00 p.m. There will be more than thirty other attractions to interest the hobbyist and his family with full catering facilities. The club meet at the Melville Hotel every other Thursday at 8.30 p.m. Further details from the club secretary Mrs. P. Bowden. Ring 061 226 1264.

RECENTLY High Wycombe A.S. heard a talk by P. Merritt of Reading on "Aspects of Fish-Keeping" which was very interesting and informative. Early in April there was a discussion on the closed show for table trophy, live food and making your own fish food. Results of the club members' table show for annual table show trophy were: 1. Pierce 23 points, R. Cox 23, R. Leslie 22, J. Bushby 21, D. Lynne 12, K. Pierce 10, P. Bushby 7, O. Leslie 4, C. Leslie 3, D. Gossett 2. There were 81 entries.

The society meet at 8 p.m. on alternate Thursdays at The White Horse Inn, West Wycombe Road, (corner of Oakridge Road), High Wycombe. Visitors are very welcome at the meetings. The schedule is: 10th July Club discussion; 24th July, 8 A/Side, 7th August, club discussion. Further details can be obtained from the secretary J. Bushby, 3 Hawthorne Walk, Hazlemere, High Wycombe Bucks. Tel. Penn. 3825.

MEMBERS of the Gloucester A.S. were shown a slide and tape lecture on Discus, kindly loaned from the Henson A.S. at their April meeting and all members remarked on the enjoyable standard of the evening. The society were winners of the "Six-a-Side" show which was held at Ivesham in March. Results of the monthly table show were as follows: 1, M. Freshney; 2 and 4, R. Jarvis; 3, K. Gill.

IN the first three months Ealing & District A.S. have enjoyed the Irvine and Mills K.O. contests in the first round, an Inter-dub with Hounslow A.S., a three-way with Riverside and Bethnal Green and a slide show by J. Hetherall on his fishhouse and killes.

NEW SOCIETY

The Brize Norton A.S. held its first meeting at The Mason's Arms, Brize Norton, on 27th May at 8 p.m. Meetings will be held every other Tuesday at 8 p.m. and all new members will be made very welcome. Further information from D. Tovey, 28 Northolt Road, Carterton, Oxon.

SECRETARY CHANGES

Tonbridge and District A.S.: Mrs. J. Feast, 19 Bardley Road, Sevenoaks, Kent TN13.

Glossop A.S.: Mrs. Vera Davies, 33 Norfolk Street, Glossop, Derbyshire.

Kidderminster and District A.S.: R. James, 4 Sunnyside Gardens, Wolverley Road, Franche, Kidderminster.

Stratford and District A.S.: Mrs. P. Bowden, 310 Claremont Road, Moss Side, Manchester 14, Lancs. Tel.: 061-226 1264.

East Dulwich A.S.: R. Callaghan, 22 Vega Road, Lewisham, London S.E.13. Tel.: 01-690 3950.

Bishops Cleeve A.S.: T. Viner, 10 Epoxy Road, Lower Tuffley, Glos.

VENUE CHANGE

Due to unforeseen circumstances there has been a change of venue for the Huddersfield T.F.S. open show on the 17th August. The new venue is Deighton Civic Youth Club, Deighton Road, Deighton, Huddersfield.

AQUARIST CALENDAR

5th July: Cardiff A.S. Open Show at St. Margaret's Church Hall, Roath, Cardiff. Details from B. Guy, 30 Letterston Road, Rummy, Cardiff.

6th July: Billingham A.S. Annual Open Show in the Community Centre, Billingham.

6th July: Grantham and District A.S. Open Show at Aveling-Barfords Social Hall, Arncliffe, Gonerby Road, Grantham. Show secretary, W. E. Neville, 32 Sharpe Road, Grantham, Lincs., N30 1 9BW.

6th July: Lytham A.S. Annual Open Show to be held at Ansdell Institute, Woodlands Road, Ansdell, Lytham-St. Anne's, Lancs. Show schedules from show secretary, Mr. Peter Ham, 1 Wyndene Grove, Preckleton, Preston, Lancs. Tel: Preckleton 633182.

6th July: Bristol A.S. Tropical Show. Schedules from show secretary, E. N. Bowden, 12 Stoneleigh Walk, Knowle, Bristol BS4 2RL. Tel.: 775355 or from C. Summers, 6 Heath Gardens, Coalpit Heath, Bristol BS17 2TQ. Tel.: Winterbourne 773833.

6th July: Leamington and District A.S. Open Show at Trinity Hall, Trinity Street, Leamington Spa (Benching 11.30 a.m.-1.30 p.m.).

6th July: Thorne A.S. Open Show, The Grammar School, St. Nicholas Road, Thorne.

6th July: Chard and District A.S. first open show at Furnham School, Furnham Road, Chard. Benching 10 a.m. to 12.30 p.m. Information obtainable from B. Riste, 126 Henson Park, Chard, Somerset.

20th July: Alreborough and District A.S. Open Show will be held at Menston Community Centre, Main Street, Menston. Schedules from show secretary, Mr. J. S. Hall, 14 Salisbury St., Calverley, Pudsey LS28 5PY. Tel.: Pudsey 74609.

20th July: Sandgrounders A.S. Annual Open Show at Meols Cop Secondary Schools, Meols Cop Road, Southport. Show secretary: G. A. Waterhouse, 23 Moss Lane, Southport, Merseyside PR9 9QR.

20th July: Brighton and Southern A.S. Open Show, St. Barnabas Church, Halls, Sackville Road, Hove, Sussex. Further details from B. Sayers, 11 Seaview Estate Southwick BN4 4AS, Sussex. Tel.: Brighton 593851.

26th July: Goldfish Society of Great Britain, Conway Hall, Red Lion Square, Holborn, London W.C.1.

27th July: Runcorn A.S. Annual Open Show at the Grandway Youth Centre, Grandway, Runcorn. Show secretary: J. V. G. Drake, 50 Conliffe Close, Palacefields, Runcorn, WA7 2QE.

27th July: Ely and District A.S. Tropical Fish Exhibition, at Bedford House, St. Mary's Street, Ely. Open from 11 a.m.-6 p.m. 15p. Adults, 5p. Children. Details from Mr. S. Cowell, 123 Queenway, Soham, Cambs.

1-2 August: Hull A.S. (Hull Show "Aquarist Section"), East Park, Holderness Road, Hull.

2nd-3rd August: Tottenham and District A.S. open cold water show will be held at Harringay Recreation Grounds, Lordship Lane, London, N.22. Judges to be G.S.O.B. Details and show schedules from Mrs. S. Townson, 1 Haslam Court, Waterfall Road, London, N.11. Telephone: 01-368 2091.

3rd August: Tonbridge & District A.S. Open Show. Show secretary, S. Feast, 19 Bardley Road, Sevenoaks, Kent TN13 1XX. Sevenoaks 54998.

3rd August: Blackpool and Fylde A.S. 25th Annual Open Show (Judging starts 2 p.m.) at the Blackpool Boys Club, Laycock Gate, off Devonshire Road, Blackpool.

4th-9th August: Portsmouth A.S. Open Show and Exhibition will be held at the Wesley Central Hall, Fratton Road, Portsmouth. Benching on Saturday, 2nd August. Judging on Sunday, 3rd August. Schedules from J. Stillwell, 34 Salcombe Avenue, Copnor, Portsmouth, Hants PO3 6LD.

8th August: Newport A.S. Open Show at St. Johns Hall, Victoria Avenue, Maidlee, Newport, Gwent. Further details and show schedules available from P. Jordan, 16 Rosslyn Road, Newport, Gwent. Tel. 75436.

10th August: Grimsby and Cleethorpes A.S. Open Show Memorial Hall, Cleethorpes. Schedules from: Show Secretary—T. P. Walker, 51 Cheshire Walk, Grimsby, South Humberside.

17th August: Oldham & District A.S. Annual Open Show, Werneth Park, Oldham. Details from A. E. Chadwick, 341 Broadway, Chadderton, Oldham.

17th August: Newcastle Guppy and Livebearer Society, Second All Livebearer Open Show. Details Mrs. J. Renton, 128 Dunstan Tower, Garth 18, Killingworth, Newcastle-on-Tyne NE12 0TX.

17th August: Stroud and District A.S. at Stroud Subscription Rooms as last year. Details from Mrs. Cole, "Avignon", The Hill, Randwick, Stroud, Glos. Tel: Stroud 4504.

17th August: Huddersfield T.F.S. Open Show, Deighton Civic Youth Club, Deighton Road, Deighton, Huddersfield. Details from D. Hough, Flat 5, Sycamore Court, Sycamore Avenue, Golear, Huddersfield. Tel.: Huddersfield 57147.

17th August: Bedworth A. and P.S. open show at Nicholas Chamberlaine School, Bulkington Road, Bedworth, nr. Nuneaton. Schedules from J. Salisbury, 261 Gadsby Street, Attleborough, Nuneaton.

24th August: Corby and District A.S. at the Corby Leisure Activities Exhibition, Civic Centre, Corby a "Mini-Show" (10 Classes) for members of the *Northamptonshire Societies* only.

24th August: Fleetwood and District A.S. annual open show at Fleetwood Grammar School, Poulton Road, Fleetwood, Lancs. Show secretary, N. D. West, 406 Mowbray Road, Fleetwood.

24-25th August: Yarmouth and District A.S. Third Annual Tropical and Coldwater Fish Exhibition to be held at Hopton Village Hall (on A.12 between Gt. Yarmouth and Lowestoft). Plenty of parking space this year.

30th August: Hounslow and District Open Show will be held at Hounslow Youth Centre, Cecil Road, Hounslow. Show schedules and all relevant information can be obtained from E. Shepherd at 9 Moulton Avenue, Hounslow, Middlesex. Tel.: 01-570 6127.

31st August: The Castleford A.S. third Annual Open Show at the Castleford Civic Centre, Ferrybridge Road, Castleford, Yorkshire. Details from Mrs. E. Asquith, 32 Lower Oxford Street, Castleford, Yorks WF10 4AE.

31st August: Morecambe Bay A.S. Open Show at the St. John's Parochial Hall, Norton Road, Morecambe. Show secretary, Mrs. B. Booker, 18 Gringley Road, Westgate, Morecambe.

31st August: Stratford & District A.S. Annual Open Show, Salford Grammar School, Bule Park, Salford. Details from Mrs. P. Bowden, 310 Claremont Road, Moss Side, Manchester 14. Tel.: 061-226 1264.

September: Bishop Auckland A.S. annual Open Show. Details later. Show secretary, R. Minto, 111 Craddock Street, Spennymoor, Co. Durham.

6th September: Federation of British Aquatic Societies General Assembly, Conway Hall, Red Lion Square, Holborn, London, W.C.1. 2.30 p.m.

7th September: Bethnal Green A.S. Open Show to be held at The Bethnal Green Institute, 229 Bethnal Green Road, E.2. Schedules and further details available from the Show Secretary, Sybil Hodges, "Koi Kono", 150 Ashburton Ave; Seven Kings, Ilford, Essex, IG3 9EL. Tel.: 01-590 3239.

7th September: Killingworth Aquarist Association First Open Show at "Communicare", Killingworth, Newcastle. Schedules from, D. B. Hickman, 14 Crumstone Court, Longmeadows, Killingworth, Newcastle NE12 0SZ.

7th September: Wellingborough and District A.S. Open Show Weavers Sport Centre, Weavers Road, Wellingborough. Schedules from D. Hitchener, 1A, George St., Wellingborough.

7th September: Buxton and District A.S. Open Show, Pavilion Gardens, Buxton. Judges F.N.A.S., and points gained will be awarded to the League. Further details from Mr. Gullane, 18 Derwent Road, Buxton, Derbyshire.

7th September: Nuneaton A.S. Open Show, Priory Youth Centre, Abbey Street, Nuneaton, Warks. Schedules from show secretary, M. Short, 8 Greenhill Road, Stoke Golding, Nuneaton, Warks. CV13 6HJ.

7th September: Hoylake A.S. sixth open show at Y.M.C.A., Market Street, Hoylake, Merseyside. Show secretary, Mr. D. W. Morris, 9 Pump Lane, Grassby, Merseyside L49 3PW.

7th September: Bishops Cleeve A.S. open show at the Community Centre, St. Marks, Cheltenham. Show secretary, Mrs. J. Bishop, 36 Clarence Square, Cheltenham.

12th September: Malvern & District A.S. Second Open Show to be held at Barnards Green Cricket Club, North End Lane, Malvern. Schedules available later.

12th September: Bristol A.S. Goldwater Show. Schedules from show secretary, E. N. Bowden, 12 Stoneleigh Walk, Knowle, Bristol BS4 2RL. Tel.: 775355.

14th September: Torbay A.S. will be holding its Seventh Annual Open Show at the Torquay Town Hall. Show schedules will be available from Mr. J. R. Davis, 45 Haldon Road, Torquay, Devon.

14th September: Three Counties Group 21st Annual Open Show run by the Basingstoke, Bracknell, Didcot, High Wycombe and Reading A.S.'s at the Reading University, with 50 classes which will include a 'specialist' Killie Show. Schedules from, R. Leslie, 29 Meadow Walk, Tylers Green, High Wycombe, Bucks, HP10 8DG, or M. Strange, 10 Lodon Court, Neville Close, Basingstoke, Hants.

14th September: Cleveland A.S. annual Open Show at the Guisborough Parish Church Hall, Whitby Road, Guisborough (same venue as last year). Schedules will be available later, from the show secretary, R. W. Begg, 35 Tyreman Street, Lingdale, Saltburn, Cleveland TS12 3ES.

20th September: Hounslow and District A.S. Annual Open Show at the Hounslow Community Centre, Cecil Road, Hounslow, Middx.

20th-21st September: Litchampton and Bognor A.S. will be holding its annual two-day exhibition at Bognor Regis.

21st September: Hastings and St. Leonards A.S. Third Open Show at Ore Centre. Show schedules and further details from, P. Martin, 20 Silverlands Road, St. Leonards-on-Sea, Sussex.

21st September: Hucknall & Bulwell A.S. Annual Open Show. Details to follow.

21st September: Loynes A.S. Open Show, St. Pauls Hall, Southforth, Lancaster. Show secretary, Mrs. B. Hammond, 30 Wharfedale Road, Lancaster, LA1 5ND.

21st September: Chesterfield and District A.S. annual open show, Clay Cross Social Centre, Chesterfield Road, Clay Cross, nr. Chesterfield, Derby. Exit 29 off M1. Follow signs 4 miles to show. The venue is situated on the A61. Details from show secretary, P. Marton, 56 Salisbury Crescent Newbold, Chesterfield.

27th September: Goldfish Society of Great Britain Open Show to be held at Sutton Adult School, Bushill Avenue, Sutton, Surrey.

27th September: North Gosport A.S. First Annual Open Show at the Leisure Centre, Ebbw Vale.

28th September: Newbury and District A.S. Third Open Show at the Plaza, Market Place, Newbury, Berks. Details and schedules from S. Canning, 6 South End, Thatcham, Newbury, Berks.

28th September: Northampton and District A.S. Open Show at the Drill Hall, Clare Street, Northampton. Show schedules will be available from Mrs. S. Taylor, 25 Rowley Crescent, New Duston, Northampton, NN3 6PU shortly.

28th September: The Ealing and District A.S. Open Show. Northfields Community Centre, Northcroft Rd., Ealing, London, W.13.

October: Chimsford A.S. Date and venue to be decided.

3-5th October: German Livebearer Association Open Show, Breeding Pairs only. Further details and application forms from DGLZ, 11 Intern, Lehrungschau, Herr Hans Kroger Guckstrasser Weg. (Schule am Barle) 2000, Hamburg 53, West Germany.

4th October: East London Aquatic and Pondkeepers Association Annual Open Show.

4th October: Haslemere and District A.S. first Open Show, at the Haslemere Town Hall, Bridge Road, Haslemere, Surrey. Schedules and further details from show secretary, R. J. Hard, 6 Lower Hanger, Woolmer Hill, Haslemere, Surrey. Tel.: Haslemere 51812.

5th October: Eboracum Aquarists Open Show to be held at Nunthorpe Grammar School Hall, Enquiries to show secretary, Mr. A. S. Allison, 14 Bessley Street, Bishopthorpe Road, York.

5th October: Second Open Show of the Scunthorpe and District A.S. at the North Lindsey College of Technology Annex, Cole Street, Scunthorpe. Schedules are now available from L. Burr, 6 Saaby Road, Scunthorpe, South Humberside.

11th-12th October: British Aquarists' Festival, Belle Vue Zoological Gardens, Manchester. Details from G. Cooke, Spring Grove, 33 Field Hill, Batley, Yorks.

12th October: Ilfracombe and District A.S. Open Show at the Ilfracombe Junior School, Princess Avenue as last year. Details from Mrs. S. Lipscomb, 8 Foxbears Road, Ilfracombe, N. Devon.

12th October: Vauxhall Motors A.S. open show. Schedules from A. D. Philip, show secretary, 15 Hollybush Road, Luton.

26th October: Doncaster A.S. Open Show Brodsworth Miners Welfare Hall, Welfare Road, Woodlands, Nr. Doncaster. Benching 12-2.15.

2nd November: Blackburn Aquarist Waterlife Society Open Show, Windsor Hall, Blackburn. Details to T. Burton, 21 Henry Street, Ribton nr. Blackburn BB1 4JJ.

9th November: Halifax A.S. Open Show, Forest Cottage Community Centre, Cousin Lane, Ellingworth, Halifax. Schedules from D. Shields, "Cobblestones", Gainsel, King Cross, Halifax. Phone: Halifax 60116.

9th November: Glossop A.S. open show at Adult Education Centre, Talbot Street, Glossop, Derbyshire. Show secretary, Mr. S. Turner, 56 Arundel Street, Glossop. Tel.: Glossop 3409.

22nd November: Fur, Feather & Aquaria Show, King's Hall, 39 Lower Clapton Road, E.5. Schedules and further details from show secretary, Sybil Hedges, "Koi Kerner" 150 Ashburton Avenue, Seven Kings, Ilford, Essex, IG3 9EL. Telephone 01-590 3239.

22nd November: Goldfish Society of Great Britain, Corway Hall, Red Lion Square, Holborn, London W.C.1.

26th November: Hensforth A.S. open show at the New Civic Hall, Pudsey. Show secretary, C. Corns, 15 Thornleigh Grove, Leeds S59 8QR, Yorks.

6th December: Federation of British Aquatic Societies Annual General Meeting, Corway Hall, Red Lion Square, Holborn, London, W.C.1. 2.30 p.m.

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