AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers

Spotlight on Regal Angel Fish

Breeding Tank for Artemia

THE AQUARIST AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

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Commentary

by

ROY PINKS

ALTHOUGH I made a number of efforts last season to acquire some Bitterling and their associated mussels (*Unio pictorum*), I did not intend to carry out any breeding attempts until this year, mainly because I left it too late to progress beyond the collection stage. It had been my intention to condition the fish indoors during the winter, and to let them loose with their mussels in late spring. Alas, everything has had to be rescheduled because of traits of character of these fish of which I was hitherto completely unaware. My earlier experiences with Bitterling indicated that, apart from the unusual habit of spawning in mussels, they were peaceful and decorative creatures, outstandingly beautiful in the breeding season, and desirable as good mixers for the rest of the year. They are not at their best in the pond, where their small size reduces them to virtual insignificance, but in the aquarium they really come into their own. I must admit that in past years I either kept them in pairs in separate tanks, or as companions to miscellaneous cold-water fish—goldfish, tench, carp and the like, and in such association they were quite admirable.

However, as I had bought two pairs in the late summer of last year and had to wait for a time before I managed to track down the mussels, the fish were accommodated temporarily in a 3 ft. × 1 ft. × 1ft. tank, indoors. This was in a quiet and secluded position, calculated to encourage them to settle down, and probably to pair. For several days there were the usual mad scurryings due to nervousness, but they gradually gained confidence, and a number of what seemed to be mock battles began to take place. The females were both displaying prominent ovipositors, but the males were extraordinarily dull, and I assumed that this was due to the lateness of the season, coupled with the recent disturbance, factors which many would-be breeders completely fail to acknowledge. One of the males was considerably larger than the other, and as they seemed to be hitting it off rather badly I decided to remove the smaller to an outside pond, and to leave the larger with the two hens. Then the mussels arrived.

Disgressing for a moment I then received some correspondence from readers about their experiences with Bitterling, ranging from complete breeding success to some rather puzzling observations as to temperament and compatibility. Paul Szymanski of Nottingham, for example, recorded that there where was a number of males and females together, the males fought and had killed one of the females. He had, after some experience, concluded that one male, two females and two mussels, was a successful combination, and I would add that as he had 60 young fish to show for his efforts, he was very much on the right lines. There were other reports about uneven temperament and some intriguing instances where ovipositors had dropped off.

I then chanced upon a fascinating article on the breeding of the Bitterling, written by Laurence Perkins in the July 1963 *Aquarist*. It is difficult to summarise into a sentence or two a longish article in which not a word was wasted, but he commented on the fact that in the case of a pair he both observed and photographed the supposedly normal insertion of the ovipositor into the inhalent siphon of the mussel did not take place. He drew attention to the fact there is what he termed a "sub ovipositor" (a small organ to the fore of the normal one), and that the exhalent siphon had been entered on some occasions. Referring to a number of accounts by other reliable observers he opened up the possiblity that, in practice, two points of exit from the fish may be employed, and that two points of entry into the mussel are equally likely. Accompanied by such stimulating photographs, this is an article which should be studied by everyone interested in this fish—I have not seen in later years anything even half as factual.

He speculated whether the variations in practice may have arisen from retarded or advanced mutations, and I suppose that this is possible. But animals do often seem to get confused over even fundamental functions, and are not always as efficient in discharging them as we would like to imagine. All sorts of sexual deviations are manifest in humans, and when I see our cock doves attempting to mate with one another whilst there are hens present I can hardly wonder that the Bitterling, faced with the odd necessity to negotiate with a mussel rather than with one of its kind, may sometimes get muddled, too. The whole matter is nevertheless a very good example of the open-minded approach one should make towards living things. Although they are usually fairly predictable, the dogmatic approach by many ostensible experts makes one sigh at times and point to the reference above as an example how one should regard nature's happenings. One year the musk plant, across the whole world, lost its scent, and it has never regained it; this perhaps, is the most telling incident I can recall in support of never laying down the law!

Having left the reader with the arrival of the mussels, I will pick up the narrative again just briefly before describing my own puzzling events in a separate article. I had one male, two females and two mussels in the 3 ft. tank, the latter ploughing around and trying to decide on amenable lodgings. I decided to remove the smaller of the females and allow her the company of the solitary male in the outdoor pool, in which a couple of mussels had already been placed for the winter. As the two females had in any case been none too friendly, this seemed to prove a sensible gambit, as the pair in the tank began to show some interest in the mussels, and the male assumed a mildly reddish hue, though nothing like the customary nuptial colours, which are out of this world. It seemed at this point that I might just secure a spawning really late in the season, so I sat back to await events.

A visit to Britains Largest Aquarium

by B. Whiteside

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WHAT'S THE largest aquarium in Britain like and what does operating it involve? These were some of the thoughts running through my mind recently when I was in London; so I decided to visit The Zoological Society of London Aquarium—situated in London Zoo, Regent's Park, N.W.1. I set off from Piccadilly Circus and took the Bakerloo line tube to Baker Street—from whence I crossed the road and waited rather a long time for the appropriate bus to take me to the Zoo.

When I arrived at the Zoo I made my way to the Society's main offices where I was met by Miss Joan Crammond, the Society's Public Relations Officer, who kindly provided me with a Press Photographer's Permit and told me something about the fish that are kept in the moats surrounding The Cotton Terraces which house species such as horses, cattle, giraffes, zebras, camels, llamas, deer and antelopes. The fish are kept in the moats to control the growth of algae. Miss Crammond also asked me if I intended to use flash when taking photographs. I recalled the darkness of the Aquarium from a visit I made there about ten years ago and told Miss Crammond that flash would be essential for all interior shots. She pointed out the necessity to obtain the permission of the Head Keeper concerned because of the fact that some animals can be frightened or disturbed by flash.

Soon afterwards, armed with my Permit, I crossed the road and entered the Zoo itself—arriving just in time to capture a couple of shots of the male giant panda being given a meal of bamboo shoots. I didn't have time to ask about the progress of the female giant panda, which had recently undergone surgery, so I quickly made my way to the Aquarium armed with my camera, flash unit and bracket. I had left my extension tubes at home, in N. Ireland, because I knew that public aquaria are not the most suitable places for photographing fishes because it's impossible to arrange to have the glass cleaned both inside and out; and, in any case, I was not very hopeful about my chances of photographing individual fishes or aquaria because many of the aquaria and fishes at London Zoo are massive in comparison to my own six, small tanks and relatively minute fishes at home.

Entry to the Zoo is £2·75 for adults, and £1·25 for children between the ages of five and sixteen. Admission to the Aquarium is an additional 30p for adults and 10p for children. Photograph 1 shows the outside of the Aquarium.

Some of the general information about the Aquarium may astonish you as much as it did me. It runs for 150 yards under the Mappin Terraces and was built in 1924 at a cost of £55,000. Over 3,000 specimens are on exhibition and these comprise more than 350 species. There are tropical, freshwater and seawater halls, with 200,000 gallons of fresh and seawater in circulation through 100 exhibition tanks—of from 1 ft. to 30 ft. in length. The thickness of the glass ranges from ¼ in. to 1¼ in. and the largest tank holds 3,500 gallons! Sea water, from the Bay of Biscay, is brought to the Zoo twice each year in ballast tanks of ships of the General Steam Navigation Company and is used to top up the seawater in circulation.

I obtained permission to attempt to photograph some of the many fishes and other aquatic animals on display. The interior of the Aquarium is in almost total darkness, most of the light coming from the lighted aquaria, so I found it somewhat difficult to set and focus my camera; and, of course, the Aquarium was a busy place with many visitors—both young and old—gazing in wonder at the exotic creatures on display.

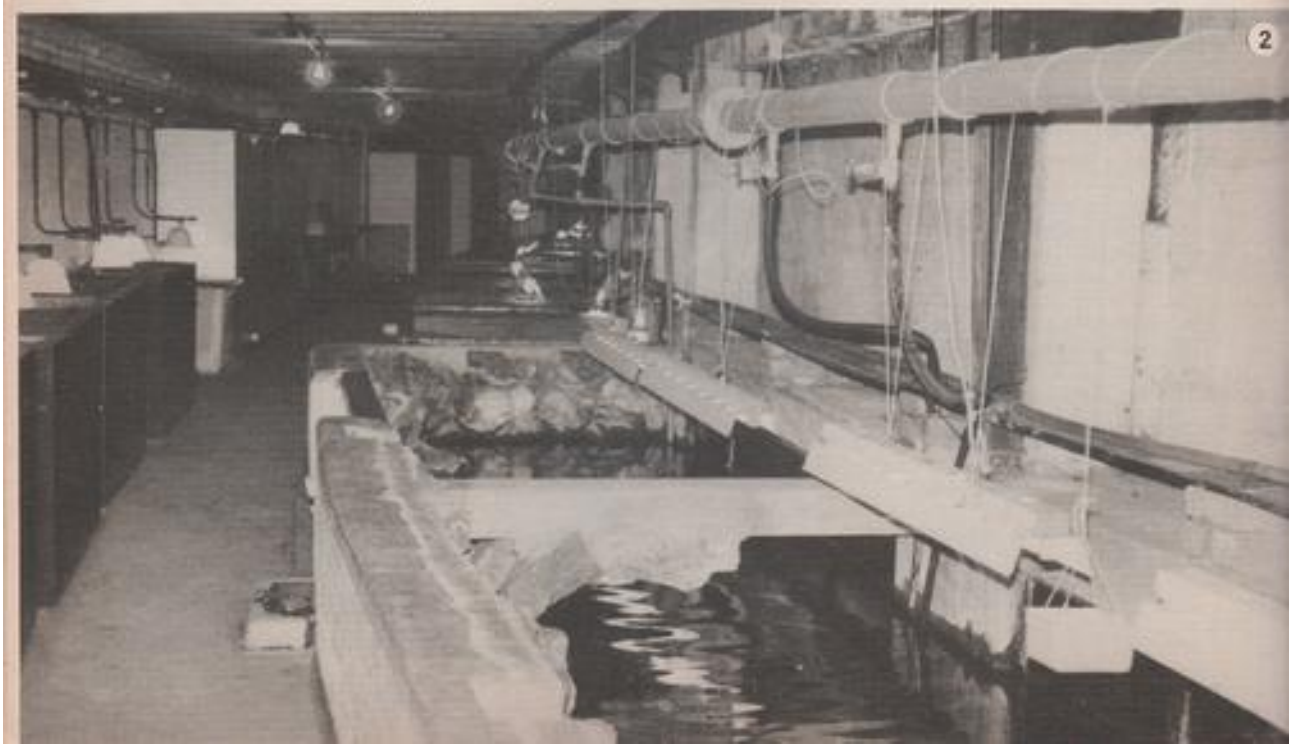
What's it like to look after such a massive aquarium complex and how does it operate? To obtain answers to these questions I interviewed the man in charge, Head Keeper of the Aquarium, Mr. Ron Dumbelton, who kindly answered all my questions, showed me round the maze of the interior workings of the Aquarium (this area is out of bounds to the general public), and gave me permission to take some photographs. (I did not photograph Mr. Dumbelton because it would have been contrary to the policy of the establishment.)

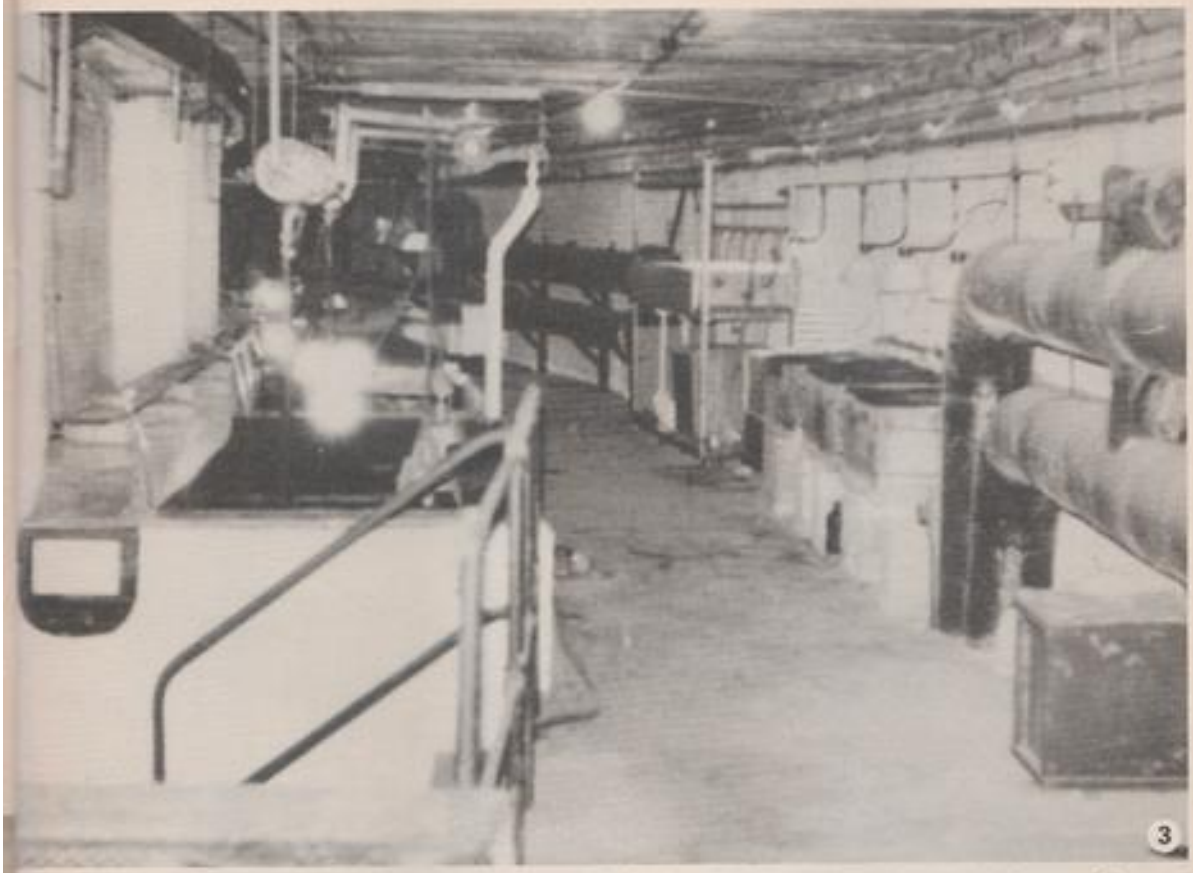
"Roughly how many visitors do you have during the year?" I asked the Head Keeper.

"About half-a-million," he replied. "We get about 1,500,000 people visiting the Zoo each year; and of those about one third pay the additional admission charge to visit the Aquarium."

When I arrived at the Aquarium I expected the man in charge to be someone of an academic bent, sitting in a centrally-heated office overseeing the army of men that I thought would be required to run successfully such a large complex. The reality was quite a contrast to my preconceived notions. Ron is very much a practical aquarist: he and only four other men operate the Aquarium. When I arrived I found him and his assistant in their working clothes hosing down a concrete area near the giant filter beds that keep clean all the water that circulates through the tanks. Ron took a temporary job at the Aquarium when he was a young man; 32 years later he's still there—as Head Keeper!

While wandering round the interior galleries, behind and above the giant aquarium that houses a collection of large carp, I asked Ron about the problems of feeding the various fishes, sharks, turtles, amphibians, etc. that comprise the hundreds of species housed in the Aquarium. He told me that commercially-produced flake foods would be far too expensive to feed to the stock—many of which looked as if they could consume a standard container of such food, tin and all, as a single snack. Ron said that they did use commercially-produced trout pellets and supplemented them with a variety of fresh foods, as well as a 'home-made' food that they made themselves. Fresh foods fed to the fishes include bread, meat, earthworms, gentles (maggots) and sprats; and vegetable material is provided in the form of fresh lettuce, and tinned peas —straight from the tin. I hinted that I'd very much like to see the large carp being fed and Ron went off and returned with a small, sliced, brown loaf.





"Would you like to see the carp collect in one corner?" he asked, bending down towards the surface of the water and reaching out his hand. Within seconds the surface of the water was churning up, as if boiling, with a collection of large carp obviously aware of their Keeper's presence and the possibility of being given some food. Ron told me that they preferred white bread to brown; but their preference was thrown to the wind as he tossed a couple of slices of brown bread into the water. The fish thrashed at the surface of the water, larger ones taking whole slices of bread into their mouths at one bite. Additional slices were torn apart as the smaller carp struggled to get a share of the unexpected treat.

I enquired about the home-made food and was told that it is made from dried shrimp, meat, sweet biscuit meal, egg powder and cod liver oil. These ingredients are bound together using margarine and the resulting mixture baked at a suitable temperature. When the product has cooled it is ground down into fragments of different sizes for large and small fish. Sometimes Ron and his colleagues boil up a collection of small potatoes which are then dropped into tanks containing large fishes; but apparently potatoes, when eaten by hungry fishes, tend to make the water rather messy.

Photograph 2 shows the water surface of the carp tank as it is swirled into ripples and waves by the hungry inmates. Note the fluorescent lighting above the tank and the various pipes that circulate and filter the water in the system.

Photograph 3 gives some idea of the complex array of pipes, pathways, lighting and smaller stock tanks that the public do not see. The stock tanks are used to house additional fish and other aquatic creatures used to replenish the larger tanks on display to the public. Some breeding is carried out; and, of course, some fish breed without any assistance from the Keepers. Ron told me about the need to keep and breed some of the less common species because, occasionally, outside suppliers are unable to obtain—sometimes for a period of several years—fishes that he will require to replace those that die, from old age, in display tanks. Some stock tanks house common guppies bred to produce live food for larger fishes that require it in their diet.

I had already noted that most of the display tanks—especially those housing large species—did not contain any plants. Mr. Dumbelton pointed out that it is a complete waste of time to put plants in such tanks because the fish immediately eat them. The plants that grew best in the smaller display tanks housing smaller tropicals were very obviously *Cryptocoryne* species. Amazon swords also seemed to grow reasonably well; and at least one aquarium sported a strong growth of giant *Hygrophila*. Photograph 4 shows a top view of some Amazon swords and *Cryptocoryne* species growing in a stock tank specifically used for the cultivation of tropical plants. I asked Ron about the amount of money spent each year on plants and was amazed to learn that it is usually less than £20·00. Many readers must spend a reasonable proportion of such an amount each year on plants for their own few aquaria.

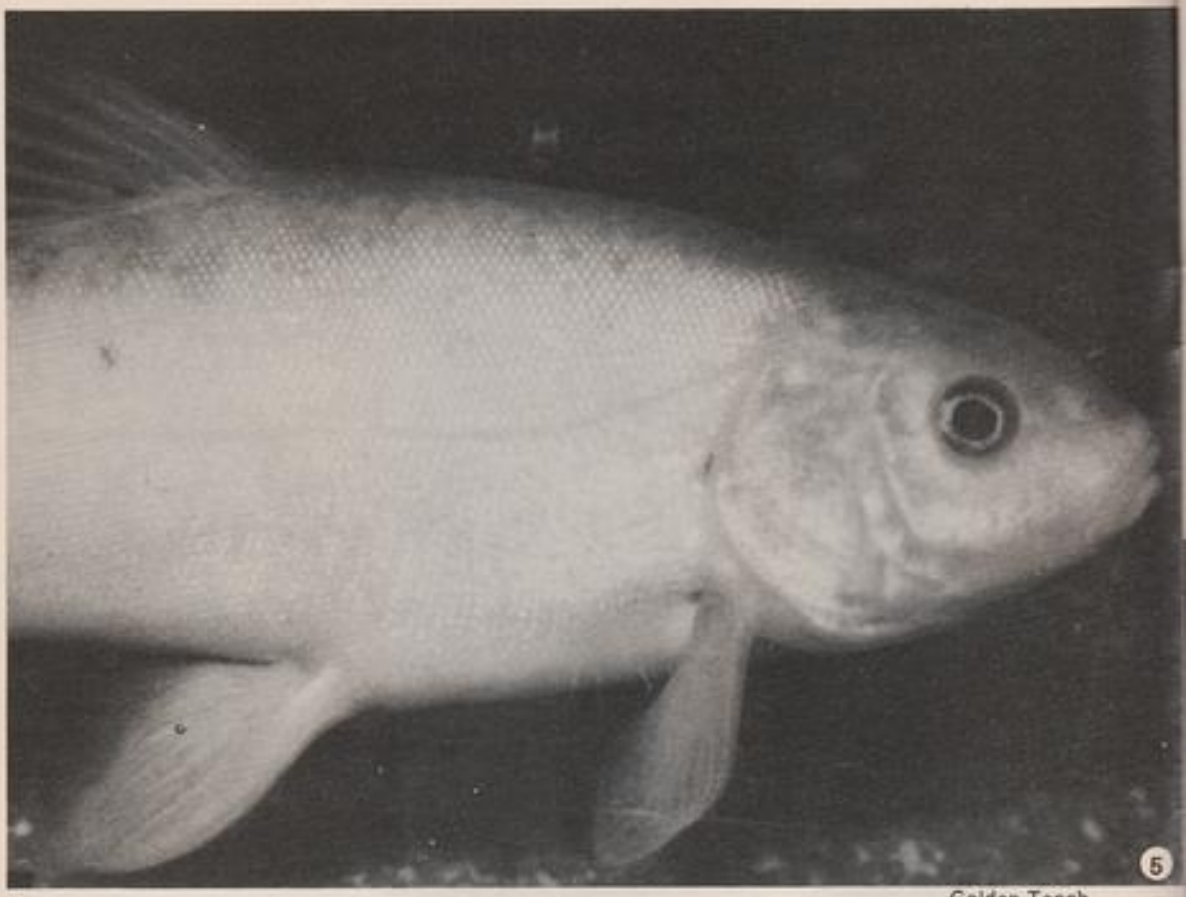
I asked if any artificial plant fertilizers were used to encourage plant growth and was told by Ron that he preferred to rely on the normal waste provided by the droppings from the fishes. The problem of disease was the topic I raised next and Ron told me that the water circulation system and the filtration system at the Zoo Aquarium present special difficulties. Massive, biological, filtration beds are used: each seemed to be about the size of a living room in area, being 30 ft. × 12 ft. × 12 ft. × 5 ft. deep. In each is a system of herring-bone filter pipes containing a series of slotted cuts—about the width of a table knife. The filters work for long periods without requiring any cleaning; but when the filtration pipes get clogged up with fine debris the blocked cuts are cleared out using a knife blade and a hammer. The filters contain a layer of shingle topped by a layer of filter sand. These filter media support vast colonies of aerobic bacteria which thrive because of the continually-circulating water. Each filter lasts about 25 years. Circulation rates through the filters are about 2,000 gallons of seawater, 2,000 gallons of freshwater, and 1,500 gallons of tropical water.

Water circulates through all the tanks in each of the three systems and passes through the appropriate filter bed. I asked about the addition of, say, a disease 'cure' to a specific display tank and Mr. Dumbelton pointed out that any chemical used would eventually find its way into the filter bed where it could possibly kill off the bacteria and ruin a system that has been working for well over half a century.

Some problems are now being faced as a result of the age of the Aquarium and its maze of water pipes. Numbers of the metal pipes have corroded over the years, and many have accumulated interior deposits of salts—just like furred kettles in hard water areas. There is also the problem of trying to join in new sections of metal pipes into old metal pipes—and the cost in time and labour, where such fittings could be made, would be high. Attempts to replace some of the old metal pipes with modern plastic pipes caused some difficulties because some of the various types and temperatures of circulating water affected the plastic materials from which the modern pipes were made; however, an appropriate type of plastic pipe has now been found and some replacements have been made. Ron pointed out the advantages of plastic—especially the ability to add on an additional pipe or fit a junction much more quickly, thus saving both time and money.

The Aquarium at London Zoo contains a fascinating collection of fishes and other creatures—many of which you won't see in your local dealer's tanks because of their massive size and the problems that would be associated with the keeping of them. When I had looked at all the display tanks I was left with a vague feeling that I'd like to have seen on display a few more of the well-planted, tropical tanks that most of us try to set up in our own homes—I suppose 'decorative tanks' would be the best term to use. I gave the matter a lot of thought—bearing in mind that the Aquarium was designed and built well over 50 years ago—and finally reached the conclusion that I was wrong: the Aquarium was not designed to reflect the world of the home aquarist in the Eighties; it was built in the Twenties—in 1924, to be exact, the same year in which this magazine, *Aquarist and Pondkeeper*, was founded as *The Amateur Aquarist*—to let members of the general public see aquatic creatures that they would probably never see elsewhere, and certainly not at such close quarters. Pretty, decorative aquaria require a lot of attention on the part of the aquarist—and each tank in one's home is provided with its own lighting, filter, heater, aeration, etc. If you want to see a few decorative aquaria, look at your own, study those of your friends, go along to your local dealer's shop and study those that he keeps, or visit a local aquarium show and head for the furnished aquaria section.

I assume that zoos are probably designed and built with two main purposes: to house animals in an appropriate environment where they will remain healthy and happy and, possibly, where they will breed—and no doubt the concept of conservation is prominent in the minds of those who are responsible for zoos; and also as places where



Golden Tench

Miller's Thumb

members of the general public may come along to see and study at close quarters animals from many and various parts of the world. The Aquarium at London Zoo provides one with the opportunity to study a wide variety of aquatic life from only a matter of inches or feet.

It does what I assume it set out to do extremely well and caters both for the general visitor and the dedicated aquarist. Many aquarium shops that contain a couple of dozens of small tanks are staffed by five or more people. Mr. Ron Dumbelton, the Head Keeper, and his four colleagues must be congratulated on managing to keep and maintain such a magnificent display of fishes and other aquatic creatures in such good condition. The five men who look after the largest aquarium in Britain must work extremely hard to maintain such high standards.

The admission charge to London Zoo, £2·75, plus the additional admission charge to the Aquarium, 30p, may seem rather high; but don't forget that for that sum you can see not only fishes and aquatic creatures but also a vast range of other animals from all parts of the world. If you

will be in London this summer I can thoroughly recommend a visit to London Zoo—and for only £3·05, including admission to the Aquarium. Put the cost of admission into the London context by considering the fact that a good seat at some West End shows can cost in the region of £8·00.

What about my attempts at photographing some of the fishes and aquatic creatures on display? Actually, I was reasonably pleased at many of the shots I obtained—bearing in mind that I used no special equipment, that I made my visit when members of the general public were also crowding round the tanks to see what was on display (and they had paid £3·05 to be allowed to do so), and that the aquarium glass had not been specially cleaned for my visit (indeed Mr. Dumbelton had no opportunity to know that I was coming and learned of my visit only when I presented myself before him in person).

Photograph 6 shows the rather ugly miller's thumb, *Cottus gobio;* and photograph 5 the front part of a large golden tench, *Tinca tinca.* You will have gathered that many of the species on display were so large that I was forced to photograph only the head sections because my flash unit would have been useless had I moved farther away in an attempt to fill the whole frame.

The final shot for which I have space, photograph 7, shows one of the two most amusing sights I observed in the Aquarium: a pair of giant catfish, or wels, *Silurus glanis,* which can reach a length of from one to three metres—making it one of the largest, freshwater fishes in Europe. The pair in the picture were resting their giant heads and mouths on the front glass looking as if they would like to have been stroked like domesticated cats. The happy pair left me wondering, as I headed towards the exit and the bright light of the outside world: did my ugly mug fascinate them as much as their ugly mugs fascinated me?

I must end by thanking once again Miss Joan Crammond, the Public Relations Officer, for her kindness in granting me a Press Photographer's Permit for the day; and Mr. Ron Dumbelton, the Head Keeper of the Aquarium, for giving his valuable time and his vast fund of information collected over 32 years at work in the Aquarium of The Zoological Society of London's Zoological Gardens at Regent's Park. I thoroughly enjoyed my visit—and the extremely courteous treatment I received at the Zoo.

7

SPOTLIGHT

The Regal Angelfish

Pygoplites diacanthus

Common names: Regal Angel, Royal Empress Angel.

Range: Red Sea, Tropical Indo-Pacific Oceans.

Max. size: Approx. 12 inches.

by Martyn Heywood

THE REGAL ANGELFISH, as it is most commonly known in Britain, is probably one of the most eagerly sought yet most perplexing of the readily available angelfishes. This species is frequently imported and its stunning colours ensure that it stands out in dealers' tanks. There seem to be two distinct colour phases, but it is unlikely either could be considered a sub-species of the type. Those from the Philippines, which unfortunately are the most commonly encountered, are much paler and of less intense coloration than those of the western Indian Ocean and the Red Sea. A Filipino specimen is easily distinguished by the pale, almost smoke grey colour of the throat and forward belly area. Also the orange areas of the body, and the tail, tend to shade towards yellow, rather than towards scarlet, as is the case with the more desirable Red Sea and Maldivian specimens.

Fishes from these latter regions are altogether more desirable in both colouring and ease of maintenance. These fish have colours which almost seem to glow, so intense and sharply defined are their markings. They also seem to be less shy than their Filipino relatives. Unfortunately, because of the ever-tense political situation in the Near-East, Red Sea Regal Angels are becoming ever more difficult to obtain. However, there is a steady, if limited, supply of fishes from the Maldive Islands available through Sri Lanka exporters and these are whole heartedly recommended to those aquarists with sufficiently large tanks to house them.

One drawback with this species is that they seem to need proportionately more gallonage than a similar sized fish of alternate species if they are to be content in captivity. Most imported specimens are about six inches long and obviously require substantial tank space. Occasionally smaller specimens, one to three inches in length, are seen but these come primarily from the Philippines and colour considerations come into play. However, for the aquarist with only 20 or 30 gallons at his disposal, these may satisfy his desire for a Regal Angel. Indeed, these smaller specimens are considerably easier to maintain than larger ones.

Perhaps the main drawback to Regal Angels is their frequent unwillingness to feed. This is particularly pronounced with large Filipino specimens—many of which starve to death in captivity. Whether this is due to the Filipino catching methods, our inability to provide suitable foods or the fishes' demands for extremely pure water is a moot point. The fact remains that most large, six inch or more, Filipino fishes are very reluctant to feed, or indeed compete with other fishes for food. However, the small specimens, which even at only an inch long show the adult colouring, are usually very willing feeders—taking any small, meaty foods such as mysis shrimp, razor clam, etc., and even a good quality flake food. Never, under any circumstances, buy a Regal Angel without seeing it feed. No reputable dealer will object to feeding a fish provided the customer buys it if it takes the food.

Absolutely optimal water conditions must be maintained and regular partial water changes are a must. A Regal Angel is a jewel of a fish so give it the setting it deserves—plenty of space, placid tankmates, as varied a diet as possible and plenty of rockwork.

Meet the Aquarist No 12

Master Robert Robinson

by B. Whiteside

MASTER ROBERT ROBINSON is 14-years-old and a third year pupil at Hopefield High School, Newtownabbey, Northern Ireland. Robert lives quite near the school—which is situated only a few miles from Belfast. Having noted that all the readers who have already appeared in *Meet the Aquarist* have been adults, and being aware that I receive a large number of letters for *W.Y.O.* from teenage readers, I thought that it would be an interesting idea to feature a teenager as the subject of this month's article; so armed with camera, film and flash I headed for Robert's house on a dull, February afternoon.

Robert is a pleasant, intelligent and well-mannered young chap who has been keeping tropical fish for only six to seven months. Last year he was lucky enough to visit Canada—where he discovered that his uncle was a keen aquarist. The hobby also appealed to Robert and about three weeks after he returned home he obtained his first tank. The Robinson household houses three tanks at the moment: a 36 in. × 12 in. × 15 in. all-glass tank and 24 in. × 12 in. × 15 in. framed tank, both of which are sited in the sitting room and both of which are Robert's. The third tank is also 24 in. × 12 in. × 15 in., has a frame, is situated in the living room, and belongs to Robert's 13-years-old brother, Stephen, who is a pupil at Ballyclare High School.

Photograph 1 shows Robert proudly displaying some of the fish in his larger tank. Above Robert's head can be seen two photographs; that on the right is of Robert himself; and the one towards the left is of younger brother Stephen who, unfortunately, proved to be totally camera shy and absolutely refused to appear either alone with his own tank or together with big brother Robert. Stephen's 24 in. tank houses an interesting collection of tiger sharks, tinfoil barbs, sailfin and black mollies, and kribensis.

A careful look at the fish shot may enable you to see that Robert's largest fish in his larger tank are gouramies—his favourites—and angels. He is particularly fond of moonlight, pearl and golden gouramies. Some of the other fish housed in the larger tank are kribensis, platies and catfish.

Robert's smaller tank is situated neatly beneath the larger one and houses, amongst others, angels, catfish, serpae tetras, tiger barbs, blind cave fish, black neons, glowlights and neons.

Robert uses under-gravel filtration. When I asked him why he replied, quite simply, "It does a better job." He also has air stones operating in his tanks and each is lit for about seven hours daily by a fluorescent tube in the hood. The wattage of the tube is 20 watts. Robert's plants, Amazon swords, *Elodea* and *Cabomba*, appear to grow quite well under the conditions provided.

I asked our young reader roughly how much he spends per week on his fish and he told me £2.00-£3.00. He often takes a bus into Belfast to visit either Grosvenor Tropicals or Ulster Aquatics, where he obtains fishes, foods, etc. He prefers separate heaters and thermostats because if either unit fails it can be replaced more cheaply than a combined unit. When I asked if the boys' parents were also interested in fish Robert replied, "My dad is interested—a bit!"

Robert prefers outside, stick-on, digital thermometers (liquid crystal). He has no plans to buy more tanks but he feels sure he will retain his interest in the hobby. His mother told me she was pleased at the boys' interest in aquaria and fish-keeping as the hobby kept them indoors and out of mischief.

The foods that our subject finds most popular with his fish are Aquarian Flakes, vegetable diet, Tetramin Staple Food and dried worms; the fish also like live *Tubifex* and

bloodworms. So far Mrs. Robinson has been lucky: there have been no spoiled carpets!

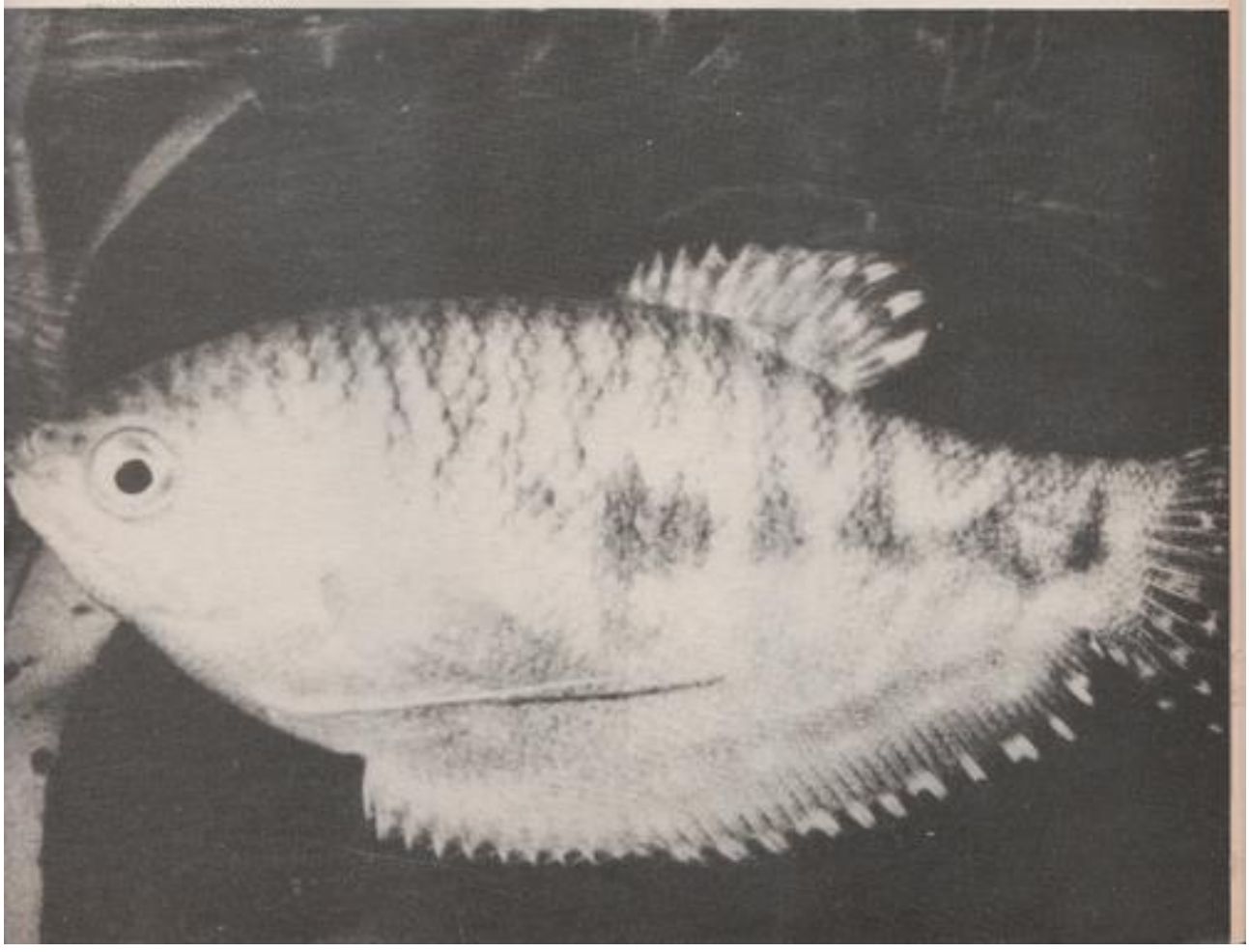
Before I left Robert's home, having again failed to persuade brother Stephen to appear in a photograph, I wondered if Robert was very interested in biology at school or if a career associated with fish would appeal to him. Strangely enough, his reply to both points was in the negative. "I like physics, chemistry, maths, English and technical drawing," he told me. He has not yet given serious consideration to a future career; but he will obviously give the matter more thought soon as he selects the subjects that he will study for G.C.E. 'O' level in his fourth and fifth years at Hopefield High.

Young Robert does not yet have the fund of personal stories built up to recount to reporters such as I am simply because he has been an aquarist for a relatively short time; however, during those few months he has widened his horizons considerably and has gathered up a vast store of useful information—much of it from *The Aquarist*, and

Melostoma temmincki—the Kissing Gourami

gleaned from books borrowed from his local library. I like Robert's fresh, direct approach to aquarium keeping and feel sure that he will soon achieve his ambition to breed several species of fish—other than guppies! Our hobby should be safe in the years ahead in the hands of bright, young readers such as Robert Robinson.

Trichogaster trichopterus
—the Golden Gourami



PLANT PROFILE

No. 3

Lilaeopsis novae-zelandiae

by B. Whiteside

THE WORD 'exciting' is not one that I would normally apply to an aquarium plant but it's a word that springs to mind when I think of the potential of the subject of this month's Plant Profile, *Lilaeopsis novae-zelandiae*. I read about the plant last year in Rataj and Horeman's book, *Aquarium Plants—their identification, cultivation and ecology* (T.F.H. Publications, Inc., 1977), but I was unable to find any mention of the plant in any of the specialist dealers' catalogues in my possession.

Subsequently I asked one leading specialist about the plant in question and was delighted to learn that it appeared in his lists and catalogue under a different name. It appeared (appears?) as *Echinodorus pusilis*, the carpet sword plant; and *Echinodorus pusilus*, the dwarf chain sword; and the plant grower told me that when his catalogue was re-printed the plant would appear under its correct name.

Lilaeopsis novae-zelandiae belongs to the **Umbelliferae** family, together with common garden plants such as parsnips and celery, and with the genus *Hydrocotyle* (pennywort), a species of which I hope to feature in a future *Plant Profile*.

The subject of this month's profile is rather difficult to photograph in monochrome because it is a dwarf plant. I've decided to use a photograph of a clump of the plants growing in the foreground of one of my tanks; and the main attractions of the plant are its size—it reaches a height of about only 1-2in.—and the fact that once it has settled into a suitable environment it will carpet the foreground of the tank with a beautiful, little lawn of bright green leaves.

Single plants of this species look rather uninteresting because they are so tiny and insignificant. The plants grow in long chains and I find it best to wind little lengths of chain round the tip of my little finger and to plant the resulting clump, not too deeply, in the gravel at the front of a tank. Numbers of little bundles, planted here and there, should soon form a creeping carpet that covers the base of the aquarium; and the plants won't just restrict themselves to the front half of the tank but will grow into the rear portion as well.

This delightful little plant does not seem to be at all fussy about the conditions under which it will grow—although I've found that it seems to do well in a gravel that contains a fair amount of fish waste and that is inhabited by Malayan sand snails. About 6-8 hours of tungsten lighting daily seems to suit the plant well; and, fortunately, such conditions also suit many other aquarium plants.

The plants that I bought from the specialist grower—who advertises in *The Aquarist*—cost me 25p each, 'each' being a little clump that could be planted as a unit, or spread out. (The chains of this plant are so fine that it's somewhat impractical—and unnecessary—to attempt to use strips of lead to hold them down.) Once the plant gets rooted into the gravel and begins to spread, the plants that result seem to remain rooted quite firmly unless they are pulled up; and if one attempts to pull up one little plant or clump, long chains growing in several directions are also pulled up. It's useful to have a small pair of scissors handy when attempting such an operation: the scissors can easily be used to snip off each of the chains at an appropriate point.

I find *Lilaeopsis novae-zelandiae* one of the most exciting 'new' plants I have ever 'discovered.' Newly-planted sections in tanks look rather uninteresting; but once the plant has established itself and spread well it can make the lowest regions of a tank look extremely attractive. This plant does for the aquarium what grass in a lawn does for a garden: it provides a beautiful background/base and shows up other species to advantage. The growth of the plant is easily controlled and I should imagine that once more people get to know about it, it will become as popular as Java moss with aquarists giving plants to neighbouring aquarists and posting pieces to friends in other parts of the country—or world. The plant grows very well and is a bargain at the price. Do try it. I think you'll eventually wax as lyrical as I have.

Incidentally, were I asked to coin a common name for the plant—and Rataj and Horeman make no mention of a common name; and the plant seems to be totally unrelated to sword plants (*Echinodorus*)—I should go for something such as the dwarf chain carpet plant, the dwarf carpet plant, the dwarf chain plant, or the dwarf lawn plant. (I should point out that Rataj and Horeman state that the genus *Lilaeopsis* belongs to "APIACEAE (=Umbelliferae) (Parsley Family)".

PLANT PROFILE

The female fans water over the eggs.

Breeding Herotilapia Multispinosa

Written & illustrated
by Jørgen Hansen

Herotilapia multispinosa is a free-spawning monogamous cichlid which comes from Costa Rica and Nicaragua in Central America. The genus *Herotilapia* contains only one species—*multispinosa*. *Hero*—comes from the Greek word Heros which, according to Greek mythology, is a demi-god, and the last part of the name of the genus—*tilapia* is the African name of a closely related cichlid genus in Africa. *Multi*—is latin and means many and the last part of the name of the species also comes from Latin and means points in reference to the many spines (up to 12) which this species has in the anal fin.

This cichlid is different from all other American cichlids in that its teeth are tricuspide—each tooth has three points (Fig 2) as with children while they still have their milk teeth. Other cichlids from America have conical teeth (see Fig. 1).

The male *Herotilapia multispinosa* grows to a size of 12 cm while the female grows to 10 cm. The only way—apart from the size—to tell the difference between male and female is to feed the fish properly when it becomes possible to see that the female is a little bit fatter than the male.

These cichlids eat anything. They like plants too and it is not very difficult to feed them plants if one keeps a tank of Hornwort (*Ceratophyllum demersum*). This plant grows that fast, that one has plant food enough for all the cichlids one could think of.

My first meeting with *H. multispinosa* came when I became the owner of 10 females. After much searching I was finally able to make one of my females happy with a male. As soon as they were put together in a 130 litre tank the male started with great eagerness to clean a stone, and two days later the fish were busy spawning.

A sure sign that spawning is imminent is the appearance of the breeding tubes of the fish. The ovipositor of the female was approximately 5 mm long and widest nearest the body. The colour was pink. The genital papilla of the male was much smaller—not more than 1 mm in length and 1 mm wide and the colour was white.

Both fish took turns to swim slowly over the stone. In the beginning there were no eggs but suddenly the eggs started emerging from the female's ovipositor. They were yellowish, oval and measured nearly 2 mm in length and they stuck to the stone.

Each time the female swam over the stone, 10-15 eggs were laid and immediately after the male swam over the eggs and fertilised them. The spawning continued like this for nearly an hour and when they had finished nearly 500 eggs were laid.

After the spawning it was mostly the female who hovered over the eggs and with her pectoral fins she fanned fresh water over them. The male was a bit further away on guard.

In the morning three days after the spawning there were small dark spots on the eggs and in the evening they hatched. As soon as a small tail started wriggling outside the egg shell, the female took the fish larva in her mouth and moved it to a hollow that had been dug in the gravel. While the female moved the fry the male looked after the stone with the eggs. If a snail came too close to the eggs or the fry, the male took it in his mouth and moved it to the furthest corner of the tank.

Fig. 1

Fig. 2

The next day the fish larvae had been moved to another place in the acquarium. This time it was to a hollow in the gravel. Two days later I could not see the fry but by keeping an eye on the parents I discovered where they had gone.

On the surface there were large amounts of Hornwort (*Ceratophyllum demersum*), and up there in between the floating plants fish larvae hung like grapes from a vine. It was quite easy to see that the fish larvae had, on top of the head, a small gland which produced a sticky substance and they were hanging on thin threads. The female looked after them and each time a fish larva moved too much and fell down, the female would catch it with her mouth and spit it back into the bunch.

At first I thought that this part of the parental care was just on one occasion but several times later the same pattern of behaviour was followed by the parents. Later I read an article in the DDR magazine *Aquarien-Terrarien* in which an aquarist told the same story.

The next day the eye pigmentation had developed and three days later the fry were free swimming.

The adult fish swam around with an enormous swarm of fry. In the beginning they were fed with *Artemia* and the first time my hand came near the surface of the water I got a big surprise. From 20 cm down in the water the male came rushing and knocked my hand 10 cm over the surface and he was hardly down in the water again before he made another attack.

When the parents had looked after their offspring for 10 days the number of fry decreased remarkably so I moved the remaining lot of the baby fish to another aquarium where they were fed with *Daphnia* and dry food. When they were six months old they measured 7 cm and at this age they were mature.

When a pair of *Herotilapia multispinosa* spawns and shows parental care it is impossible not to notice how the adult fish change colour pattern according to the different stages of the spawning.

The eggs are laid:

The female has five vertical stripes on the hind part of the body. The forepart of the body is yellowish. The eyes are bright red.

The male is yellowish and has a black horizontal line running from the eye to the base of the tail. On the last half the black line is partly broken. The eyes are bright red.

The egg hatch:

The female is now completely black on the hind part of the body and her ventral fins are also completely black.

Two days before the baby fish are free swimming, the hind part of the male's body also turned completely black.

When parent fish change colour in this way, it may be in order that the fry will recognise them as a safe refuge while steering clear of other members of the species which are not displaying this parental livery.

If another *Herotilapia multispinosa* is getting close to the fry and it does not have the black hind part of the body, then the fry will know that this fish does not have the instinct for parental care, and the fry will regard it as a danger and hide.

Before the eggs hatch the female retains her normal colour pattern.

When the eggs are about to hatch, the female's body becomes much darker.

When the fry are free swimming, the female's black coloration ensures they stay close to her.

From a Naturalist's Notebook

by Eric Hardy

DO FISH RECEIVE a fair press? Apart from angling reports, the media is often less informative than ever; sometimes downright false. After the financial success of the sensational, unnatural history of "Jaws," a film is now being made of the story of a Windermere pike which ate a man alive. Pure fiction; but a gullible public believes fiction too. I wonder how many watchers of a weekend TV magazine in early April claiming that fish could be charmed by underwater music, noticed the "rigging" when it gave some shots purporting to be fish dancing to tunes from a microphone suspended in a plastic bag. Obviously from the extra rapid gulping of the fishes' mouths the film had been speeded up so that normal swimming movements became rapid jerks right and left,—and the mentally constipated studio audience applauded the phoney dance with laughter.

Earlier this year the televised Life and Times of Lloyd George showed him visiting London Zoo aquarium "in 1905" and admiring colourful Japanese koi carp. Though bred in Japan before the 12th century Koi were not shown even in Tokyo until 1917 and in Britain until the 1930s, or the zoo until probably after the last war, as the secretary of the Koi Keepers Society pointed out.

Hornwort

Few native pondweeds are so useful to the fish breeder as two species of hornwort, with tufts or whorls of thread-leaves along their stems, fairly widespread in canals and ponds below 300m, but scarcer in Wales and Scotland. Common *Ceratophyllum demersum*, dark green and stiff, grows by the boathouse at Windermere's Wray Castle and so high in Snowdonia as Llyn Idwal. The scarcer, soft, lighter green, three-forked more lax, spineless *submersum* is in more southern and eastern waters, but also in the north in the Kendal canal at Stainton in Cumbria. This is only safely distinguished by its usually spineless fruit, but both species are very reluctant to flower and fruit here. When they do, separate male and female flowers grow in the leaf-axils.

Many fish spawn in hornwort, and one Hertfordshire aquatic murserymen alone sells a quarter of a million bunches a year to home and continental aquarists, either for aerators or for spawning fish. Often free-floating hornworts sometimes anchor to the mud with almost colourless shoots, rather than roots. They are very brittle plants, easily distributed by barges or the feet of waterfowl. Like several submerged aquatics, they grow small, thick, pimply terminal leaves which form the winter "bud," rich in starch, which detach and after wintering at the bottom produce next year's new plants. The plant does decompose readily. The toothed leaves of the common kind fork only once or twice, those of the "spineless" species (which occasionally has a few spines) 3 or 4 times.

It is strange that Bursche's German book on water-plants rated them of no use for fishes. I never found *demersum* common when I began plant-hunting over 50 years ago, and it is supposed to be declining. Neither apparently grows in Pembrokeshire though *demersum* is in S.E. Wales. The Horseshoe Pond is a well-known haunt of the spineless *submersum* in Madingley Park, Cambridge.

I used to grow it in a cellar in white-lined baking bowls that reflected the light from above. It flowers only in warm summers in July in well-lit water; not in our family cellar! When it does, the anthers are shed to float to the surface and release their pollen, which sinks again on to the stigmas of the female flowers, so it has to grow in bunches to have much success.

Protection

As a prelude to its ratification of the Berne Convention, Ireland last October began legal protection for common frog, lizard and smooth newt. It has only one of each of these genera and no toads. Though it has increased its 600-strong forestry staff with 43 forest-wardens, and some nature reserves have private wardens, it is difficult to see how it can enforce this protection excepting in broad terms of habitat planning.

It is probably at this level of environmental protection of habitat that conservation offers its best opportunities. In Amsterdam, for example, so much pollution is discharged into the inner city canals that they would be sterile of life

instead of with their present surprising stock of fish, were it not for this more practical policy. The water in all its inner city canals is replaced every second night by the intake of huge amounts from the Ijssellake, the former Zuider Zee. This assures a high enough oxygen content to support roach, minnows and eels; but it also brings a conspicuous algal bloom in summer from the blue-green algae also introduced this way. Carp, tench, perch and pike also inhabit Amsterdam's canals whose margins are screened with growths not only of reedmace and common Phragmites reeds, but flowering rush and sweetflag.

Amsterdam also has four lakes, mostly former sand excavations, and therefore deep; but no direct discharge of waste water, treated or untreated, is allowed to enter, though rain water washes some pollution into them and domestic sewage enters. They are the haunt of fish, especially pike-perch which is popular with Dutch anglers for its size. Pike-perch also inhabit the less polluted upper waters of its harbour and North Sea canal, which have an inflow of seawater to admit seagoing vessels. The smell of phenol sometimes makes the pike-perch unsuitable for food. These latter waters have a stable two layer system, with heavy sea-water forming the lower layer and lighter brackish water the upper layer. The large pumping station at Ijmuiden in recent years has reduced the salt content and as a consequence the stability of the layers and may extend its future aquatic fauna. A new sewage system will reduce by over 90% the discharge into the inner canals.

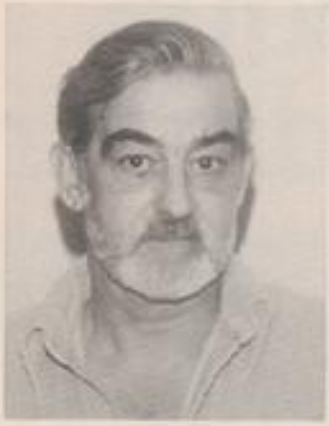
Red Coral

Last year's United Nations' environment conference at Athens drew attention to the Mediterranean's seriously threatened red coral, growing only in the Med. and the Adriatic, as well as to the monk seal, less than a thousand of which survive around Sardinia, Sicily, Corsica and Cyprus, but chiefly around the islands of the Aegean Sea where the onus lies on close co-operation between the traditional rivals, Greece and Turkey. Mediterranean turtles were also mentioned, but the green turtle has always been exceptionally rare there.

Natterjacks

In Britain, there's more public interest in conservation, hence we make more progress. With the highest water-table of any recorded spring season, natterjack toads were assured this year of a good breeding season on their extensive Formby-Freshfield dunes. I was talking to a young Cambridge zoologist there, researching into their behaviour. He finds, as expected, that the larger, old, louder males dominate the smaller younger ones, calling at annual assembly places, but never in such concentrated masses as have been claimed by previous people there. These dominant, loud-voiced males take over an area and attract 10 or more females for mating, whereas the smaller males, overpowered by their stronger voices, daren't call in their presence, but keep away. The latter may not mate at all unless, like some lesser stags in a deer forest, they slip in unawares for a chance mating. He showed me how he found it possible to recognise individual male natterjacks by colour pattern, and he noticed some return this spring to where they took up territory last year. Even tape-recorded calls lured these toads and some even tried to mount the tape machine.

Normally, the females are attracted to approach the calling male and nudge it into mating activity. Apart from occasional dry springs, their chief problem is the more aggressive and large male common toad which frequently attempts to mate with natterjacks which, being the smaller species, may sometimes be drowned in mating. He had just rescued a female from such a fate submerged in a pool. The female also has a short, quieter call, presumably a warning of an approaching common toad. Male natterjacks roam around somewhat at night, calling females if not many have emerged early in the season, when the males appear first at the pools.



Coldwater Jottings

by Frank W. Orme

DURING THE LATTER part of last year I mentioned, in these columns, that, despite enquiries to a number of people, I had been unable to find anyone who could supply me with any Ampullarius snails. In a number of instances I was met with a blank stare, followed by a confession that the person, to whom I had addressed my enquiry, had never even heard of this particular snail. I found this surprising, as most of my enquiries were made to dealers in aquarium fishes and supplies and, I would have thought, should have known what I was asking about even if they did not stock them, but to admit that they had never heard of the Apple snail—as Ampullarius is commonly known—was quite remarkable. However, following my mention of my unsuccessful search, I received a letter from Mr. I. J. Seaton, who lives at 67 Brive Road, Downside Estate, Dunstable, Bedfordshire. Mr. Seaton wrote to say that he had Apple snails and could let me have some, an offer which I appreciated and accepted. Apparently the original snails were obtained from a dealer in Luton, but are no longer available from that source—in fact the dealer has offered to buy surplus snails from Mr. Seaton.

Twenty-four year old Mr. Seaton is married and has a baby daughter, born, he told me, the day after his snails laid their first batch of eggs! He became interested in fishkeeping two years ago and keeps both coldwater and tropical fish. Although he attempted to acclimatise the snails to the coldwater tank conditions he found that they did not do very well, therefore they were removed and placed into the tropical aquarium. Since then they have thrived and, at the time of writing, had increased to number around eighty or more—and there were another seven batches of eggs to hatch out. Of course, no plants would survive very long in the company of these large, greedy snails, and this means that the aquarium has to be decorated with artificial, plastic plants.

South American

Originating from tropical South America, Ampullarius are large snails with globular shells, often attractively striped. They have a wide foot, whilst on the head there are two very long feelers, at the base of these are the eyes set on stems. On the lips are another two feelers. They have the ability to breathe atmospheric air and can, therefore, live for some time out of water, this means, of course, that they can escape from one tank to another if given the opportunity. They prefer a temperature of around 70°F. (21°C.), at lower temperatures they tend to become much less active and, if too cool, will eventually die. Given the correct temperature they are ravenously greedy feeders, consuming large quantities of food, and will quickly strip a planted aquarium of all vegetable matter. If possible they are best kept in their own tank, where they can be plentifully fed upon lettuce, cabbage, boiled potato, fish-food, and similar foods together with an occasional feed of raw fish or meat. The eggs are laid above the water line, in longish, raspberry-like, pinkish clusters, and will take from two to six weeks to hatch depending upon the temperature. The young snails will fall into the water and immediately seek food.

Apple snails are, in their own way, most interesting

creatures to keep; apart from temperature, they are undemanding actively moving animals, with large, attractively marked shells. Due to the amount of food which they consume, their droppings are copious and this encourages the development of infusorians—the microscopic livefood—which can be used to feed to small fish fry. After the snails have been established for some time, water can be taken from their tank and gently poured into the aquarium containing the fry—thus providing the essential fine food, and placing not quite so much reliance upon newly hatched Brine Shrimps. When the water is not being used for this purpose the droppings should be regularly siphoned out, and approximately one-third of the water replaced, in order to keep the tank sweet and prevent it becoming smelly. If kept with fish they will prove quite safe and will prevent any excessive growth of algae, however, their excreta can be a problem unless removed at very frequent intervals and, of course, it will not be possible to grow any plants in the same tank.

Before the introduction of Brine Shrimp eggs, I made extensive use of the infusoria bearing water, provided by these snails, to raise young goldfish for many years. Now, through the kindness of Mr. Seaton, I hope once again to make use of the Ampullarius in conjunction with Brine Shrimp nauplii.

Not so very long ago a man called to see me, he brought with him a bottle of water taken from his pond. I was told that the pond was constructed of concrete about three years ago, it measured 20ft × 8ft and had a depth of from 2ft to 6ft. It was surrounded by an 18 inch high wall, and the water was quite clear with a constant level. If anything, the plants grew too well, however, fish failed to live more than a few months. I was assured that the concrete had been cured properly and, as an added precaution, treated with Aquaseal.

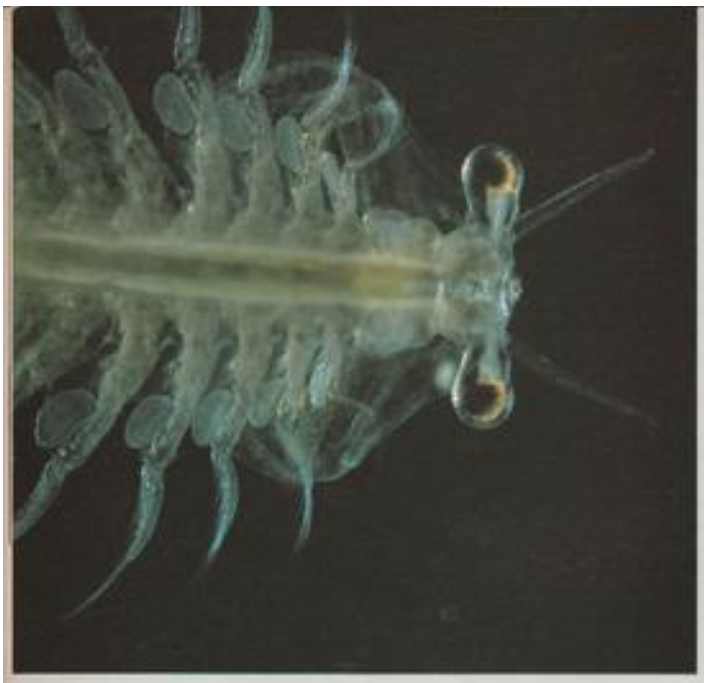
It seems that for a time any introduced fishes would settle down quite well, but after a time they would become lethargic, stop feeding and eventually die. There was never any evidence of fungus, injury or other malady. The fish looked quite normal, floating at the surface in an ordinary attitude, with expanded fins; only when they were touched did it become obvious they were dead. 'What is killing the fish?' he asked.

Poisoning

A simple water test proved nothing wrong with the pH value of the sample, in fact it was slightly acidic and moderately soft in character. Yet, from the information, the evidence suggested some form of poisoning. I was assured that there was no metal anywhere near the pond; no weed-killers or pesticides were used in the surrounding area; and no trees. I was completely lost and could think of no logical reason for the problem, and yet there had to be a culprit somewhere. Again I questioned him and received the same answers until I queried him about trees. 'Well, there are no trees,' I was told, 'but my neighbour does have a small laburnum, but it is not very big.' And there it was; further questioning revealed that the laburnum grew quite near to the pond and the leaves and seeds often blew into the water. Although the man skimmed off many of the offending leaves and seeds, some still remained and eventually sank. Due to the size of the pond, it was confessed that it had not been cleaned out since being first set up. I suggested that, in view of the fish losses, it might have been sensible to have cleaned the pond out as a first step towards finding a cure for the problem.

Although the man was well aware that laburnum seeds could make a child very ill, if they were put into the mouth, he had not realised that the tree could prove toxic to fishes. Having found the cause of the fish losses, he departed with the intention of thoroughly cleaning the pond and covering it with a small-mesh net. He also hoped to persuade his neighbour to move the offending tree to another position. In my opinion, unless the neighbour agrees to remove the laburnum, the fish will remain at risk for as long as the leaves and seeds can enter the water; the use of netting will not completely cure this particular hazard.

OSCAR **G. Robinson**



A Breeding Tank for Artemia Salina

by
Alain Breitenstein

Male Artemia seen from above. One can see on each side of the head the prehensile organs with which the male attaches itself opposite the incubating pouch of the female

Adult couple of Artemia. The female is positioned in front. The male is attached at the back

Ventral view of incubating pouch containing the eggs

Live *Artemia salina* are very much appreciated as food by fish and marine invertebrates. Breeding these tiny shrimps provides an ideal diet: an attractive live food which is rich in vitamins and available at all times of the year. Furthermore, they can be used at different stages. Newly hatched specimens, or *Nauplii*, constitute the basic food for the fry of freshwater and sea fish. Adult Artemia are more suitable for tempting a newly acquired fish or one which is difficult or delicate. A further considerable advantage is the fact that Artemia will remain alive for several hours in a

marine tank, thus avoiding the problem of polluting the water.

A culture of Artemia, in the traditional manner, is raised in one litre or one and a half litre bottles containing sea water, which is kept in movement by a diffuser. This method, which is very practical for the incubation of the eggs, does not allow one to raise the shrimps to the adult stage. The construction of a tank which is specially designed for this purpose presents a number of advantages:

(a) Large scale breeding.

(b) The separation of the nauplius and removal of the adults for feeding to fish.

(c) No empty shells, therefore no pollution.

(d) cleaning and syphoning are made easy.

Construction of the tank

Artemia live and breed in large expanses of shallow salt water (American salt lakes, salt marshes). The ideal, therefore, is to construct a wide and very flat aquarium; only a few centimetres in height. The finished tank measures 80 cm in length, 40 cm wide and 6 cm high. The design, incorporating sheets of plexiglass 5 to 10 mm thick, affords two important advantages for this kind of assembly:

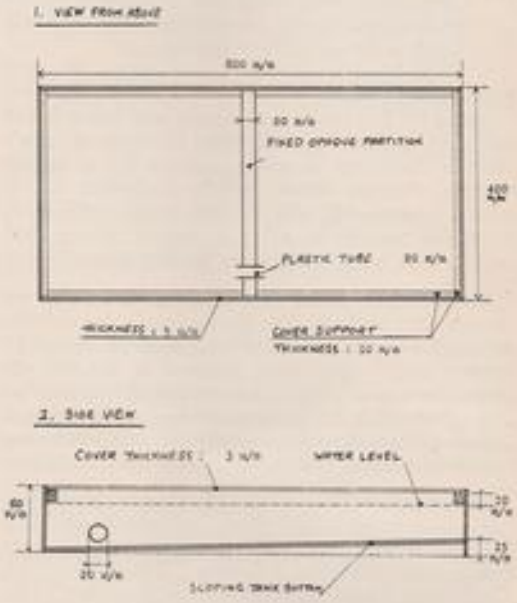
—resistance to knocks, which is very useful when moving the tank.
—perfect neutrality to sea water.

Only the two covers are of glass, 3mm thick. The bottom of the tank slopes slightly, enabling waste products to collect towards the front which can then easily be removed with a syphon. Lighting, consisting of two 40 watt Grolux tubes, should be provided for twelve hours a day. It is not indispensable, but ensures an abundant growth of green algae.

The water for rearing the shrimps comes from the tank in which the fish to be fed are kept. Artemia can tolerate large fluctuations in temperature between 20 and 30°C. However, they are most active and reproduce more readily at about 25°C. Depending on the conditions within the premises where the tank is kept, one can, if it is necessary, introduce a low-power heater without thermostat. For example, in my 'fish' room the temperature fluctuates between 15 and 16°C in winter. I connect a small resistance of 10 or 15 watts which keeps the water at about 25°C with variations of 3 to 4°. Since the water is very shallow (35 to 50mm), there is no point in aerating the water.

Beginning a culture of brine shrimps

Artemia eggs previously treated with a solution of diluted javel water lose their shells as they dissolve. After



this treatment, which speeds up the incubation period, the eggs are placed in the tank and hatch the next day. At the present time, non-encased or treated eggs can be obtained which, though without shells, are fertile. Eggs of this type have the following useful characteristics:

No empty shells in the breeding tank—less waste products.
A markedly reduced incubation period—the shrimps are more readily at one's disposal.
All the eggs hatch—more shrimps survive.

A further point to note is that if the empty egg cases are ingested by the fish, serious upsets in their intestinal metabolism are caused, which are especially likely in alevins. The tank can be given a culture of shrimps in two ways:

Either the eggs are hatched in the traditional way, in a bottle of sea water which is vigorously shaken. On hatching, the *nauplii* destined for the rearing tank are filtered off.

The second and simpler method consists of placing the non-encased eggs directly into the tank, without aeration or being shaken up. Depending on the temperature of the surroundings, the eggs will hatch at the end of 24 to 30 hours.

Rearing large quantities

During the first few days the *nauplii* grow slowly. The food given to them, Liquizell, Preiss Microplan or baker's yeast, is distributed in small quantities but at regular intervals. Artemia absorb particles suspended in the water. Consequently, it is necessary to agitate the water gently but regularly in order to prevent uneaten food particles from being deposited on the tank bottom.

Mating begins fifteen days to three weeks after the shrimps have hatched. The mating couples can easily be discerned as the male remains attached to the rear of the female's body. After being fertilised in this way the females lay their first eggs. Suitably fed adult Artemia are very fertile and a few grammes of eggs are sufficient to initiate a stock which can be maintained, with a little care, for several months.

The external structure of the eggs differs according to the season when spawning takes place. In optimum conditions of salinity the very thin empty egg cases disappear quickly, broken down by colonies of bacteria. If the salinity is too high (1028 and more) the shells are thicker and float on the surface, creating large numbers of pathogenic bacteria, which are harmful to the whole culture. In order to mitigate these problems it is necessary to maintain a low density of around 1020 to 1022.

A variety of foods are welcomed by Artemia. Commercial powders (Microzell, Preiss Microplan paste in a tube, yeast) or the flagellate algae of the genus Dunaliella. It is relatively easy to produce a culture of this phytoplankton in conical glass flasks or simply in plastic bottles.

Culture of the phytoplankton

The culture of microscopic flagellate algae, aimed at providing a supply of food for adult Artemia, is carried out in the following manner. Plastic bottles can be utilised, simply stoppered with a wad of moss or cotton. (Aeration is not necessary). These 'phials' are filled with mature sea water (250 to 300 ml) to which one or two drops of liquid fertiliser, of the type produced for house plants, are added. The bottles are illuminated twelve to fifteen hours a day, but kept out of direct sunlight. The day after the fertiliser has been added the medium is ready to receive a stock of Dunaliella, at a quantity of about 5 ml per bottle. These algae are not visible to the naked eye, but, at the end of a few days, they are so abundant that the coloration of the medium indicates that the plants are reproducing rapidly.

A feeding supply of the algae is removed by means of a fine sieve or distributed directly into the Artemia tank. The coloration in the tank decreases as the plants are consumed and thus indicates when further algae should be introduced (several feeds a day may be necessary). The algae in the bottles must be thinned out at frequent intervals in order to prevent them choking through excess growth. The frequency of these thinning out operations depends on the needs of the plants, taking place every five or six days. The Artemia have large appetites and often the culture of algae is insufficient to maintain a sufficient food supply for the shrimps. It is essential, therefore, to keep several cultures of algae. It is also wise to have available a few tubes of commercial powdered food which can, if necessary, solve the problem of a temporary lack of plants.

Harvesting the adult shrimps

Using sieves with differing mesh sizes, it is easy to select shrimps of various sizes. The adults, sucked up by a syphon, are retained in a sieve with a large mesh, the *nauplii* being returned to the tank. In this way a large number of shrimps can be removed daily, in relation to the size and appetites of the fish to be fed. If one wishes to raise large quantities of adult Artemia, it is a simple matter to have several tanks and so obtain thousands of shrimps.

Cleaning the tank

The design of the tank allows cleaning and water changing operations without it being necessary to completely remove the Artemia. The tank is divided into two equal parts by a fixed, opaque partition which is traversed by a single plastic tube 20 mm in diameter.

A few days after the eggs have hatched, the resultant waste materials quickly form a brownish deposit on the bottom of the tank. In order to clean and change the water in the right side of the tank, it is merely a question of making the Artemia pass over to the other side. To this end, during the night, a 15 watt bulb is left illuminated above the left side and the Artemia, attracted by the light, pass through the connecting tube and leave the dark part of the tank. The next day, after the tube has been closed off, the water and waste material on the bottom can be syphoned off. When cleaning has been completed, the syphoned water is replaced by new water; the connecting tube is opened up again and the Artemia distribute themselves in both parts of the tank.

Conclusion

Artemia salina, new-born or at the adult stage, constitute an ideal food much appreciated by marine fauna. A healthy tank, inhabited by well-fed shrimps, is well worth the effort (minimal) needed to start rearing Artemia. The shrimps provide a number of vitamins and an interesting variation in the diet of the fish. Whenever the shrimps are introduced the fish compete eagerly for a share in the feast.

John Hall—
New BAF Organiser

A PEARL OF A SHOW!

30th BAF

Alan Darby—
Publicity Officer

Writes Alan Darby in his progress report on the British Aquarists' Festival

THE 1981 British Aquarists' Festival is to be something special. It is thirty years since the event began as part of the Festival of Britain celebrations, and the traditions that have brought the show to it's special 30th Anniversary are foremost in the minds of the new organising committee led by Mr. John Hall. They say this 30th anniversary will be something for aquarists to remember, it's going to be a pearl of a show.

Over £1,000 will be available for prize money and the society with the winning tableau, stands to receive £110 minimum. Consolation prizes of up to £40 will be donated to all societies entering a competitive tableau.

The whole of the classes have been reviewed. The emphasis remaining on the pairs of fish and the furnished aquaria, with the single fish classes, especially in the tropical section, being almost doubled.

Four or five of the major Federations outside our own are being asked if their judges may be approached in order to invite at least one judge from each area, to participate in the festival.

As in recent years every exhibit will be fully pointed and whilst only the first three from each class will be displayed on the notice boards, the pointing lists will be available for inspection on the F.N.A.S. stand.

A complete new attraction to this year's festival will be a **FREE PAINTING COMPETITION.** Entry will be open to under eleven years of age and eleven to sixteen years inclusive, through societies or schools. The competition will be based on any aquatic subject chosen by the competitor. The paintings will be independent of the tableaux and are to be displayed around the hall.

There is also to be an additional class this year for **INDIVIDUALS FURNISHED AQUARIA,** for persons whose societies cannot provide a tableau or have insufficient space on their tableau for additional tanks. The organisers will provide stands and electric points for this class.

In order to provide a warmer, friendlier atmosphere the organisers are trying numerous ways to improve the show, including **varied entertainment, more seating accommodation, brightening up of the hall** and an **up-to-date information service,** on all aspects of the Federation and the hobby.

To help with this service, societies throughout the country are invited to send to Mr. A. Darby, information regarding their time and place of venue and any relevant information about their activities in order to collate a **Societies Reference List** for any visitor to the festival who wishes to become a member of a society.

One of the biggest attractions to the British Aquarists' Festival is the presence of numerous traders, who put on a wide display of fish and equipment for sale to the general public.

The information available from the traders on the products they sell is invaluable to fishkeepers and the working models are an inducement to a newcomer to the hobby.

Every effort this year will be made to cover all aspects of generalised and specialised fishkeeping. It is hoped that numerous **Specialised Societies** will respond to the invitation forwarded to them to participate in the festival.

1981 is the year of the disabled, and organised groups will be welcome to visit the British Aquarists' Festival as guests of the Federation of Northern Aquarium Societies. For details please contact Mr. John Hall.

For further information about the Festival including Schedules and Entry Forms contact: Mr. J. V. Hall, 54a Carr Road, Calverley, Pudsey, Yorkshire. Telephone: Leeds 574609 or Mr. A. Darby, 1 Perrin Street, Hyde, Cheshire. Telephone: 061-368 4868.

What is Your Opinion?

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

"I WISH SOMEONE would explain to me the purpose of producing fish such as the wagtail, lyretail, swordtails featured in W.Y.O., in March 1981, pages 25 and 26," writes Mr. T. Hatton, of 143 Cecil Road, Rochester, Kent. He continues, **"I fail to see that these fish are any more aesthetically pleasing than a standard fish maintained in excellent health and condition; and in particular to produce a male fish unable to perform its role in life and surely one of its most basic instincts, i.e. mating, is pointless and, possibly, morally wrong.**

"I can see some point in the raising of 'artificial' fish such as koi, shubunkins, red swordtails and platies, more colourful guppies, etc., where the fish remains a normal, fully-functioning, anatomically-correct being, but the perpetuation and exaggeration of deformities—which is surely what they are—which reduce fish to a parody of their normal selves is surely not justified, and merely serves to make mere playthings of living creatures."

What is your opinion? I think I must agree with most of what Mr. Hatton has to say; however, if we did not manipulate the genes of many animals and plants we would be unable to produce many of the very beautiful and/or useful animals and plants that large numbers of people take for granted. If allowed to breed/mate/reproduce without any intervention by man numbers of our most attractive plants, e.g. F2 hybrids, and animals, e.g. fancy guppies, would soon revert to the normal, plain, common ones. I'm typing this in late March and on the table beside me is a beautiful busy lizzie (*Impatiens*) plant that I grew from expensive seeds last year. The flowers are a beautiful, bright red colour with a spreading central patch of white. Beside me I have a packet of coleus seeds of a man-made variety named 'Molten Lava'; and a packet of F1 busy lizzie seeds of a new variety called 'Grand Prix'. Another packet contains seeds of new colour varieties of the Christmas cactus. The latter packet cost me 85p—which is not now an unusual price for a packet of seeds of a new variety. I'm pleased that such new colours and varieties of plants are being produced. (Incidentally, my elderly Christmas cactus bloomed in October last year; it's now producing a new crop of flower buds in late March and should be in bloom in April. Obviously the poor plant has been as confused as the rest of us by the past several bad summers we've had. Thank goodness the clocks will be put forward one hour this morning—29th March—despite the fact that most diaries state that the change should have been made a week ago. No wonder even the plants get confused! B.W.)

Mr. W. J. Nicholls resides at 25 Wroxham, Great Hollands, Bracknell, Berks., and writes: **"I have had a similar experience to that of Master Justin Green, of Kings Langley, with a sucking loach** (*Gyrinocheilus aymonieri*) **and a red-tailed black shark** (*Labeo bicolor*). **I had kept them in a 39 in. × 12 in. × 15 in. community tank for five years and they attained a length of 5 in. I made a cave for them out of slate and they seemed content to share it.**

"About three months ago I noticed that they were getting aggressive with each other for possession of the cave; not actually touching but making threatening rushes at each other. I made another shelter but it did not work. No matter which cave one of them was in, the other would try to chase it out, one being as aggressive as the other.

"Then about three weeks ago my wife noticed a white patch the size of a 1p on the side of the black shark. We thought it had injured itself on a rock and as it was behaving normally we hoped the wound would heal. However, a week later I found the black shark floating on the surface in a very distressed condition and I put it out of its misery.

"On close examination I found the white patch was then a hole of about ¼cm. in depth and that the black sheen had disappeared from other places, with

What is this plant? It looks like a giant *Ambulia* and has two leaf forms.

the white flesh showing through. I must point out that at no time had my wife or myself seen the sucking loach attach itself to the black shark or molest any of the other fish."

Miss A. M. Mitchell's home is at 17 Norfolk Road, Maidenhead, Berks. She says: **"You have asked for opinions on first food feeding to baby livebearers and egglayers. I cannot draw from experience on egglayers, as none of my adults has so far obliged—due, no doubt, to a combination of hard water and living in a community tank.**

"I started keeping tropicals just over 18 months ago with the one tank, consisting of a mixture mainly of tetras, barbs, guppies and swordtails. One day about four months later I spotted a couple of baby swordtails lurking in the undergrowth; sadly they disappeared after a few days and I have little doubt as to their fate! However, later on, one hardy and wary little soul managed to survive the attentions of his doting parents and the other denizens. I fed him on Liquifry, Aquarian Fryfood and, occasionally, shredded hard-boiled egg—all of which the adults also gulped down with apparent enjoyment—and he is now a handsome yearling lyretail.

"Subsequently, I invested in a smaller tank to act as a quarantine-cum-sick-bay-cum-nursery, and in due course one of the guppies gave birth. I managed to rescue 36 and transferred them to the fry tank where I started them off with Liquifry for the first week and then tried them out on various powdered foods such as Aquarian, Tetramin, Frygrain and Biol, later graduating to Wardley's Miniflakes. I noticed that they did not appear to be too keen on Frygrain or Biol. 22 eventually grew to adulthood; most of them were presented to the landlord of the local pub!

"By the time the second generation of baby guppies arrived on new year's eve, I had at long last learned the knack of hatching out brine shrimp eggs thanks to a thoughtful pre-Christmas present of a Hykro hatcher from a friend; I had also invested in guaranteed San Francisco eggs through an advertisement in your magazine. So, as well as the aforementioned food, this brood are also getting a daily feed of brine shrimps and they certainly seem to be growing more quickly than the first batch; so far I have not lost any.

"I hope the foregoing is of some use to you. Incidentally, I wish somebody would open a tropical fish shop in Maidenhead; at the moment there is none—something very lacking in a town of this size."

I was pleased to learn, from Mr. J. Gill, of 4 Fitzgilbert Road, Colchester, Essex, CO2 7XB, that he has produced another index for this magazine. He says: **"May I, through your feature, advise readers that I have now produced an *Aquarist & Pondkeeper* Index for the year 1980, in addition to those already produced for the years 1975 to 1979 inclusive. I would be pleased to send readers any of these indexes if they write to me direct, enclosing 50 pence for each index in order that I may cover my costs. I enclose a complimentary copy and hope that you shall find it of use to you."** (Mr. Gill's latest index stretches to ten pages and, as before, should be invaluable to those who like to refer back to articles and subjects in previous issues. It is a typed index and is printed on A4 sized pages stapled together. Please remember to send requests for indexes to Mr. Gill direct and *not* to me. B.W.)

Letters from readers who live in the Isle of Man are rare; hence I was delighted to receive the following from Mr. Nigel Jarratt, of 56 Ballacriy Park, Colby, Isle of Man. **"In the April edition of the magazine you asked for opinion on the new format of *The Aquarist*. I have taken and read with interest *The Aquarist* since April 1974 and its bound volumes occupy pride of place on my bookshelf. I find the new format to be an improvement in the presentation and illustration of articles and the increase in the use of colour photographs is pleasing.**

"However, I have one criticism and that is one that has been raised in this column before; namely the absence of an index for each volume. Several readers in the past have requested this and have said that they, like myself, have had to compile their own index. This is a very useful exercise and converts the magazines into a valuable reference work.

"Regrettably, for some unknown reason *The Aquarist* does not share this view and indeed would seem to be attempting to defeat the creation of an index by, since April 1979, numbering the pages of each magazine commencing with number one instead of letting the numbers of the pages run consecutively throughout the volume. This point apart, I find the magazine to be extremely good value and very reasonably priced.

"Incidentally, I have recently moved from Liverpool to the Isle of Man and have had to dismantle my tanks and set up again in my new home. I

A young discus.

was a little apprehensive about what I would find in the way of dealers on such a small island; but was very pleasantly surprised to find the excellent Abbey Aquaria who have helped me enormously during the past few weeks and I would recommend to any reader visiting the island this summer a visit to the Aquarium situated in Rushen Abbey, Ballasalla."

No doubt Mr. Jarrat and numbers of other readers will be happy to buy one or more of the indexes, price 50p including postage, produced by and obtainable from Mr. M. J. Gill (see above). His separate indexes cover each of the years from 1975-1980, inclusive. (Don't forget to order direct from Mr. Gill.)

The Aquarist has readers in many parts of the world and I'm always particularly interested to receive letters from readers in other countries. Mr. Tariq Mahmood wrote to me from Aquarama, First Floor, 125 Panorama Centre, Saddar, Karachi, Pakistan. Mr. Mahmood said: **"I read your column *W.Y.O.* every month with great interest. I am 33 years old. I have a full-time aquarium fish business, having a retail aquarium shop and a fish house having about four hundred aquariums ranging from three to fifty gallons. Like fish, import of many aquarium accessories is banned in our country and as there are no manufacturers, we have to make everything from all-glass aquariums to flake foods ourself. We are breeding quite a few species and varieties of fish to cope with the increasing demand as the hobby is now picking up. As there is also a great demand for aquatic plants, I also wish to start my own aquatic plant culture on a commercial scale using plant fertilizers etc. as it's done in aquatic plant nurseries in Britain and elsewhere.**

"I shall be thankful if you could publish my query as I would very much like to hear from professionals as well as hobbyists of their experiences and techniques in commercial plant culture. I would also love to correspond with other keen aquarists, amateurs or professionals who would like to discuss and exchange views regarding different aspects of our hobby." (I'm sure some readers will be happy to respond to Mr. Mahmood's request for information and for correspondents. Some years ago I asked a professional plant grower if he would permit me to visit his nursery so that I could write something about it to interest readers. I did not receive a reply to my letter so I assume my presence was not wanted. I suppose individual plant growers have their own secrets. B.W.)

Mr. W. H. Hornsby's home is at 85 Stoneybeck, Bishop Middleham, Ferryhill, Co. Durham, and he writes: **"Although I have been a keen aquarist for some seven years now I have never written to *W.Y.O.*—although I have had the idea in mind on several occasions. I am putting that straight right here and now. May I begin, as I'm sure most other people do, by praising *The Aquarist* magazine as a whole, and your feature in particular. I look forward every month to my copy and always turn to your feature first. I hope it will continue to appear and that you will keep up the good work.**

"I am 29 years old and began fishkeeping back in early 1974 when I was given a 24 in. plastic tank and equipment, then unwanted, by my brother. Little did I know then that I would become so obsessed with this fascinating hobby of ours. One tank soon led to two, then three, and so on until I was totally 'hooked' on fishkeeping—please excuse the unintentional pun. I went through various stages of keeping a mixture of fish and breeding one or two common livebearers; and then moved on to keeping cichlids. Angels came first: they spawned regularly but I never managed to rear any. Other types of common cichlids followed: kribensis, convicts, brown acara, *Tilapia* etc. I did not really have enough room to breed any of these, but thoroughly enjoyed keeping what I believe to be the most intelligent, fascinating and diverse genus of all tropical fish.

"At this point fishkeeping took a back seat as we prepared to move house. Tanks were sold to make the move easier and unfortunately the one I did keep was broken when the handle of a bucket of gravel broke and dropped into the tank. I began to lose interest; but once settled into the new house, one or two visits to my local fish shops soon lured me back to the fold.

"In 1978, as a birthday present, I was given a 30 in. all-glass tank and hood. This was set up for one year as a community tank; then after visits to many shops, and much thought, I decided to convert to marines. I would recommend marine keeping to anyone with sound experience of freshwater tropicals and I give the following advice. (1) Don't be put off by people who say that marines are difficult

to keep and much more consuming of time and finance. Usually such are the people who have never kept marines themselves; or else tried and failed, due to mistakes they need not have made. (2) Do read as much literature as possible before starting, especially concerning setting up of tank, maintenance, choice of fish for the beginner and feeding. (3) Decide straight away that you are going to fail and you probably will; be determined to succeed and you will. You won't find out how successful a marine aquarist you are going to be until you try.

"When I began with marines I decided to work on a shoe-string budget. I used as much existing equipment as I could, buying only those new things that were necessary for a marine tank—such as sea salts, coral sand, coral, shells, hydrometer, test kits, etc. Then I shopped around to find the best buys—not always the cheapest. May I say that in the nine months that I had this first tank set up, tank maintenance, feeding etc. really took no extra effort once a routine was established. As long as I realised not to rush ahead and buy the more delicate, expensive fish—it's a temptation, believe me—but stay with the hardier, easier to keep species until I had gained at least one year's experience, I can honestly say I was fairly successful in my attempt. I did lose one or two fish due to inexperience; but this was not as costly as it would have been if I had purchased the more expensive fish—such as butterflies and angels.

"After nine months I decided to set up a 48 in. tank as a room divider and focal point to my lounge. My stock of fish was slowly growing so this larger tank became a necessity. The 30 in. tank reverted to a freshwater community tank. In setting up the new tank, again, economy was a prime factor. Existing equipment was used and as Christmas was nearing new equipment came in the form of presents —better than socks and after-shave! At first hardy fish were put in the tank; and later I tried one or two of the more delicate fish. Plenty of coral and shells gave the fish a sense of security and they were always ready to feed—some, even, from my fingers.

"In January 1980 I joined Bishop Auckland Aquarist Society and my enthusiasm for fishkeeping is now at a point where I don't think it will ever wane. I soon became interested in showing and breeding fish. Neither could be done to any extent with marines so I decided at this point to concentrate more on freshwater tropicals; so I decided to cease keeping marines for the moment. Don't worry! I intend to have another marine tank in future—probably for my lounge when I move my freshwater fish into that fish house I've promised myself. Once you've kept marines you don't forget them.

"At this point I'd like to comment on societies, using my own as an example. In the short time I have been a member of this society I have made

'Sarasata' comet-tailed goldfish.

many new friends and learned much more about my hobby and the fish I keep. I would seriously recommend the joining of a local society to any newcomer to this hobby. Clubs and societies open up a whole new world to hobbyists! As far as my society is concerned, each meeting is a social evening in the pleasant atmosphere of a very nice pub, where new friends are met who have at least one common interest: tropical fish. Lectures, slide shows etc. all help to build up our members' knowledge—obviously making us better fish-keepers. As well as this our members find out about local shows, visit new shops in different areas, have the opportunity of attending national shows, and whole new aspects of the hobby are opened up. Personally I feel that hobbyists not having the advantage of membership of a local society are missing out on some aspects of fishkeeping. (Non-members please comment.) Local societies must continue to survive for the good of our hobby, so I say: Support your local society, readers! Find out about your nearest society; attend the next meeting. If it's like many societies you won't be expected to join straight away but will be able to make up your mind over the next few meetings.

"During the past 14 months I have acquired and set up one 48 in. tank, one 36 in. tank and four 18 in. tanks, in which I have bred *Ameca splendens*, *Goodea atripinnis*, *Phallichthys amates* and *Pseudotropheus ornatus*. At present I am breeding *Julidochromis regani* and in future hope to move on to breed *Julidochromis dickfeldi* and various dwarf cichlids. I have the fish; it's just a matter of getting them to spawn.

"I have shown fish in the 1980 season with some success, gaining various place cards, plaques, trophies, and one Best Fish in Show with a male *Barbus titteya*. Needless to say I am looking forward to the 1981 season. I have, for my own use, begun constructing showing tanks, and breeding white

Dwarf Egyptian mouth-brooder *Haplochromis multicolor.*

worms and micro worms. I find that auctions at local shows are an ideal outlet for any surplus tanks, fish and cultures that I do not need; and of course the extra money is soon put back into my fishkeeping activities. I hope you don't mind my listing all my activities, but really I have done this to prove my points about the usefulness of societies. I feel that this variety of activities has been a direct result of my membership of a society. I do not think I would have known so much about or been able to get so much out of my hobby if I had not been a club member. (Again, please comment, readers.)

"Although I have been keeping fish for seven years my activities have really only taken off over the past 14 months, and I am more interested in fish now than I have ever been. This interest has grown to the extent that one day I would dearly like to own my own shop. Well, Mr. Whiteside, I have a great deal more to say and would like to comment on your suggestions printed at the end of each month's feature, especially February and March; however, I think they will have to wait till my next letter. I don't think you'll have to wait another seven years for that! I look forward to writing to you again."

From 4 Crawford Square, Airth, Falkirk, Scotland, comes the following letter written by Mr. Ian Phillips, who is president of Grangemouth Aquarist Society. "I am writing in response to your request for information about various societies' newsletters and magazines. I enclose the latest three copies of my society's newsletter, which we call *Fins & Things*, and I hope you will find them interesting. Mrs. J. Wardlaw, our secretary, has had an interesting and rather baffling problem with her *Aequidens maronii*—as is reported in Vol. 2 No. 2 of *Fins & Things*. I have written to the Tropical Queries section of *The Aquarist* to see if they can help us with that particular problem. (*A. maronii* is the keyhole cichlid.)

"I notice in the March edition that you asked for details of experiences of breeding any of the tetras so I'll tell you of my 'successful failure', if you'll excuse the term. Last year Mr. Steve Naesmith visited our society to talk to us about characins. He brought along with him a pair of lemon tetras to illustrate how to sex them using the amount of swim-bladder seen when looking through the fish. At the end of his talk he put this pair into our raffle and I was lucky enough to win them. Also, he very kindly gave me some coconut fibre to use as a spawning medium.

"After conditioning them on chopped earthworms —a favourite conditioning food of mine—and flake food I placed the pair into an 18 in. × 12 in. × 12 in. tank, which contained no plants. At one end I placed the spawning medium; the other end was left bare. The tank contained clean, aged water into which I had put a liberal amount of Blackwater Tonic. After two days, during which time the tank lights were left off, I removed the pair as they had been swimming in amongst the coconut fibre, and placed them in my community tank. A towel was wrapped around the tank, a few drops of Liquifry added, and the tank was left in darkness for a week with the temperature at 78°F. After much searching of the tank with a torch I decided I had failed. However, I now had a pair of emperor tetras, *Nematobrycon palmeri*, which I had been conditioning, so I tried the same procedure with them; with, I'm afraid, the same results. By this time my lemon tetras, *Hyphessobrycon pulchripinnis*, were again ready, so being obstinate and persistent I tried them again for good measure. You've guessed it: the same result! After all this I decided to give it a rest and a couple of days later I switched on the tank lights in preparation for emptying it. There he was! One solitary fry, about ¼in. long! I removed the coconut fibre very carefully in case there were more hiding there; but no; he was alone. My wife immediately christened him the Lone Tetra. I decided that if I'd waited a bit longer the first time with the lemons I would probably have got more fry because the size of the single fry showed him to have been from the first spawning session.

"Unfortunately, a couple of days after finding him, my tank suffered a thermostat failure and he was never seen again. Still, as they say, if at first you don't succeed . . . I'll try again and this time I'll be patient. . . .

Fins & Things, Grangemouth Aquarist Society's Journal, consists of about five A4 sized sheets, printed on one side. Some of the topics in recent issues include the spawning of pearl gouramies, the keyhole cichlid, the leopard danio, the Siamese fighting fish, and making an under-gravel filter.

In a recent issue I included a photograph of several dead pencilfish. Mr. Roger Grimshaw, of the Post Office, High Road, Newton, Wisbech, Cambs., sent the following response: **"... My local dealer had some problems with pencilfish. He lost 40 odd in one day because he had added some snail killer. You have said in the past that you use snail killers and algae killers. Could these be the cause? Concerning tungsten light bulbs: I use Woolworth's own brand of 25 watt bulbs. They are very good just as long as the hood/lid is not moved too often; if it is they soon blow and another 43p** (*sic*) **is called for. I feel that the worst value for money is the 30 watt striplight. One has only got to breathe on them and they blow. At £1·50 a time this cannot be the cheapest method of lighting tanks.**

"I first bought six clown loaches, *Botia macracanthus*, when these delightful fish were offered at £1·30 for 1¼in. specimens. Apart from one, they all petered out fairly quickly. Not to be beaten I bought two more about a week later. They have thrived. I concluded that when I bought the first fish they had not been in the country long enough and therefore were not tough enough to be moved again.

"Regarding *Meet the Aquarist:* I heartily enjoy seeing how other people keep their fish and I would be extremely interested to see how the professionals are kitted out, e.g. Messrs. J. Hansen, M. J. Richter and R. Zukal. Would this be possible?"

Mr. Grimshaw has made some interesting points. I cannot recall ever having bought a snail killer, although I think I tested a review sample some years ago. (No doubt readers will correct me if I'm wrong; my memory is not quite as good as it used to be.) It's years since I used a snail killer, hence such was not the cause of the deaths of the pencilfish in my photograph. On rare occasions, when the need arises, I do use an algae killer. I am absolutely sure the produce I use had nothing whatsoever to do with the deaths of my pencilfish. I certainly would not continue to recommend the product if I had the slightest suspicion that if used according to instructions it would cause any fish to die. I suspect that an unidentified disease killed three of my four new pencilfish. The surviving one remains alive and health at this moment.

Today I had to replace another expensive long-life bulb with a cheaper Woolworth brand. I bought another pack of four 40 watt clear Winfield bulbs in Woolworth's for 95p. I think I got the last remaining pack of clear 40 watt bulbs—which I still consider to be good value at the price. I think—no more than *think* at the moment —that plants grown under a 40 watt *clear* Winfield bulb in an 18 in. × 10 in. × 10 in. aquarium are growing slightly better than similar plants in an identical tank lit by a 40 watt *pearl* Winfield bulb. I'll have to extend the experiment for a lot longer and measure pH, hardness and temperature, etc. before drawing any worth-while conclusions—if any can be drawn.

I'll conclude with this month's photographs. What is the species of plant in photograph 1? The plants are of the same species but two distinct leaf forms appear to be evident. The species looks like a giant *Ambulia*. The second shot shows a young discus. Have you successfully bred or kept this beautiful fish? Photo 3 is of a 'Sarasata' comet-tailed goldfish. Have you kept this very attractive coldwater variety? The fourth print displays the simple beauty of the dwarf Egyptian mouthbrooder, *Haplochromis multicolor*. Have you managed to get this species to breed? If so, please send me details.

I'd be pleased to receive your opinions on any of the following for a future feature: (a) the shape and design of aquarium lids and hoods; (b) ditto for cover glasses; (c) fishes that have spawned/bred in your community aquarium; (d) breeding mouthbrooders; (e) breeding cardinals or neons; (f) garden ponds; (g) marine tanks; (h) reptiles and amphibians; (i) special mediums for cultivating particular aquarium plants; (j) Malayan sand snails; (k) cultivating Amazon swords (*Echinodorus species*), *Hygrophila* species and *Cryptocoryne* species; and (l) details of public aquaria you visit while on holiday.

One final point: I was delighted to read, in the May issue, that *The Goldfish*, by Harvey and Hems, *is* available from Faber & Faber, in paperback, price £3·25. This should be a set text for all aquarists.

I hope your summer holidays will be enjoyable. Drop me a line if they provide you with a few spare minutes.

COLDWATER Queries

by Arthur Boarder

READERS SERVICE

Our experts are always pleased to receive your letters which should be addressed to:
Readers Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

All queries requiring a personal response **must** be accompanied by a stamped addressed envelope.

Can I keep a pumpkinseed sunfish (*Lepomis gibbosus*) in my aquarium stocked with fancy and ordinary goldfish?

It is never advisable to place even a small *L. gibbosus* with fancy goldfish. The latter are almost certain to have their well-developed caudal and dorsal fins ripped to shreds. As for a well-grown *L. gibbosus*, this fish is far too pugnacious to share living quarters with similar-sized goldfish.

I have just bought a weatherfish. What sort of environment and food suits this fish best?

The so-called weatherfish (*Misgurnus*), whether from central or eastern Europe, or Japan, flourishes best in an aquarium furnished with a least 3 in. of fine grit or sharp sand on the bottom. At irregular intervals it burrows into this soft floor and stays hidden from prying eyes. Hence plants that root in the compost are out. In the matter of food, the weatherfish should keep in good condition on a mixed diet of chopped or whole earthworms, whiteworms, thin strips of uncooked cod, fresh haddock, and the like, and small pieces of raw red meat. One last word. Keep the aquarium well-covered with a sheet of glass, for the weatherfish is a clever jumper. In stormy weather it bobs about at the surface and jumps a lot, a fact which has given rise to its popular name.

I intend to set up a 36 in. × 15 in. × 12 in. aquarium for shubunkins and comet-tailed goldfish. Please give me all the information you have to offer on the number of fish I can keep in this aquarium without having to run to the expense of an air-pump and filter.

Your tank will house up to 18 in. of fish. Or put in another way three 6 in. fish or six 3 in. fish or eight 2½ in. fish. Bear in mind though that several small fish in a 3 ft. tank will soon outgrow their container.

I would be grateful for any information you can give me on the keeping and breeding of fishes outdoors?

You can hardly do better than obtain a copy of *Coldwater Fishkeeping* (£1·75 post paid from this office). This well-written and informed book deals with species and varieties of fishes most suited to keeping and breeding in captivity.

Please name some submerged plants suited to growing in a 3 ft. tank illuminated by a 30-watt Gro-Lux lamp kept switched on for about 12 hours a day?

In a well-washed grit about 2½ to 3 in. deep any of the following plants should do well at normal room temperature: *Lagarosiphon major*, *Egeria* or *Elodea densa*, *Sagittaria subulata*, species of coldwater myriophyllum, and *Hygrophila polysperma*. Plants such as hair grass (*Eleocharis*) are very attractive, but bottom-grubbing goldfish or bronze carp soon have them out: their roots are too fine and short to take a firm grip in the compost.

Would a large galvanized iron tank installed in a well-lighted garden shed make a suitable home for goldfish?

Only after it has been given two or three coats of a best quality bitumastic paint. Make certain each coat of paint is dry before applying the next. After the final coat has dried out, give the tank a good soaking in two changes of water before setting it up for fish.

I have a pond 10 ft. × 4 ft. × 18 in. deep. How many goldfish and shubunkins can I introduce into it without fear of robbing them of oxygen and swimming space as they increase in size?

Provided you do not exceed a dozen fish about 3 in. long, not counting the tail-fin, everything should go along quite smoothly.

I should like to know if I should continue to feed my goldfish in an outdoor lily pond during the winter?

It really depends on the state of the weather or, strictly speaking, the effect of the weather on the temperature of the pond. In really cold weather, goldfish keep to the bottom and go into a state of hibernation or semi-hibernation. If, however, there is a protracted spell of mild weather, goldfish can become quite active and search around at all levels for food. Hence a few chopped worms or a small quantity of a first class dried food will do nothing but good. As soon as the weather turns cold again, cease feeding immediately. With its bodily functions slowed down, a goldfish, that is a healthy goldfish, can go without food for weeks on end.

TROPICAL Queries

by Dr. C. Andrews

Can you send me some information on tinfoil barbs?

The tinfoil barb (*Barbus schwanenfeldi*) may reach 25-30cm. in length, and originates from South East Asia. These fish are not fussy about pH or water hardness in the aquarium, although extreme values should be avoided. A stable temperature between 22-25°C is recommended. Because it is a large (and relatively active) fish, it should be given a large, deep tank; live plants are unnecessary, although the tank may be decorated with plastic plants, large rocks, etc. There must be plenty of free swimming space.

Tinfoil barbs will eat all good quality flaked and tablet foods, safe live foods, and lean raw meat and soft vegetable matter (eg lettuce).

If the temperature in a large aquarium is raised to around 28°C (and the fish are fed a good mixed diet), it is possible to breed tinfoil barbs. However, it is rather difficult to accurately sex these fish.

I am intending to set-up a "tetra tank". Can you recommend the best type of filtration for this sort of tank, and give me some idea of the best scavengers for the tank?

Shoals of tetras look their best in relatively large, well planted tanks. Assuming that your tank is in the region of 100cm. long, I suggest that you instal a poly-foam cartridge filter in each rear corner of the tank, and disguise these with plants or rockwork. These filters will blend well with the decor of the tank, are easy to maintain, do not interfere with plant growth, and carry out efficient biological and mechanical filtration.

With regard to scavenger fish, you cannot do much better than to stock your "tetra tank" with a shoal of 5-10 Corydoras catfish.

I recently had an outbreak of anchor worm in my tank following the use of live foods (*Daphnia, Tubifex*, **etc.). My local aquarium shop tells me that this parasite may have been introduced with the live foods. Is this so and how can I use live foods safely in my aquarium? Can you also recommend a good cure for anchor worm?**

Daphnia, Tubifex and other live foods from ponds or rivers which contain fish may well have introduced anchor worm (*Lernea*) into your tank. Such live foods are often the cause of disease outbreaks in ponds or aquaria, and their use is best avoided unless absolutely necessary. There is, of course, a range of prepared foods which is based on similar natural food items, carefully processed to eliminate all dangerous disease organisms. In addition, there are other live foods (eg earthworms, whiteworm, etc) which may be safely used as fish food.

Lernea can sometimes be difficult to control. "Sterazin" (Waterlife Research) is said to control this parasite. Reluctant infections on large fish may be treated by removing the fish from the water and touching the parasite (*not* the fish) with a paintbrush dipped in a strong solution of potassium permanganate.

Can you supply me with some information on the glass catfish (*Ompok bimaculatus*)**?**

The glass (or one-spot) catfish (*Ompok bimaculatus*) originates from South East Asia, where it may reach 45cm. in length and is highly prized as a food fish. Because it has the same common name, this fish should not be confused with the "other" glass catfish (*Kryptopterus bicirrhis*). Both are members of the family Siluridae (naked catfish).

There is not a great deal of information available on *Ompok*. It seems that these fish are best kept in twos or threes (perhaps small shoals) in a relatively large tank, since lone individuals do not fare well under aquarium conditions. It is quite an active fish, and is not exclusively nocturnal. Because of its large size it is probably best kept in a one species tank. I would provide only moderate illumination with a water temperature in the region of 20-25°C. These fish should eat all kinds of live, along with (perhaps) tablet and pelleted food, lean raw meat, fish, etc.

By the way, you will notice that *Ompok* becomes less transparent with age. I would suggest that you keep a record of your experiences in maintaining these fish, and that you publish them in a future edition of the "Aquarist and Pondkeeper."

One of my lionhead goldfish is suffering from what appears to be "mouth fungus." Can you recommend a cure?

"Mouth fungus" is, in fact, an infection with a bacterium, often *Flexibacter*. Aquarists have found a number of treatments successful. Placing the fish in a hospital tank to which has been added the required amount of a proprietary brand of "fish tonic" sometimes works. Alternatively the fish may be dipped into a strong solution of zinc-free malachite green (6ml. of a 10% solution per 10 litres of water) for 10-30 seconds, and then returned to a hospital tank treated with 0·1ml. of a 1% solution of zinc-free malachite green per 10 litres of water (and leaving the fish in this tank for at least five days). Some success has also been achieved by adding "Terramycin" (oxytetracycline hydrochloride) to the water of a hospital tank. This antibiotic is only available on veterinary prescription, and I have sent you a leaflet explaining how it may be administered.

KOI Queries

by Hilda Allen

I am going to excavate a garden pond for Koi measuring approximately 12 ft. × 7 ft. × 3 ft. deep with half of it going to 4½ ft.; would a sloping wall on one side be all right, or would a sheer wall be best? I intend to use a Butyl liner and could I use the overflow system described in your 'Aquarist' article in April?

A friend tells me it would be best to have the pond below ground level otherwise it would freeze-up above ground and I would be glad of your advice.

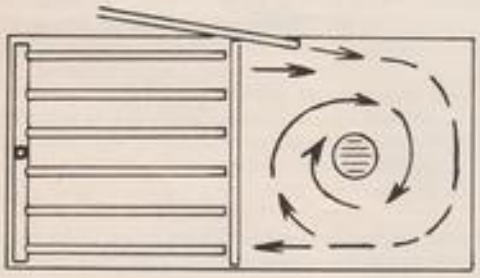
To answer your questions more or less in order, I would first advise that there is little purpose in greatly sloping sides to a pond and they may as well be as near sheer as possible. However, to reduce the number of folds in your liner it could be better to introduce a slope along the bottom from the 3 ft. to the 4½ ft. depth or better still to make the pond more or less a 4½ ft. deep box shape. One can never have too much water!

Although different from the size of your pond, you might like to consider some of the features given in "Koi Queries" of April 1980, where the liner was just above ground level with provision made for a safe overflow of water via a few gaps, or short lengths of PVC pipe built into a protective surrounding wall.

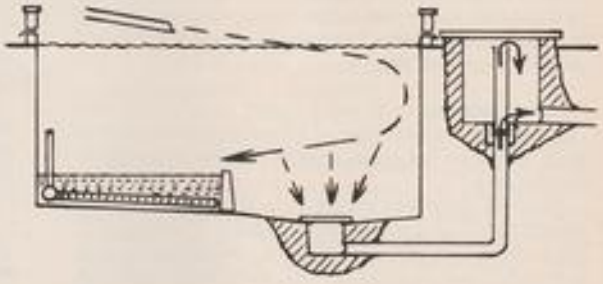
The principle of water-exchange was fully described and illustrated in my article "A Pond for Koi" of June 1977. In your case I would strongly recommend a swimming pool type bottom drain specially made for liners and having a 2 in. side outlet which, together with the PVC drain pipe can all be built underground before placing the liner in position. Location of the final drain connection outside the pond, and how much water can be removed will obviously depend upon levels of your site, or the existence of a convenient soakaway or drain etc.

Shut-off (gate) valves are expensive and it is more common for a simple pull-out length of stand pipe to be used. The pipe leading from underground and its connection should be firmly bedded in concrete and contained in a chamber, covered by a paving slab.

You have not mentioned any proposal for filtration and I am certain that you will soon realise the need for some form of filtration if you hope to keep Koi. Filters can be in or outside the pond and the water return will provide useful aeration that will be necessary through most of the year.



Plan view of filter pipes with water return creating a circular motion.



Section view showing the bottom drain set in concrete and a separately constructed disposal chamber.

In your case, I would suggest the installation of an undergravel filtration system in the shallower or opposite end to a bottom drain generally as shown in my earlier articles. If you arrange the return from the pump to create a slight circular motion to the whole pond water, this will cause the more solid waste products and any other mulm that usually develops to settle in the centre of the deeper part, where the bottom drain should be sited to dispose of it.

MARINE FORUM

by Graham F. Cox

This is a specially extended article from the Managing Director of Waterlife Industries Ltd., to assist the marine fishkeeper. It is based on a letter recently received from a Scottish enthusiast.

I have a number of questions which I hope you can answer for me. My tank set-up is 36 in. × 15 in. × 12 in. Temp. 78-80°F. Under gravel filter covered with 4 in. shell, 2 in. coral sand. Two out-lets worked with one Whisper 800 pump. Two air stones (wood) worked off small Ocean pump. Lighting two "Warm White' Thorn fluorescent lights 3 ft. long plus one "Gro-Lux" 3 ft. long. Water is changed every six weeks. This set-up has been up for 3 years. The decoration is dead coral and shells. The livestock consists:

1 Fire Clownfish and a Sea Anemone;
1 Humbug Damsel;
2 Saffron-Blue Damsels;
1 fanworm;
1 Sea-Cucumber;
1 Black Sea-Urchin.

All have been in the tank over one year except the Sea-Urchin acquired three months ago.

My questions are:

1. My tank has become infested with small crustaceans which are grey in colour. They hide most of the day. But appear when food is dropped in.

> **". . . the presence of swarms of copepods in a sea aquarium is always a tell-tale sign of a sloppy feeding regime and/or poor or non-existent tank maintenance procedures."**

2. My Sea-cucumber has become very small and has lost its red "feeders". What do you think I am doing wrong with it? I feed it every second day.

3. The Sea-Urchins were brought back from Formentera, a small island off Ibiza. I caught two of them myself. The Red one died after two months. Will the Black one live as it seems to be doing well?

4. Is my lighting enough? (On twelve hours).

5. When will I have to clean tank out altogether?

6. I have tried dearer fish but have only twice had success in keeping them. Many of them died after only one day after a 30 minute acclimation change over to my tank. What is wrong please?

Harpactid copepods are small *non-parasitic* crustaceans which feed on uneaten surplus food and *sea humus* (i.e. the very-slow-to-biodegrade organic residues fish and invertebrate excretum which slowly accumulates in the top 1-2 in. depth of oolitic coral-sand) buried in the coral-sand. I am very sorry to say that the presence of swarms of copepods in a sea aquarium is always a tell-tale sign of a sloppy feeding regime and/or poor or non-existent tank maintenance procedures.

What you must now do, and in the following sequence is:

(1) Dissolve 5 gallons of "Natura" of "Synthetica" seawater and aerate/heat for 24 hours.

(2) Turn off all filtration and aeration in your aquarium.

(3) Move all rocks, corals/shells, etc. to the two rear corners, and in the area of filter-bed so revealed, penetrate your fingers down 2 in. in your case (4 in. in everybody else's case) and thoroughly agitate the coral-sand layer *only* in order to dislodge all the sea-humus into floating suspension.

(4) Now remove all the rocks, corals, etc., to the front of the tank and repeat the process for the two triangular rear corner areas which you previously could not reach.

(5) Remove all the rocks, etc., back to the rear of the tank and now slope the coral-sand as steeply as possible from a high back to a low front.

(6) Go and have a cigarette, cup of tea, etc, for 15 minutes to allow all the sea-humus to subside to the bottom edge of the front tank glass.

> **"A few minutes of tank maintenance on the first day of each month is a much more scientific method than saying "White Rabbits" and leaving the rest to the good fairies."**

Do not begin to panic because of the filthy brown colour of the water. Your fishes/inverts have lived with it in the system for the last few months/years. Another few minutes will not hurt them!

(7) Return to the tank and with a 3/16 in. diameter (airline) siphon tube, take out *all* the sea-humus and five gallons of the clapped out old seawater. Discharge down the toilet and replace with sparkling clear, nitrite-free, nitrate-free, 78°F, 1·020 to 1·022, "Synthetica"/"Natura" seawater.

(8) Replace all the rocks/corals/shells to your creatures' liking and start up the aeration/filtration again.

NB: (a) There is no need to rush this job. Your creatures can survive without aeration/filtration for 2-4 hours depending on stocking density. The entire job rarely takes more than 30 minutes!

(b) Some people have told me later on (i.e., after the first attempt) that they prefer to empty all the rocks/corals/shells out into an empty bucket. I never do this personally because all my tanks are crammed with expensively-bought and expensively-cultured *living* rocks, *but*, if your tanks are full of dead rock there is no harm in it. However, be very careful that you are not lifting out Damselfishes, Blennies, Gobies, and sub-littoral zone invertebrates, etc., as well as rock!

(9) Go out and buy a Mandarin Dragonet (*Synchiropus splendidus*). These delightful little creatures make short work of even the most spectacular copepod cultures and you will never see a copepod alive again as long as the dragonet lives.

"Nobody in your lifetime nor in mine will ever supercede the beautifully simple and efficient air-lift operated, undergravel filtration as a carefully, scientifically-defined, aquatic culture system."

(10) Repeat the above procedure Nos. 1-8 above inclusive *every month*, say on the first of the month. It's a lot more effective as a system of sea aquarium maintenance than saying "White Rabbits" and trusting in the good fairies. If the algae is scraped off the four vertical walls of the tank also before the siphoning-off process is started, it's the only maintenance a semi-natural sea aquarium *ever* needs apart from feeding. How many adherents of the flashing-light, ringing-bells, digital display, silicon-chip, £1,500-a-time Teutonic systems can say the same?

Joking apart, Sir, nobody in your life-time nor in mine will *ever* supercede the simple air-lift operated, U/G filtration system as an aquatic culture system in terms of either cost effectiveness, lack of maintenance, sheer technical efficiency and simplicity. Notwithstanding this fact, neither will anyone ever eradicate the "money-snob syndronist" who can genuinely convince himself that a shirt bought for £100 in the West End *must* be better than the same article for £10 from Marks & Sparks. The foolish rich will always be with us, thank goodness.

With regard to the future: (i) don't forget that your regular 28 day, 25% water change *must always* be taken as an opportunity to flush as much sea-humus from the coral-sand layer as possible (ii) the golden rule in feeding coralfishes is that never even *one* morsel of food is allowed to reach the bottom of the tank uneaten. **Every morsel that does so becomes 1,000 parasites/pathogens within 48 hours!** (iii) tanks which are so dirty as to support a visible culture of copepods (remember **—non-parasitic**!) also always support even larger populations of monogenetic and digenetic trematodes (= "flukes"), cestodes and nematodes. **All of which are extremely parasitic and swiftly lethal to anything other than Damsels, Dragonets and a few hardy Clownfish spp.**

This is why you have never been able to keep successfully the larger showfishes such as Butterflyfishes, Angelfishes, Surgeon/Tangs, Batfishes, Wrasses, etc., and why you never will unless you heed *all* the above.

(11) *Sea Cucumbers* (=Sea Apples). I wonder how you feed this creature? Such a large animal needs 3-4 *irradiated* Mysid shrimps dropping into its tentacles, *every day*. Additionally, the sea-cucumber family more than most invertebrates and fishes, has an enormous **trace element** uptake. Are you using a cheap sea-salt without trace-elements? Look on the back of the bag. Does it tell you how much of each trace element is present? Or simply print an impressive list of elements which, lets face it, you could also print on a packet of rock salt and not be telling fibs. You'd better begin adding liquid trace-elements every week strictly according to the bottle's instructions. And don't forget the liquid vitamin supplement each week. Under aquarium conditions all fishes and invertebrates have a tremendous vitamin requirement.

"Every morsel of food which reaches the floor of an aquarium uneaten, becomes a thousand pathogens/Parasites within 48 hours."

(B) *Lighting*. Your lighting is exemplary and could not be improved upon no matter how much money you spend on exotic (prices as well as names!) tubes *but* please remember that the best tubes you can buy only last for 6 months if you're burning them for 12 hours a day. After that you should smash them and put them in the bin. They are quite useless as far as the health of your creatures is concerned. After 2,000 hours use, all fluorescent tubes are U/S (tube manufacturers please correct me in these columns if you feel I'm being unfair to your product!) and should be safely disposed of.

(C) *Sea Urchin*. The black species you mention is indestructibly hardy and might even reward you by reproducing, provided that you remember the trace elements and liquid vitamin supplement and drop 2 or 3 irradiated Mysid shrimps into its spines every 48 hours. These urchins are *benthic* feeders and get around quite a bit and so do not need as much food from you as the "apple".

(D) *Tank Clean-Out*. The quick answer is **never,** *provided* that you take every work of A above as gospel and do something about it from now on.

(E) *Deaths of Showfish*. If you have read all the foregoing carefully two or three times, I think you can answer this one for yourself. It would also be a great help if you were to carry out a nitrite, nitr*ate* and pH check every week and restore the levels to normal parameters when required.

News from Aquarists' Societies

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

SOUTH WEST

MR. JOHN JAMES spoke to members of **Bristol A.S.** about the work of the Avon River Preservation and Restocking Society. He described the methods of netting and weighing to estimate the rate of growth and the culling of some species of Carp that might hybridise and so produce smaller specimens than the true strain that originally occupied the lake. Table-show Results: Bristol Shubunkins: 1, 2 and 3, Victor Cole; 4, S. Howells. Terry Ball Jim Whiting Trophy for Best Coloured Bristol Shubunkin, Victor Cole.

SOUTH EAST

RESULTS of the 1981 **Croydon** open show: Class U.D.: 1, D. Winder. M.B.: 1, C. Tonna; 2, B. May; 3 and 4, P. Mills. U.B.: 1, C. Brown; 2, S. Hogan; 3, E. Franklin; 4, T. J. Asquith. D.B.: 1 and 3, D. Winder; 2, C. Brook; 4, D. Swale. X (U.W.): 1, R. Shiner; 2, G. Owen; 3, W. E. Woodward; 4, C. Brock. G.A.: 1, C. Brook; 2, H. Johnson; 3, T. Walmesley; 4, D. Brook. F.D.: 1 and 2, H. Johnson; 3 and 4, C. Cherwright. K: 1, D. Swale; 2, F. Scarr; 3, C. Brock; 4, J. Jackson. E.Z.: 1, C. Finnis; 2, W. A. Knight; 3, G. Owen; 4, C. Brook. U.C.: 1, A. Floyd; 2, C. Chisholm; 3, R. S. Graham; 4, C. Brooks. U.B.: 1, C. Chisholm; 2, W. A. Knight; 3, W. Woodward. C.A.: 1, H. Johnson; 2, G. Woodhams; 3, B. Cox; 4, B. May. L.A.: 1, A. L. Feast; 2, V. A. Feast; 3, T. Tester; 4, M. J. Draper. U.A.: 1, R. S. Graham; 2, S. M. Brown; 3, P. J. Whiddett; 4, C. Brown. F.E.: 1, J. Jackson; 2, A. L. Feast; 3, W. Woodward. D.Z.: 1, B. Hastings; 2, W. A. Knight; 3, E. Mitchell; 4, P. May. H.A.: 1, D. Winder; 2, J. Rowsey; 3, B. Hastings; 4, C. Finnis. N.B.M.: 1, A. Chaplin; 2, R. Ratcliffe; 3, R. Mitchell; 4, D. Brown. T.: 1, J. Owen; 2, J. Jackson; 3, B. Hastings; 4, T. Tester. X.O.T.: 1 and 3, D. Cherwright; 2, D. Winder; 4, F. Cripps. Novelty: 1 and 3, A. Reid; 2, G. Braddick; 4, D. Dixon. H.Z.: 1, G. Owen; 2, J. Adams; 3, H. Johnson; 4, B. Hastings. R: 1, 2 and 3, C. Clarke; 4, C. Finnis. E.A.: 1, M. Powell; 2, C. Hogan; 3, D. Winder; 4, J. Edwards. F.C.: 1 and 3, J. Jackson; 2, F. Cripps; 4, A. E. Farrow. F.B.: 1, G. Edgecombe; 2, F. May; 3, A. J. Feast; 4, G. Owen. C.Z.: 1, B. Hastings; 2, J. Edwards; 3, M. West; 4, T. Tester. W: 1, G. Owen; 2, A. Fuller; 3, S. M. Brown; 4, J. Fuller. O.: 1, M. J. Faltch; 2, Mrs. B. May; 3, J. M. Brown; 4, P. Edwards. N.O.T.: 1, F. Scarr; 2, J. Owen; 3, D. Cherwright; 4, P. Mills. P.: 1 and 3, T. Tester; 2, J. Tonna; 4, C. Finnis. D.C.: 1, B. Johnson; 2, R. Rowley; 3, W. A. Knight; 4, T. Tester. G.Z.: 1, H. Johnson; 2, A. Chaplin; 3, B. Myers; 4, D. Brown. J.: 1 and 3, A. Chaplin; 2, A. L. Feast; 4, P. Levins. Q.: 1, G. Owen; 2, P. Edwards; 3, F. Cripps; 4, J. Edwards. V.Z.: 1, M. Franklin; 2, D. Shiner; 3, R. Shiner; 4, R. S. Graham. O.A.: 1, R. Mitchell; 2, C. Finnis; 3, J. Tonna; 4, F. Cripps. B.Z.: 1, P. Levins; 2, D. Goodwin; 3, J. Edwards; 4, C. Tonna. S.: 1, N. Johns; 2 and 4, E. Jackson; 3, G. W. Moore. C.B.: 1, F. Scarr; 2 and 3, V. A. Feast; 4, F. Ratcliffe. V.A.: 1, 2 and 3, A. Nichol. F.A.: 1, D. P. Lambert; 2, D. Winder. M.A.: 1, A. L. Feast; 2, D. Winder; 3, B. Light; 4, F. Cripps. L.Z.: 1 and 4, C. Hogan; 2 and 3, D. Winder. F.F.: 1, J. Owen; 2, J. Jackson. B.A.: 1, A. L. Feast; 2, D. P. Lambert; 3, T. Tester; 4, F. Cripps. X. (BM): 1, G. Owen; 2 and 3, F. Scarr; 4, J. Adams. M.Z.: 1, A. L. Feast; 2, H. Johnson; 3, C. Hasdcock; 4, D. P. Lambert. E.B.: 1 and 4, G. Woodhams; 2, P. Cook; 3, M. Powell. F.Z.: 1, J. Jackson; 2, C. Cherwright. Best Fish in Show: B. Hastings with a *Anzorowus ternetzi*. Best Killie Fish: H. Johnson with a *Rivulus Strigatus*.

* * *

FOLLOWING the success of last year's Public Exhibition of Fishkeeping, **East Kent Aquatic Study Group** have set up a working committee to organise a similar event for this year. The Exhibition will be held at Lower Hardres Village Hall, near Canterbury on the weekend of 5th and 6th September. At the May meeting, the 43 members present enjoyed a talk and slide show presented by Mr. Colin Pannell, who had taken many of the slides himself. Colin's wife, Joan judged the table show which resulted: Rasboras: 1, S. Bowden; 2, J. Edwards; 3, C. Bridgeman. Catfish: 1, F. Scarr; 2, A. Aspittal; 3, J. Edwards. Meetings are held on the 2nd Tuesday of each month at St. Barts Church Hall, Herne Bay, at 7.45 p.m. Further details from Secretary, Mr. C. J. Bridgeman (Herne Bay 61907).

* * *

AT the May meeting of **Mid-Sussex A.S.** at Ockley Lodge, Ockley Lane, Keymer, Andy Feast from Tonbridge, gave a slide lecture on Killie Fish. Table show results: J: 1, 2 and 3, P. Levine; 4, A. and J. Fall. E: 1, A. and J. Fall; 2, Mrs. E. Smith; 3, P. Levine. K: 1 and 2, P. Levine; 3 and 4, A. and J. Fall.

Meetings are held on the 2nd Thursday of each month at Ockley Lodge, Keymer. Any enquiries to J. Smith, 51 Eastbourne Road, Brighton. (Bts. 602607).

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Bethnal Green and Independent A.S. recently played host to Romford and Becontree A.S. and Walthamstow A.S. in a three-way interclub. Results: Class E: 1, Mr. and Mrs. Carney (BG&I); 2, Garry Steptowe (Rom.); 3, Paul Mills (Wal.); 4, Margaret Lambert (Rom.). G: 1 and 4, Janet Farrell (BG&I); 2, Barry Myers (Wal.); 3, John Adams (Rom.). V: 1, Colin Brown (BG&I); 2, Sylvia Brown (BG&I); 3 and 4, Bert Crompton (Rom.). Nb.m.: 1, John Adams (Rom.); 2, Barry Myers (Wal.); 3, Paul Mills (Wal.); 4, Jim Brown (BG&I). The best fish in show award went to Janet Farrell for a callichthys. A total of 64 fish were judged by Mr. D. Durrant and Mr. B. Hastings. Total points gained by each society: BG&I, 17 points; Walthamstow, 10; Romford and Becontree, 13. Return inter-clubs are scheduled for Romford and at Walthamstow.

A TOTAL of 466 entries were benched at **Tongham Aquarists'** 1st annual open show on 26th April, at the Central Club, Farnham, Surrey. F.B.A.S. Championship trophy awarded for Class Ob (Pencilfish) was won by Mrs. E. Davies, of Corby A.S., with a *Nannostomus eques*, which also took Best Fish in Show. Other results were: Class Ag: 1 and 3, M. Bird (Tongham); 2, S. White (Brighton); 4, D. Swatridge (Tongham). Ba: 1 and 3, D. and P. Lambert (Kingston); 2, F. Cripps (Newbury); 4, M. Nunez (NARS). Bz: 1 and 3, D. Goss (Reading); 2, D. Ford (Bracknell); 4, J. Parr (Romford). Ca: 1 and 2, C. Richards (Sudbury); 3, C. Hogan (E. Dulwich); 4, P. Handley (Portsmouth). Ch: 1 and 3, E. Davies (Corby); 2, D. Goss; 4, N. Jackson (Reading). Cr: 1, D. and P. Lambert; 2, W. Hastings (SELAS); 3, E. and T. Tester (Mid-Sussex); 4, C. Richards. Dr: 1, P. Bradley (Brighton); 2, R. Goatcher (Brighton); 3 and 4, C. Richards. Du: 1, M. Bird; 2, W. Knight (Havant); 3, R. Cooke (Tongham); 4, W. Hastings. Dz: 1, W. Hastings; 2, W. Knight; 3, R. Cooke; 4, Haines Family (Uxbridge). E: 1, B. Winteridge (Sudbury); 2, Haines Family; 3 and 4, F. Cripps (Newbury). Eg: 1, P. Handley; 2, J. Parr; 3, E. Davies; 4, D. Brown (Havant). F: 1, H. Armitage (Havant); 2, B. Winteridge (Sudbury); 3, S. Norris (Bracknell); 4, F. Cripps. G: 1, C. Richards; 2, B. Smith (Brighton); 3 and 4, J. Parr. H: 1, P. Handley; 2, H. Armitage; 3, S. Norris; 4, C. Hogan. J: 1, N. Jackson; 2, D. Goss; 3, J. Parr; 4, E. Davies. K: 1, C. Richards; 2, S. Norris; 3, N. Jackson; 4, C. Hogan. L: 1, C. Richards; 2, G. Arnold (Havant); 3, F. Cripps; 4, B. Winteridge. M: 1, S. Swann (Tongham); 2, J. Parr; 3, C. Hancock (Havant); 4, F. Cripps. Nbm: 1 and 3, E. Davies; 2, N. Jackson; 4, A. Brown (Havant). Noc: 1, P. Martyn (Basingstoke); 2, D. Goss; 3, W. Hastings; 4, E. and T. Tester. O: 1, W. Crockford (Petersfield); 2, D. Swatridge (Tongham); 3, S. Smith (Mid-Sussex); 4, C. Gibbs (Croydon). P: 1, A. Chapman (Newham); 2, S. Norris; 3, M. Cardus (Croydon); 4, D. Swatridge. Q: 1, P. Cripps; 2, J. Parr; 3, P. Hooper (Portsmouth); 4, E. Piper (Bracknell). R: 1, 3 and 4, C. Clarke (Uxbridge); 2, P. Cripps (Newbury). S: 1, J. Smith (Mid-Sussex); 2, F. Chapman (Newham); 3, P. Handley; 4, A. Chapman. T: 1, C. Richards; 2, W. Hastings; 3, M. Strange (Basingstoke); 4, N. Jackson. U: 1, 2, 3 and 4, P. Whiddett (Tonbridge). V: 1, S. Hogan (E. Dulwich); 2, C. Gibbs. W: 1, 2 and 4, V. Hunt (Portsmouth); 3, C. Ratcliffe (Tonbridge). Xbm: 1, H. Brown (Havant); 2, M. Nazer (Tonbridge); 3, Haines Family; 4, M. Bird. Xot: 1, N. Jackson; 2, C. Hancock; 3, W. Hastings; 4, F. Cripps. The shield for highest pointed visiting society was narrowly won by **Reading A.S.**

EAST

AT the **Breckland Aquarist Club** the officers elected were: Chairman, Adrian Westfield; secretary, Angela Edwards, 11 Lavender Grove, Toftwood, Dereham, Norfolk; P.R.O./Lecture organiser, Tim King.

PHILIP SWINDELLS

Will the above named gentleman kindly contact the Editor of this magazine as soon as possible.

MIDLANDS AND WALES

RESULTS of the **Port Talbot A.S.** open show: AG: 1, Mrs. E. Perkins (PTAS); 2, J. Francis (PTAS). Ba: 1, A. J. Feest (TB); 2, J. G. Heenan (TRT); 3, C. Richards (SBY); 4, J. Egan (PTAS). Br: 1, J. Egan; 2, R. Jones (MYR); 3, S. Manuel (SAS); 4, B. Witteridge (SBY). Cs: 1, J. Egan; 2, S. Manuel; 3, T. Rees (PTAS); 4, P. and M. Davies (TRT). Ca: 1, 2 and 4, C. Richard (SBY); 3, T. Rees. Dz: 1, C. Richards; 2, S. Manuel; 3, J. Egan; 4, T. Rees. Da: 1 and 3, B. Fogarace (PTAS); 2, S. W. Oatoby (CHY); 4, S. Walters (NSE). Db: 1, P. R. and M. D. Fitchett (NSE); 2 and 4, C. Richards; 3, J. Egan. Dc: 1 and 2, A. Phillips (TRT); 3, P. R. and M. D. Fitchett; 4, R. Jones (MYR). E: 1, S. Manuel; 2 and 4, J. Francis (PTAS); 3, C. Jones (TRT). Ea: 1, W. E. Holland (NSE); 2, J. G. Heenan; 3, M. W. Thomas (CHY); 4, C. Richards. F: 1, S. Manuel; 2, B. Witteridge; 3 and 4, W. E. Holland. G: 1 and 4, C. Richards; 2 and 3, E. Morgan (MYR). H: 1, P. and M. Davies; 2, P. R. and M. D. Fitchett; 3, J. Egan; 4, R. Morgan. I: 1, C. Thomas (TRT); 2, A. J. Feest (TB); 3, J. Egan; 4, B. Witteridge. K: 1, T. Rees; 2, C. Richards; 3, J. Egan; 4, Bowyer and Nelder (CHS). L: 1 and 4, C. Richards; 2, B. Witteridge; 3, A. J. Feest. M: 1, A. J. Feest; 2, T. Rees; 3, B. Witteridge; 4, R. Jones. N: 1 and 3, I. H. Dibble (NSE); 2, J. Egan; 4, R. Perkins (PTAS). O: 1, A. Nelder (CHY); 2, C. Richards; 3, S. Manuel; 4, T. Williams (PTAS). P: 1, M. W. Thomas (CHY); 2, W. E. Holland; 3, S. W. Oatoby; 4, A. Nelder. Q: 1, R. Perkins; 2, A. Phillips. R: 1, P. and M. Davies; 2, J. Egan; 3, E. Jones (PTAS); 4, A. Phillips (TRT). S: 1, S. Manuel; 2 and 3, K. Davies (CHY); 4, Mrs. E. Perkins. T: 1, I. H. Dibble; 2, C. Richards; 3, C. J. Davies (PTAS); 4, P. and M. Davies. U: 1, 2 and 4, C. Rupert (PTAS); 3, S. Howitt (TRT). V: 1 and 2, C. Rupert; 3, S. Howitt; 4, N. Clifford (MYR). W: 1 and 2, Bowyer and Nelder; 3 and 4, C. Rupert. XBM: 1, P. R. and M. D. Fitchett; 2 and 4, E. Morgan; 3, W. E. Holland. XoT: 1, 3 and 4, I. H. Dibble; 2, C. Jones (TRT). BMy: 1, A. Samuel (ADR); 2, S. Howitt; 3, E. Newton (LM); 4, A. and L. Clifford (MYR). O.Ty: 1, A. Samuel; 2, 3 and 4, J. Arnold (PTAS).

Abbreviations:—PTAS, Port Talbot A.S.; TB, Tonbridge A.S.; TRT, Trethomas A.S.; SBY, Sudbury A.S.; MYR, Merthyr A.S.; SAS, Selective A.S.; CHY, Caerphilly; NSE, Nailsea A.S.; ADR, Aberdare A.S.; LM, Llantwit Major A.S.

Entries: 350. Best fish in show: C. Richards (Sudbury A.S.), *M. Punctus*. Best "junior" fish in show: A. Samuel (Aberdare A.S.), *C. D. Warnei*. Highest pointed visiting Society: Sudbury A.S. P.B.A.S. championship trophy "Class Ba": A. J. Feest (Tonbridge A.S.), *Barbus Cloeis*.

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THE **Midlands Association of Aquarists Societies** held their Judges Course and Examination at Birchenhead Community Centre, Stoke-on-Trent. Four people successfully passed the examination: John Sanders, Philip Birnie, Alan Rodwell and Andrew Edwards. All four are members of the Potteries A.S. The M.A.A.S. Judges Examiners, Mr. Ralph Teeds and Mr. George Hayes, were very pleased with the high standard of judging attained by the successful candidates. M.A.A.S. can offer their services to any affiliated Society within a 50 mile radius of Tamworth. Any Society wishing to join M.A.A.S. or needing further information should write to M.A.A.S. Secretary, Mr. Alan Dickenson, 3 Tavinock Close, Perry Crofts, Tamworth, Staffs. Societies already in M.A.A.S. range from Stoke-on-Trent and Stafford in the north down to Banbury in the south, Wolverhampton in the west to Loughborough and Leicester in the east, with other Societies within this circle.

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Banbury and District A.S. Early in the year it was decided to run their first open show on 6th September. After discussions with M.A.A.S. the Midland Aquarist League and the Catfish Association of G.B. it was decided to run the 3rd M.A.L. with the open show, also to include specialist classes for Catfish and Corydoras and Brochis which would be judged by invited members of the C.A.G.B. If the number of entries warrants the mentioned classes would be split as follows:—Catfish under 150mm. Catfish over 150mm. Corydoras under 57mm. Corydoras over 57mm. and Brochis. These classes to be judged to C.A.G.B. sizes. There will also be 21 Tropical classes and 2 Goldfish classes to be judged by M.A.A.S. judges and rules.

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CHANGE OF VENUE

Castle I.A.S. meet every Friday, 7.30 till 9.30 at St. Martin's Church Hall, Park Lane (off Cardiff Road), Caerphilly. Secretary, S. W. Oatoby, 51 Coed Main, Forest Park, Caerphilly, Mid-Glam., CF8 1RS, chairman, M. Thomas; Show Secretary, P. N. Bowyer; president, R. Bedwell, Robins Nest, Caerphilly.

NORTH

HYDE A.S. 12th annual open show was very well attended with 466 entries from the 20 societies competing. Best Fish in Show went to a cichlid owned by Mr and Mrs Underwood of Bridgewater A.S.; the prize for the competitor gaining the most points overall was also won by Mr and Mrs Underwood. Results: Section A—Guppies: 1, Mr. and Mrs. Iddon (Sandgrounders); 2, Mr. Armitt (Buxton); 3, Mr. and Mrs. Baldwin (Sandgrounders) Platies: 1, A. Rostworth (Pisces); 2, Mr. B. Leyland (St. Helens); 3, B. W. Carter (St Helens). Sword Tails: 1 and 3, L. Penney (St. Helens); 2, E. and B. Calow (Bridgewater). Mollies: 1 and 2, Mr. and Mrs. Iddon; 3, D. Bailey (Macclesfield). A.O.V.: 1, K. Buckley (Bridgewater); 2, Mr. and Mrs. Iddon; 3, M. and N. Rimmer (Sandgrounders). Section B—Barbs (small): 1, Mr. and Mrs. Stevenson (Oldham); 2, Mr. and Mrs. Baldwin; 3, R. and A. Johnson (Hyde). Large: 1, Mr. and Mrs. Baldwin (Section winner); 2, S. Walton (Rochdale); 3, Master G. Eatough (Sandgrounders). Section C—Characins (small): 1, Mr. Armitt (Buxton); 2, Mr. and Mrs. Stevenson; 3, Mr. and Mrs. Baldwin. Large: 1, Mr. and Mrs. Underwood (Bridgewater) (Section winner); 2, Mr. and Mrs. Winstanley (Merseyside); 3, E. and B. Calow. Section D—Anabantids fighters: 1, Mrs. Hands (Accrington); 2, Mr. Swift (Buxton); 3, K. Corbett (Merseyside). Small: 1, K. Buckley (Section winner); 2, Mr. Armitt; 3, B. W. Carter (St. Helens). Large: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Iddon; 3, Mr. and Mrs. Cook (Buxton). Section E—Cichlids Angels: 1, A. and J. Slater (Blackpool); 2, Mr. A. Bibby (Sandgrounders); 3, Mr. and Mrs. Stevenson. Rift Valley: 1, Mr. and Mrs. Iddon; 2, Mr. and Mrs. A. Waterhouse; 3, Mr. R. Ball (Sandgrounders). Small: 1, Mr. R. Ball; 2, L. Avery (Darwen); 3, R. Scotlock (Oldham). Large: 1 and 2, Mr. and Mrs. Underwood (Section winner); 3, Mr. and Mrs. E. Edwards (North Staffs). Section F—Catfish Corydoras: 1, Mr. and Mrs. Kenyon (Sandgrounders); 2, K. Corbett; 3, J. T. Morris Sandgrounders). Loaches: 1, Mr. and Mrs. Baldwin (Section winner); 2 and 3, Mr. and Mrs. Underwood. A.O.V.: 1, J. T. Morris; 2, E. and B. Calow; 3, Mr. P. Harris (St. Helens). Section G—Killie fish: 1 and 2, R. Scotlock (Section winner); 3, K. Buckley. Section H—Cyprinids Sharks and Foxes: 1, R. I. Paine (Merseyside); 2, A. and E. Berry (Bridgewater); 3, Mr. and Mrs. Iddon. Rasboras: 1, L. Penney (St. Helens); 2, R. I. Paine; 3, A. J. Slater. Dananos and Minnows: 1, Mr. and Mrs. Underwood (Section winner); 2, B. W. Carter; 3, Mr. and Mrs. Baldwin. Section I—A.O.V.: 1 and 2, Mr. and Mrs. Baldwin (Section winner); 3, Mr. and Mrs. Stevenson (Oldham). Section J—Marines: 1, Mr. Banks (St. Helens) (Section winner); 2, Mr. Toombs (Wythenshawe); 3, Mr. B. Leyland (St Helens). Section K—Pairs: Livebearers: 1, Mr. P. Harris; 2 and 3, J. Corbett. Egglayers: 1, 2 and 3, Mr. and Mrs. Baldwin (Section winner). Section L—Breeders: Livebearers: 1, K. Sinkinson (Oldham); 2, Mr. and Mrs. O. Rourke (Oldham); 3, Mr. and Mrs. A. Waterhouse. Egglayers C-D: 1, E. and B. Calow; 2 and 3, Mr. and Mrs. Chadwick. Egglayers A-B: 1 and 3, K. Buckley; (Sections winner); 2, R. Scotlock; Section M—Juniors: Livebearers: 1, P. Slater (Blackpool); 2, K. Corbett (Merseyside); 3, P. Williams (Blackpool). Egglayers: 1 and 2, Miss J. Baldwin (Sandgrounders) (Section winner); 3, P. and I. Iddon (Sandgrounders). Section N—Mini Jars Furnished: 1, S. F. and A. Hopwood (Darwen); 2 and 3, Mr. and Mrs. Stevenson. A Novelty: 1, 2 and 3, S. F. and A. (Hopwood) (Section winner). Section O—Coldwater Common and Comet: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Colley (Oldham); 3, Mr. and Mrs. Silk (Sheaf Valley). Orandas: 1, Mr. and Mrs. Williamson (Leigh); 2, Mr. and Mrs. Colley. Shubunkins: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Silk; 3, Mr. and Mrs. Casey (Blackpool). Moors: 1, Mr. and Mrs. Casey; 2, J. Lynch (Merseyside); 3, Mr. and Mrs. Colley. Veiltails: 1, Mr. and Mrs. Underwood (Section winner); 2, Mr. and Mrs. Colley; 3, Mr. and Mrs. Silk. Lion Head Bubble Eye Celestial Pom Pom Pearl Scale: 1, Mr. and Mrs. Williamson; 2, Master I. Whittaker (Bridgewater); 3, Mr. T. O. Brien (Hyde). A.O.V.: 1, A. and E. Berry (Bridgewater); 2, Mr. and Mrs. Silk; 3, Mr. and Mrs. Colley. Section P—Coldwater Breeders: 1, Mr. and Mrs. Storr (Oldham) (Section winner).

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THE 2nd leg of the **Statesman League** was held on 29th April at York, who were the host society. There were a total of 241 entries, and were judged by the Bridlington Society. Best fish in show award went to Mr. and Mrs. Ashton, of the Wyke Society with a Snakehead. Total points for the night were as follows. (E) Eboracum, 13 points; (H) Hull, 65; (S) Scarborough, 70; (W) Wyke, 17; (Y) York, 45.

Class results—Guppies: 1, Mr. and Mrs. Fawcett (Y); 2, Mr. and Mrs. R. Tooby (Y); 3, R. Clark (E). Swordtails: 1 and 3, C. Taylor (H); 2, Mr. and Mrs. Ellsker (S). A.O.V. Livebearer: 1, T. and J. Douglas (H); 2, Mr. and Mr Fawcett (Y); 3, K. Webb (S). Large Barbs: 1, Mr. and Mrs. Ellsker (S); 2, R. Laverick (W); 3, M. Burrows (H). Large Characins: 1, Mr. and Mrs. Ellsker (S); 2, Miss J. Walker (S); 3, T. Gould (W). Fighters: 1 and 3, Mr. and Mrs. Fawcett (Y); 2, M. Gray (H). Large Cichlids: 1 and 2, M. Gray (H); 3, Mrs. R. Bigsby (S). Angels: 1, Mr. and Mrs. Snowden (Y); 2 and 3, D. Gregory (S). Large Anabantids: 1, Mr. and Mrs. Richardson (S); 2 and 3, J. Cauvess (H). A.O.V. Catfish: 1, Roy Gee (W); 2, D. Gregory (S); 3, Mr. and Mrs. Slavin (S). Mollies: 1, Mr. and Mrs. Richardson (S); 2, K. F. Taylor (H); 3, Mr. and Mrs. Snowden (Y). Platies: 1, Mr. and Mrs. Ellsker (S); 2, M. Gray (H); 3, B. Lonsdale (E). Small Barbs: 1, C. Taylor (H); 2, Mr. and Mrs. Ellsker (S); 3, G. A. Todd (H). Small Characin: 1 and 3, W. Sowersby (S); 2, Mr. and Mrs. Richardson (S). Rasbora, Danio, Minor: 1, Mr. Stone (S); 2, G. Andrews (H); 3, J. Gray (Hull). Small Cichlids: 1, Mr. and Mrs. Slee (Y); 2, S. M. Ulyett (Y); 3, D. Weathers (E). Rift Lake Cichlids: 1, G. Andrews (H); 2, Mr. and Mrs. N. Bolton (Y); 3, Mr. and Mrs. H. Bibby. Small Anabantids: 1, M. Walker (H); 2, Mr. and Mrs. Slee (Y); 3, Mrs. R. Walker (S). Corydoras and Brochis: 1, M. Walker (H); 2, W. Sowersby (S); 3, K. Webb (S). Loaches: 1, D. Gregory (S); 2, R. Bigsby (S); 3, Mr. and Mrs. Richardson (S). A.V. Aphyosemion: 1, T. and J. Douglas (H); 2, Mr. and Mrs. Richardson (S); 3, Mr. and Mrs. Tindall (Y). A.O.V. Tropical: 1, Mr. and Mrs. Ashton (W); 2, Mr. and Mrs. Ellsker (S); 3, D. Gregory (S). Breeders (Egg) A and B: 1 and 3, Mr. and Mrs. Bolton (Y); 2, Mr. and Mrs. Richardson (S). Breeders (Live) A and B: 1, Mr. and Mrs. Fawcett (Y); 2 and 3, G. Andrews (H). Pairs (Egg): 1, M. Gray (H); 2, Mr. and Mrs. R. Tooby (Y); 3, G. Andrews (H). Goldfish and Comets: 1 and 2, G. Andrews (H); 3, W. Sowersby (S). A.O.V. Coldwater: 1 and 3, Mr. and Mrs. Snowden (Y); 2, R. Bull (E). A.V. Female (Live): 1, T. and J. Douglas (H); 2, W. Sowersby (S); 3, Mr. and Mrs. Richardson (S). A.O.V. Killifish: 1 and 3, R. Bull (E); 2, G. Andrews (H). Sharks and Foxes: 1, Mr. Stone (S); 2, B. Lonsdale (E); 3, S. M. Ulyett (Y). Breeders (Egg) C & D: 1 and 2, Mr. and Mrs. Bolton (Y); 3, Mr. and Mrs. Richardson (S). Breeders (Live) C and D: 1, G. Andrews (H). Pairs (Live): 1, C. Taylor (H); 2, Mr. Stone (S); 3, Mr. and Mrs. Ellsker (S). Fancy Coldwater: 1, K. Webb (S); 2, Mr. and Mrs. Slavin (S); 3, Mr. and Mrs. Snowden (Y). A.V. Female (Egg): 1, L. Laverick (W); 2, R. Bull (E); 3, S. R. Wilson (H).

Thursday, 21st May saw the third **Statesmans League** match of this season, with Scarborough A.S. hosting the match at the Clifton Hotel, Scarborough. Wyke Show Society donned the

judges' mantle with the following result: Scarborough A.S. 73 points; Hull A.S. 53; Bridlington A.S. 49; York A.S. 32 and Ebor A.S. 7. Leaving the league table as follows: Scarborough, 185 points. Hull, 164; Bridlington, 122; York, 101; Wyke, 47; Ebor, 20.

The **Hull A.S.** meet at the Hull Railway and Docks Club and Institute, Anlaby Road, Hull, on the first and third Wednesday of each month. Visitors and new members are welcome.

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THE **British Koi-Keepers Society** held its a.g.m. on 3rd May at the Centre Hotel, Leicester.

The Chairman, Mr. Roland Seal, opened the meeting with a slide show of some of the beautiful Koi photographed on a recent trip to Japan.

Officers elected for the coming year: President, E. A. Allen; chairman, W. R. Seal; general secretary, D. Bocklens; treasurer, M. G. Waumsley; membership secretary, Mrs. C. Mullins; magazine editor, W. Fowler; distribution officer, D. Smith; public relations officer, R. Talbot; minutes secretary, Mrs. L. Liddicoat; supplies officer (new post), A. W. Liddicoat; auditor, E. A. Allen. The final item on the agenda was a very informative lecture with slides, given by Dr. Miller, of the University of Bristol. All who attended this lecture must have returned home a great deal wiser and look forward to another such lecture by this very knowledgeable gentleman. For membership contact Mrs. C. Mullins, "Woodlands," South Avenue, Langdon Hills, Basildon, Essex SS16 6JG.

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PRESTON & DISTRICT A.S. a new Society has formed in the Preston district and holds meetings on the first Tuesday in every month at the "Golden Cross Inn," Lancaster Road, Preston. New members will be welcome. Secretary: Sue Ainsworth 47, Clanfield, Fulwood, Preston PR2 4RR. Tel: (Preston 716831).

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AT the annual open show of the **Hull A.S.** at the Albermarle Youth Centre. Despite the recession and the ever increasing cost of travel, entries were over 140 up on last year. A very high standard of fish reached the show bench.

Results: Guppy: 1, Mrs. A Smith (Forest Town); 2, M. and N. Hancock (Hallcroft); 3, Mr. and Mrs. A. E. Smith (BBC). Sword: 1, Mr. and Mrs. Wright (Darfield); 2, Mr and Mrs. Pickford (Caistor); 3, B. Banks (BBC). Platy: 1, Mr. and Mrs. A. E. Smith; 2, B. Banks; 3, Mrs. M. Gray (Hull). Molly: 1, K. Taylor (Hull); 2, Mr. and Mrs. Richardson (Scarborough); 3, R. H. Smithurst & Son (A and D). A.O.V. Live: 1, Mr. and Mrs. Wall (Barnsley); 2, P. Lane (Hallcroft); 3, H. Ackroyd (Doncaster). A.V. Female (Live): 1, M. and P. Jordan (Bridlington); 2, Mr. and Mrs. Wright (Darfield); 3, Mrs. S. Dawn (Forest Town). Pairs (Live): 1, M. Johnson (Forest Town); 2, Mrs. S. Dawn; 3, C. Taylor (Hull). Breed (Live) (A): 1, B. Banks; 2, Mr. and Mrs. Pickford; 3, Mrs. S. Dawn. (B): 1, B. Banks; 2, Mrs. Fywcett (York); (C): 1 and 2, B. Banks. (D): 1, B. Banks; 2, M. Johnson (Forest Town). Mims and Dans.: 1 and 2, Mr. and Mrs. A. E. Smith; 3, Miss J. Gray (Hull). Rasboras: 1, Pete and Sylvia (Bridlington); 2, Mrs. G. Marples (A. and D.); 3, G. Andrews (Hull). Barbs (up to 10 cm): 1, Mr. A. Marples (A and D); 2, B. Banks; 3, M. and P. Jordan (Bridlington). Barbs (over 10 cm): 1 and 2, M. Kemp (Sheaf Valley); 3, M. and P. Jordan. Angels: 1, R. H. Smithurst & Son; 2, Mr. and Mrs. Snowden (York); 3, C. Taylor (Hull). A.O.V. Cichlids (over 10 cm): 1, Mr. T. Stansfield (Leeds PO); 2, Mrs. M. Gray (Hull); 3, K. M. Fisher (Forest Town). A.O.V. Cichlids (up to 10 cm): 1, R. H. Smithurst & Son; 2, Mr. and Mrs. Tilley (Doncaster); 3, Mr. B. Brook (Huddersfield). Rift Valley: 1, Mr. M. A. Hollingworth (Forest Town); 2, Miss J. E. Hollingworth (Forest Town); 3, K. M. Fisher (Forest Town). Characins (up to 7 cm): 1, Mr. and Mrs. Davis (Grimsby and Clee); 2, Mrs. S. Dawn; 3, R. Talbot (Bridlington). Characins (over 7 cm): 1, Mrs Anderson (IND); 2, Mr. and Mrs. P. Howell (A and D); 3, Mr. and Mrs. Riley (Leeds PO). Fighters—Anabantids (up to 10 cm): 1, Mr. and Mrs. A. E. Smith; 2, R. H. Smithurst and Son; 3, Mrs. Anderson. Anabantids (over 10 cm): 1, Mr. and Mrs. P. Howell; 2, Mr. and Mrs. Richardson; 3, K. M. Fisher. Egglaying Tooth Carps: 1, Mr. Lamm (Holset); 2, Mr. and Mrs. Sida (Barnsley); 3, Mr. T. Dawn (Forest Town). Corydoras: 1, Miss J. Lee (Otley); 2, Mr. and Mrs. A. E. Smith; 3, Mr. A. Marples. A.O.V. Cats: 1, Mr. and Mrs. Howell; 2, K. Taylor (Hull); 3, S. Dransfield (IND). Loaches: 1, Mr. and Mrs. A. E. Smith; 2, Mr. and Mrs. Campbell (Ashby); 3, Mr. and Mrs. Howell. Sharks and Foxes: 1, M. Kemp (Sheaf Valley); 2, Mr. and Mrs. P. Howell; 3, Mr. A. Palmer (Hallcroft). A.O.V.: 1, Mr. and Mrs. A. E. Smith; 2, Mr. and Mrs. Ashton (Wyke); 3, Mr. and Mrs. P. Howell. A.V. Female (Egglaying): 1, Mr. and Mrs. Sida (Barnsley); 2 and 3, Mr. and Mrs. J. Riley (Leeds PO). Pairs (Egglaying): 1, Mr. Stansfield (Leeds PO); 2, Mrs. M. Gray; 3, Mrs. A. Smith (Forest Town). Breeders (Egglaying): 1, M. and P. Jordan; 2, Mr. and Mrs. Bollan (Pocklington); 3, B. Banks. Common and Comet Goldfish: 1, E. and J. Morton (Hull); 2, J. J. Goacher (Hull); 3, Mr. and Mrs. Silk. Fancy Goldfish: 1, Mr. and Mrs. Silk; 2, Mr. and Mrs. Bridge (Bridlington); 3, Mr. B. Brook (Huddersfield). A.O.V. Coldwater: 1, Mr. and Mrs. A. E. Smith; 2, Mr. and Mrs. Snowden (York); 3, P. Lane (Hallcroft).

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AT the **Macclesfield A.S.** recent open show, from an entry of five hundred fish the Best Fish in Show was a Large Cichlid owned by Mr. and Mrs. Iddon of Sandgrounders Society. The F.N.A.S. Society with the most points was won by Bridgewater Society. The Society wish to apologise for any inconvenience which may have been caused by the change of date due to circumstances beyond their control. Please note a change of club meeting venue to the Churchill Way Social Club, Chatham Street, Macclesfield, the last Wednesday in every month. Show results: Guppies: 1, D. Arnatt (Buxton); 2, Mr. and Mrs. Waterhouse (Merseyside); 3, G. Edwards (North Staffs.). Platies: 1, H. Buckley (Northwich); 2, E. and B. Calow (Bridgewater); 3, Mr. and Mrs. Waterhouse. Swordtails: 1, E. and B. Calow (Bridgewater); 2, A. and E. Berry (Bridgewater); 3, S. Waterhouse (Merseyside). Mollies: 1, 2 and 3, Mr. and Mrs. Iddon (Sandgrounders). A.O.V. Livebearers: 1, E. and B. Calow; 2, K. Buckley; 3, M. Rimmer (Sandgrounders). Small Anabantids (up to 8cms): 1, K. Buckley; 2, R. Ball (Sandgrounders); 3, S. Waterhouse. Large Anabantids (over 8cms): 1, Mr. and Mrs. Underwood (Bridgewater); 2, Mr. and Mrs. Iddon; 3, G. Edwards (North Staffs.). Fighters: 1, B. Waterhouse (Merseyside); 2, I. Whittaker (Bridgewater); 3, M. Rimmer. Small Cichlids (up to 10cms): 1 and 2, Mr. and Mrs. Underwood; 3, A. Whittaker (Macclesfield). Large Cichlids (over 10cms): 1, Mr. and Mrs. Iddon; 2 and 3, Mr. and Mrs. Underwood. Angels: 1 and 3, Mr. and Mrs. Slater (Blackpool); 2, Mr. and Mrs. Stevenson (Oldham). Rift Valley: 1, Mr. and Mrs. Waterhouse; 2, R. Ball; 3, Mr. and Mrs. Iddon. Small Barbs (up to 7.5cms): 1, Mr. and Mrs. Stevenson; 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mr. and Mrs. Underwood. Large Barbs (over 7.5cms): 1, R. Clayton (MASG); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, R. Clayton. Small Characins (up to 7.5cms): 1, Mr. and Mrs. Mulla (Merseyside); 2, S. Waterhouse; 3, D. Armitt (Buxton). Large Characins (over 7.5cms): 1, E. and B. Calow; 2, Mr. and Mrs. Underwood; 3, Mr. and Mrs. Waterhouse. Toothcarps: 1 and 3, R. Skolnick (Oldham); 2, K. Buckley. Minnows: 1, Mr. and Mrs. Baldwin; 2, Mr. and Mrs. Underwood; 3, C. Swallow (Macclesfield). Danios: 1 and 2, Mr. and Mrs. Baldwin; 3, J. Lynch (Merseyside). Rasboras: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin; 3, A. Cooke (Buxton). Corydoras and Brochis: 1 and 2, Mr. and Mrs. Kenyon (Sandgrounders); 3, J. Lynch (Merseyside). A.O.V. Catfish: 1, C. Burton (MASG); 2, J. T. Morris (Sandgrounders); 3, E. and B. Calow (Bridgewater). Loaches: 1, Mr. and Mrs. Baldwin; 2 and 3, Mr. and Mrs. Underwood. Sharks: 1, Mr. and Mrs. Underwood; 2, P. Ankers (North Staffs.); 3, Mr. and Mrs. Stevenson (Oldham). Flying Foxes: 1, Mr. and Mrs. Stevenson; 2, Mr. and Mrs. Kenyon (Sandgrounders); 3, E. Birchwood (Oldham). Breeders (Egglayers) (Hard 11 to 20): 1, R. Skolnick; 2, K. Corbett (Merseyside); 3, D. Arnatt (Buxton). Breeders (Egglayers) (Easy 1 to 10): 1, E. and B. Calow; 2, K. Buckley; 3, A. Chadwick (Oldham). Breeders (Livebearers): 1, K. Buckley; 2, A. Chadwick; 3, K. Birchwood (Oldham). True Pairs (Egglayers): 1, D. Hulse (Oldham); 2, Mr. and Mrs. Goddard (Macclesfield); 3, D. Arnatt. Two Pairs (Livebearers): 1, Mr. and Mrs. Underwood; 2, K. Corbett; 3, Mr. and Mrs. Waterhouse. A.O.V. (any variety not listed): 1, Mr. and Mrs. Baldwin; 2, L. Fountain (Runcorn); 3, Mr. and Mrs. Iddon (Sandgrounders). Junior (Egglayers): 1, J. Baldwin; 2, L. M. Buckley; 3, P. Underwood. Juniors (Livebearers): 1, P. Slater (Blackpool); 2, K. Corbett; 3, S. Waterhouse. Ladies A.V.: 1, Mrs. Underwood; 2, Mrs. Baldwin; 3, Mrs. Fynne (Macclesfield). Goldfish and Comets: 1, H. Buckley; 2, L. Fountain; 3, J. Lynch (Merseyside). Shubunkins: 1, J. Lynch; 2, A. Chadwick; 3, Mr. and Mrs. Casey (Blackpool). Orandas: 1, Mr. and Mrs. Williamson (Leigh); 2, Mr. and Mrs. Colley (Oldham); 3, J. Fynne (Macclesfield). Pan Tail: 1, Mr. Goldsbrough (Blackpool); 2, Mr. and Mrs. Colley (Oldham); 3, Mr. and Mrs. Underwood. A.O.V. Fancy Goldfish: 1 and 2, B. Fynne; 3, I. Whittaker (Bridgewater). A.O.V. Coldwater: 1, Mr. and Mrs. Underwood; 2 and 3, A. and E. Berry.

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THE **Hinckley and District A.S.** meets every 2nd Wednesday in the month at the 'Railway Hotel,' Hinckley, beginning at 8 p.m. A junior section is also included for those aged 8-12 years. Everyone very welcome. For further details ring Hinckley 613761.

Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

JULY

5th July: Association of Midland Goldfish Keepers. Sunday afternoon visit to a goldfish breeding establishment. Details of membership from Hon. Secretary, Miss G. Kedge, 6 Deansgate, Houghton-on-the-Hill, Leicestershire.

8th July: Chard & District A.S. 7th annual open show at Fursham School, Chard, Somerset. Details from E. K. Gray, 63 Henson Park, Chard, Somerset. (Tel: Chard 4272).

8th July: South East London A.S. open show at 141 Greenwich High Road, SE10. For information ring 858 6344 or 692 0283.

8th July: Kings Lynn A.S. open show at the Corn Exchange, Tuesday Market Place, Kings Lynn, Norfolk. Schedules from M. Laws, Sun-Ray, West Winch Road, Kings Lynn (Tel: K.L. 63743).

8th July: Leamington and District A.S. open show at Lillington Community Centre, Lillington. Benching from 12-1.30 pm, for details contact Mr. P. G. Stoodley 4 St John's Terrace, Leamington Spa, Warwickshire, CV31 3BJ. Tel: (0926) 312905.

11th & 12th July: Romford & Beaconstree A.S. open show at Dagenham Town Show, Central Park, Dagenham. Schedules from Garry Stapstowe, 35 Coniston Way, Elm Park, Hornchurch, Essex RM12 5EH (Tel: Hornchurch 44057).

12th July: Scarborough & District A.S. open show at Gladstone Road Junior School, Wooler Street, Scarborough. Schedules from R. Stone, 9 Clifton Street, Scarborough, N. Yorkshire (Tel: 0723 60588).

18th July: Goldfish Society of Great Britain general meeting, 2 p.m., Conway Hall, Red Lion Square, Holborn, London.

19th July: Mid-Sussex A.S. exhibition, at the Sidney West Sports Centre, Leylands Road, Burgess Hill, W. Sussex.

19th July: Sandgrounders A.S. annual open show to be held in Meols Cop School, Meols Cop Road, Southport. Further details from Mr. B. Baldwin, 10 Olive Grove, Southport, Merseyside (Tel: 0704 43384).

19th July: Caistor & District A.S. open show, Caistor Town Hall, 2 p.m. Meetings held fortnightly at Fleece Inn Caistor. Details from Secretary L. Pickford (Grimsby 50762). V. R. Black (Show Secretary).

26th July: I & E. A.S. open show at Monks Dyke High School, Monks Dyke Road, Louth, Lincs.

AUGUST

2nd August: Ashby Fishkeepers Society first open show. Show Secretary: R. J. Lack, 23 Bottesford Avenue, Ashby, Scunthorpe, South Humberside DN16 3BN (Tel: 62780).

2nd August: Leicester A.S. first open show at the St. Matthew's Community Centre, Malabar Road, Leicester. Details and schedules from Show Secretary D. Sewell, 32 Parkdale Road, Thurmaston, Leicester. (Tel: 695305).

9th August: Oldham & District A.S. open show at Werneth Park, Oldham. Information and schedules from A. Chadwick, 9 Bromville Close, Chadderton, Oldham (Tel: 061-652 6207).

9th August: Grimsby & Cleethorpes. A.S. Open Show at the Memorial Hall, Cleethorpes. Benching 12-2 p.m.

15th August: Northern Goldfish and Pondkeepers Society 5th open show at the Sports Centre, Silverwell Street, Bolton. Details and entry forms from D. Lord, 40 Hospital Road, Bromley Cross, Bolton.

15th-16th August: Yorkshire Aquarist Festival at Doncaster Racecourse. Details from R. Singleton, 13 Schofield Drive, Darfield Barnsley, Yorks.

16th August: Midland Koi Association and the United Kingdom Chapter of the Japanese Koi Society joint national open Koi show at Twycross Zoo, Leicestershire. Details from U.K. Chapter, Zen-Nippon Airinkai, P.O. Box 30, Windsor Street, Uxbridge, Middx.

22nd August: Trethomas & District A.S. show at the St. John Ambulance Hall, Pandy Road, Bedwas, near Caerphilly. Benching 9-12.30 p.m. Trophies and plaques for all classes. For further information please contact A. Phillips, 28 Llanfabon Drive, Trethomas, Gwent, or phone 0222-884391.

22nd August: Nuneaton A.S. open show at Nuneaton Arts Centre, Pool Bank Street, Nuneaton. Information from Show Secretary, G. Hemmings, 182 Tomkinson Road, Nuneaton, Warwickshire (Tel: 0682 325271).

23rd August: (Change of Date) Castleford A.S. open show at Woodhouse Hill W.M.C., Wakefield Rd, Normanton, schedule from C.A.S. secretary, B. Stansill, 4 Milnes Grove, Airedale, Castleford WF10 1EZ. (Tel: Cas 559615).

29th August: Open show of fancy goldfish in Dunfermline. Organised by the Scottish Goldfish Group. Details and schedules from Tommy McLean, 36, Corston Park, Craigshill, Livingston, West Lothian, Scotland.

29th & 30th August: The Deal and District A.S. annual show in the O.A.P.'s Hall, Duke Street, Deal. This is a 'closed' show, but is open to the public after judging has been completed.

30th August: Long Eaton A.S. sixth open show at the Gregory's Rose Gardens, Toton, Nottingham. Enquiries to R. West, Show Secretary. (Tel: Long Eaton 63023).

30th August: Fleetwood and District A.S. open show at the Marine Hall, Fleetwood. A. M. Stenhope (show secretary).

30th August: Fleetwood & District A.S. open show at the Marine Hall, in the Marine Gardens, Promenade, Fleetwood. For further information or schedules when printed write or telephone, B. Frost, 103 Chamworth Avenue, Fleetwood, Lancs. (Tel: F'Wood 70477) or Mrs. Avril Stanhope, 6 Rhyl Street, Fleetwood, or David Sands (president), 116 Hesketh Lane, Tarleton, Nr. Preston.

31st August: (August Bank Holiday Monday). Y.K.S. Annual Koi Festival and Open Show, at Harewood House, near Leeds.

SEPTEMBER

5th & 6th September: East Kent A.S.G. Public Exhibition of Fishkeeping, Lower Hardres Village Hall, Nr. Canterbury, Kent. Further details from Bob Spoore (Tel: Canterbury 52382).

6th September: Salisbury & D.A.S. annual open show to F.B.A.S. rules, at the Activity Centre, Wilton Road, Salisbury. Schedules from show Sec., D. Eidlestein, 33 Somerset Road, Salisbury, Wilts. (Tel: 0722-28219) S.A.E. please.

6th September: Banbury & District A.S. open show. Details from R. H. Hancox, 57 Lennox Gardens, Banbury, Oxon.

6th September: Huddersfield Tropical Fish Society open show at Slaithwaite Civic Hall, Slaithwaite. Details from Mrs. P. Town, 187 Abbey Road, Shepley, Nr. Huddersfield, (Tel: Kirkburton 7640).

6th September: Wellingborough & District A.S. open show at Westfield School for Boys, Brickhill Road, Wellingborough, Northants. For schedules write to M. Coe, 20 Salisbury Street, Kettering, Northants (Tel: 521600).

12th September: Hounslow & District A.S. open show at the Hounslow Youth Centre, Cecil Road, Hounslow. Information from Show Secretary, T. Bolingbroke, 2 Holmwood Close, Addlestone, Surrey (Tel: Weybridge 54976).

12th September: Bristol A.S. coldwater fish show at St. Ambrose Church Hall, Stretford Road, Whitehall, Bristol, 3-5.30 p.m. Details from I. Muldoon, 87 St. John's Lane, Bristol BS3 5AB (Tel: 0272 712383).

13th September: Buxton & District A.S. open show at the Paxton Suite, Pavilion Gardens, Buxton.

13th September: Barnsley Tropical Fish Society 17th open show at the Hall Bank School, Huddersfield Road, Barnsley. Further information contact G. Wall, Barnsley 47210.

13th September: Cheltenham Tropical Fish Club open show at St Marks Community Centre, Hesters Way, Cheltenham, Glos. Schedules (June onwards) from M. Jenkins, 3 Marlborough Place, Princes Street, Cheltenham, Glos. S.a.e. please.

13th September: Potteries and District A.S. 2nd annual open show. Venue: Stoke-on-Trent Technical College, Moorland Road, Burslem, Stoke-on-Trent, Staffs. Further details available from Melvyn Clarke, show secretary, 91 Chell Heath Road, Bradeley, Stoke-on-Trent, Staffs.

20th September: North Wilts A.S. open show. Details from Show Secretary P. Taylor, 7 Ridgeway Road, Stratton, Swindon. (Tel: 824114).

20th September: Tonbridge & District A.S. open show at Hadlow Community Centre, Hadlow. Schedules from A. Feast, 5 Pollards Wood Road, Nr. Oxted, Surrey RH8 0JN.

20th September: Diss open show at the Youth Centre, Shelfanger Road, Diss, Norfolk. Schedules from Neil Hume, 10 Blomefield Road, Diss, Norfolk IP22 3NU. (Tel: Diss (0379) 4541).

20th September: Chesterfield A.S. open show at Westfield upper School, Mosborough. Benching 12-1.45 p.m. Judging 2 p.m. Schedules from L. Waller, 79 West Street, Eckington, Nr. Sheffield S31 9GA. (Tel: Eckington 432531).

27th September: Wolverhampton A.S. open show at the Oxley Community Centre, Marsh Lane, Wolverhampton. Details from Show Secretary, Pete Wrenall, 16 Essington Way, Wolverhampton (Tel: Wolverhampton 53979).

27th September: Harlow A.S. open show at Moot Hall, The Stow, Harlow, Essex. Show Secretary, Peter Murdoch, 11 Woodfield Terrace, Thornwood Common, Epping, Essex, (Tel: Epping 72214).

27th September: Wyke show Society, Hull, open show.

OCTOBER

3rd October: Goldfish Society of Great Britain open show and convension. Particulars from H. Berger, 74 Baron Gardens, Barkingside, Ilford Essex.

3rd October: The British Koi-Keepers Society—11th Anniversary celebration at the Leicester Centre Hotel from 12.30 p.m. onwards. Lectures will be given by Dr. David Ford (Feeding, etc.), Mr Austin Cartwright (Disease), and Mr. Roland Seal (Film on Koi). Dinner-dance in the evening. Contact R. Talbot (Tel Garboldisham 366.). Membership Sec. Mrs. C. Mullins, "Woodlands," South Avenue, Langdon Hills, Basildon, Essex.

4th October: Newbury and District A.S. open show at the Corn Exchange, Market Place, Newbury, Berks. For more information contact the Show Manager, Robin Canning, 6 Southend, Cold Ash, Newbury, Berks. (Tel: Thatcham 64254).

4th October: A & D Fishkeepers first open show at the Sutton in Ashfield Social Service Centre, Hillocks School, Sutton.

11th October: British Cichlid Association convention at the Meeting Rooms, Zoological Society of London, Regents Park, 2.0 p.m.

11th October: Darwen A.S. open show in the Library Theatre Darwen., Details from Secretary Derek Gow, 95 Greenway Street, Darwen.

11th October: South Leeds A.S. open show at Hunslet Boys Club, Hillidge Road, Leeds 10. Benching 12-2 p.m. Schedules from R. Day, 3 Beulah Mount Woodhouse, Leeds Ls6 2JZ.

17th October: East London Aquarists and Pondkeepers Association open show at Catterel, Cecil Road, Chadwell Heath, Essex.

18th October: Wyre Forest A.S. open show. Show secretary Charles N. Bankerville.

18th October: Bethnal Green & Independent A.S. first open show at Windsor Road School, Windsor Terrace, East Ham, London, E.6. Further details and schedules from Mr. J. A. Bowen, 46 Airthrie Road, Goodmayes, Ilford, Essex IG3 9QU (Tel: 01-599 8232).

NOVEMBER

1st November: Halifax A.S. open show. Benching 12-2 p.m. Schedules (s.a.e. please) from David Shields, Cobblestones, Gaisest, King Cross, Halifax.

7th 8th November: British Aquarists Festival at Belle Vue, Manchester. Details and schedules from John Hall, 54a Carr Road, Calverley, Pudsey LS28 5RU

8th November: Bradford and District A.S. open show at Textile Hall, Westgate, Bradford. Details and schedules can be obtained from the show secretary, Mr. A. D. Fisher, 2 Sherbourne Road, Idle, Bradford (Tel: Bradford 624160).

21st November: Goldfish Society of Great Britain general meeting, 2 p.m., Conway Hall, Red Lion Square, Holborn, London.