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AQUARIST

AND PONDKEEPER

FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924

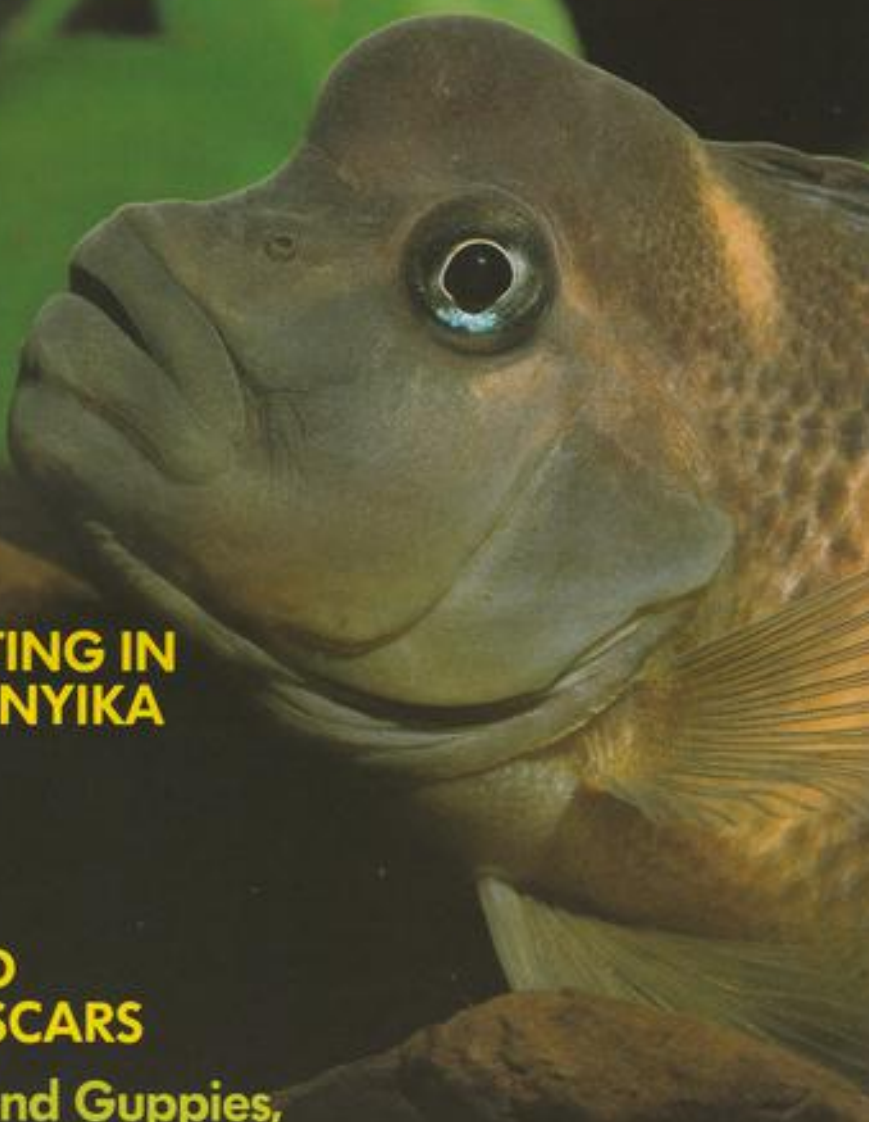
FISH COLLECTING IN LAKE TANGANYIKA

Fish for the
invertebrate
aquarium

KEEPING AND BREEDING OSCARS

Sticklebacks and Guppies,
past and present

EXCITING JOHN ALLAN COMPETITION



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Cover Story

Photograph by
Arend van den Nieuwenhuizen

The Lionhead Cichlid or Lumphead (*Steatocranus casuaricus*) is a 4 in. (10 cm.), relatively shy, peaceful fish, despite its aggressive appearance. Although both sexes show evidence of a hump over the skull, this structure is far more pronounced in males. The individual shown in our photograph is a youngish male — older ones carry even larger and, more impressive, "frontal gibbosities". Hard alkaline water, at around 75-82°F (24-28°C), suits this cave-spawning species best. The eggs, unusually, are light-sensitive and must be kept in darkness at all times.



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FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924

SEPTEMBER 1986 Vol. 51 No. 6

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The delight of seeing Keyhole Cichlid eggs was quickly followed by utter despair when the pair decided to make a meal of them.

IT'S THE WRONG TIME, AND THE WRONG PLACE . . .

By Amanda Grimes

In January of this year, I heard that a friend of mine was shutting down his three-foot community tank and was offering it, complete with equipment and stock, to anyone who was interested, free gratis! I leapt at the chance and, within the week, the tank was installed in my tank room.

As my friend's interest in fish had been overtaken by his commitment to amateur radio, his tank was pretty well covered in algae and had a motley selection of inhabitants. Having identified one Golden Barb, one Black Neon and one Red Mountain Minnow, our first job was to buy some companions for these shoaling fish. The algae were swiftly dealt with by introducing twenty juvenile *Ancistrus*, who set to work with a will, and the tank was soon sparkling. I was delighted with this unexpected and generous windfall, as it brought me two bonuses I'd set aside as future luxuries — another power filter and some new Kribensis. The latter were the most brilliantly-coloured I'd ever seen and, with two females for the male to choose between, the chances of breeding them looked good.

We left them to settle down in the three-foot aquarium and decided to set up a breeding tank for them in the summer. Well, that was the plan. Meanwhile, in the four-foot community tank a drama was building. The male *Nasacara anomala* and his three consorts were being mercilessly bullied by the Keyholes and we had to move them out. The only tank available was the new one, by which time the poor fish

were so demoralised that we felt the Kribensis might take over from where the Keyholes had left off, so it was a straight swap and the Kribensis were duly ensconced in the four-foot aquarium.

To encourage the male to establish a pair bond with one of the females, I jammed a small plant pot up against the side glass, effectively cutting off any outlet for my curiosity and leaving me feeling like Pandora. "Patience," I told myself, "Stay away from them." And I did, to the point where I was completely unprepared for what happened.

For several weeks, my attention had been drawn to the Keyholes, another of my past 'breeding' failures. Two of them were showing a great deal of interest in an extremely large piece of bogwood at the opposite end of the tank to the Kribs. My subsequent delight on witnessing egg-laying was matched only by my despair of removing the wood from the tank with a sufficient covering of water to save the eggs. The problem was solved by the next day, when I found that these wayward fish had eaten all the eggs.

While I was kneeling in front of the tank, weighing up whether to remove the wood and put in more rock, my eyes focused on a very irate male Kribensis, turning this way and that on the 'motorway' rock at the front of the tank. His colouring was high and his fins were spread to bursting point. He was threatening me! Not wishing to upset him further, I withdrew from his immediate

view and watched . . .

To my amazement, about thirty small pieces of gravel rose up in a shoal and followed the male to the back of the tank! So much for patience. The fry were well-grown, some of them as much as 10mm long, with all their fins formed. They must have been happily sorting through the gravel for a couple of weeks under the watchful eye of their father — the female was still in the flowerpot.

What to do? We investigated the flowerpot but found no further fry, only a very indignant female. So they were all out — in the community tank — with four Keyholes, a *Pimelodella*, four large Characins and various other predators. On the good side, the threats of the male had cleared one half of the tank of all fish. On the other hand, we had tried for years to breed Kribensis and we really wanted those fry. So we compromised. We left them in the charge of their father for three more days.

Do fish get bored or careless? Or are fry like children, reaching the point where obedience comes second to adventure and curiosity? By the fourth day, the fry were spreading across the tank and the male was fast losing control or interest. So we decided to intervene. We set up a two-foot tank with water from the community tank and managed to syphon out thirteen youngsters. If you've ever tried to rescue fry from a community tank, you'll appreciate the difficulty! Accompanied by cries of: "There's one, quick!"; groans of "Missed it, you idiot, get your finger off the end of the syphon pipe," and "Get ready, there's one coming out of the plant there," we spent a frantic afternoon on our rescue mission. So much for that lazy, hazy 'Gone Fishing' song . . .

All that activity was back in April. The fry are still growing well, nourished by a mixed diet of flake food, concentrated liquid food, mosquito larvae and frozen bloodworm. We have what looks like a very promising male, who will make a good partner for our 'spare' female. I have, however, two questions which maybe the experts would like to enlarge upon . . .

Dominance among the young fish was very quickly established. One of the fry seemed to take over as soon as they were given their own aquarium, chasing the smaller fry away from the food. Their numbers have gradually dropped to nine survivors. Was this a result of this dominance, or simply the natural eradication of the runts? There was no sign of disease.

Secondly, how does the father control the fry? With females, I have observed the brood care colours, but the male Kribensis didn't appear to take on any set pattern. I spent a lot of time studying him and noticed several quick body movements, but they were so rapid that it was impossible to isolate the 'return' signal. Is it body language or scent?

On a more flippant note, as soon as I first saw the fry, that old song came to mind: "It's the wrong time, and the wrong place . . ." But after years of failure, those words sum it all up: "But it's alright by me" . . .



The Fifteen-spined Stickleback is the largest British species and is entirely marine. It favours inshore waters and I've caught them at Portsmouth. As with all sticklebacks, the spines are only erected when the fish is aroused.

STICKLEBACKS

Occupying both fresh and saltwater, Sticklebacks are among our most versatile native species, as Dr Michael Benjamin of University College, Cardiff, demonstrates.

The word 'stickleback' is probably a corruption of the older term 'prickleback', for the best known feature of the fish is the sharp dorsal spines that protect them. These spines have caused the death of fishes that swallow them, and even of ducks. There are a number of species — all belonging to the family Gasterosteidae and all confined to the Northern Hemisphere. Three are found in Britain — the Fifteen-spined Stickleback (*Spinachia spinachia*), the Three-spined Stickleback (*Gasterosteus aculeatus*) and the Nine- (or Ten-) spined Stickleback (*Pungitius pungitius*).

Sticklebacks are often extremely abundant. According to the late Professor Nilsson, *Gasterosteus* assembles in enormous shoals on the shores of the Baltic during November, where local fishermen used to catch them by the boat load, extract their oil and use any refuse as manure. Once every seven years amazing shoals of sticklebacks appeared in the Welland at Spalding and came up the river in a vast column. Dr. Gunther once wrote: "The quantity may, perhaps, be conceived from the fact that a man employed in collecting them, gained for a considerable time, four shillings a day by selling them at the rate of a halfpenny a bushel". Now, a bushel is eight gallons and with twelve old pennies to the pound, he must have sold 768 gallons of sticklebacks per day. That is a mind-boggling number of tiny fish caught by one man in a single day, let alone over an extended period. I've no idea whether such shoals still appear at Spalding (or, indeed, anywhere else), but I would be most intrigued to hear from any reader who does. There is a somewhat amusing tale in one of my 19th century fish books of how one was served out with the afternoon milk in a house in London. The

only excuse offered by the salesman was that he had failed to strain the water!

Sticklebacks have certain features in common. They are fairly elongate fish with two dorsal fins. The first of these bears a number of sharp spines and the second is similar to and opposite the anal fin. The pelvic fins are reduced, but each has a pointed spine. This spine is particularly



The Nine-spined Stickleback is more timid than its three-spined relative. When hungry, it spends much time exploring the bottom for food, with its body tilted at a characteristic angle. This fish is a breeding male and has white pelvic spines (arrow).

striking in male Nine-spined Sticklebacks in breeding condition, for it is a flashing white and contrasts with a body that is sometimes jet black. Traces of white persist throughout the winter and can be useful for sexing the fish. It may interest you to know that in 1958, Desmond Morris (of 'The Naked Ape' and 'Zoo Time' fame) published a substantial (154 pages!) and fascinating scientific paper on the reproductive behaviour of *Pungitius*, while he was at Oxford University.

In general, the jaws of sticklebacks are small, but armed with many teeth, and these pygmy-sized fish are among the most active, voracious and persistent of British teleosts. They can nip the fins of large fish and greedily devour any eggs and fry. It has been recorded that a small, Three-spined Stickleback kept in an aquarium ate 74 young Dace (about a quarter of an inch long) in 5 hours. Two days later, it swallowed a further 62. They are obviously detrimental, therefore, to the successful breeding of any fishes with which they live. Although lacking scales, they often have a protective armour of bony plates on each flank. In *G. aculeatus*, the varieties that live in the sea have more plates than those inhabiting freshwaters.

Certain behavioural traits are also the hallmark of sticklebacks and I shall mention a few. With practice, you can spot these fish in their natural waters by the way they swim, for they rely more on their pectoral fins than their tails (particularly *Pungitius*, which has a more slender caudal peduncle than its three-spined relative). In aquaria, *Pungitius* spends much of its time hovering, so that it stands still in the water. All sticklebacks are accomplished nest builders and the male does the work! Spine-raising is an important response to predators — its major enemies (other than man) include the

Pike, Perch and Kingfisher. There is an interesting behavioural difference between three- and nine-spined fish, for the latter is less willing to confront a predator and more likely to hide in the weed. Perhaps its spines offer less protection than those of *Gasterosteus*. All this in turn may explain why *Pungitius* build a nest that is off the bottom and hidden among vegetation.

Some sticklebacks (e.g. the Fifteen-spined Stickleback) are confined to the sea; others are common in brackish or freshwater. But to some extent all are euryhaline (i.e. having the ability to tolerate waters of different salinities). The only ones found in British freshwaters are the Three- and Nine-spined sticklebacks. Both are largely ignored by fish keepers even though the former is the best-known freshwater fish in Europe. This is a great pity, for they are both interesting and easy to keep and a male *G. aculeatus* in full breeding regalia is a beautiful fish. It spawns between March and July, and develops a bright red throat and belly and striking blue eyes. You can bring an adult male or female into breeding condition at any time of the year provided you give it a long day-length (about 16 hours of light) and a suitable temperature (20°C). Aquarium males will stay in breeding condition for three months and females for two. If well fed, a large female will spawn about 20 times a season. This fish has attracted the attention of the Oxford Scientific film crew who have recorded the most magnificent film of its nuptial habits. The film appears from time to time on our television screens and you should not miss any opportunity to see it. When the breeding season arrives, the male stickleback stakes out a territory and makes a nest on the bottom in which his mates deposit their eggs. He builds the nest from debris and glues it together with a sticky secretion from his kidneys that acts as a mortar for the vegetable bricks. Watch him rub his vent against the nest with his



All sticklebacks are good nest builders. Here, a male, Three-spined fish is arranging its nest and tidying up some loose ends.

head pointed upwards and the rear of his body flapping at great speed. From time to time, he tests the strength of his work with strategic tugs and eventually turns it into a barrel-shaped affair that looks like a wren's nest. He plasters the inside and then a wooing goes! His fair lady declares her intent with all sorts of queer contortions; he escorts her home with tender caresses and she deposits her eggs in his nest. He follows and fertilises these eggs, but then his true moral values are exposed, for he seeks a whole succession of lovers and introduces each in turn to his nest until it is filled with eggs and milt. He guards the nest fiercely, fends off all assailants (particularly other males that try to raid the nest) and fans the eggs to ensure their adequate aeration.

When they hatch, he cares for the young until they can fend for themselves. Here too, he is a model parent, for if his offspring rise above a certain height from the bottom or move too far from the nest, he seizes them in his mouth, brings them back and gently puffs or jets them into place.

Catching sticklebacks is kid's stuff! You can even find them in Central London. All you need is a fine meshed net and a plastic container with a water-tight lid. The net must be strong, for Nine-spined Sticklebacks live in weedy waters. I use a two-piece shrimping net that I bought for about £12

This male Three-spined Stickleback is using its snout to prod the nest into shape.

Stickleback nests are held together by a sticky secretion from the kidneys. This fish is rubbing its vent against the nest to ensure that its glue is properly spread.



in Brittany eight years ago. It is sturdier than a landing net and has served me well. Look for freshwater sticklebacks in field-drainage ditches, backwaters and ponds rather than in the fast-flowing rivers and streams. Fish near the bank. At a good site, you should catch at least a dozen fish in a quarter of an hour and also have fun identifying the water beetles and boatmen, snails and leeches that you will probably find as well. Although it can be a source of great pleasure to take these other animals home and watch them, you would be well advised to put them in a separate tank — the water beetles and boatmen can attack the fish and the leeches and snails breed like fury. You can put the fish in a garden pond, but then you may not see much of them. They are best observed in an unheated indoor tank with a sand or gravel bottom. If you are keeping *Pungitius*, give them lots of vegetation, for they are less keen on open waters than *G. aculeatus* and do not nest on the bottom. Desmond Morris recommends willowmoss, water milfoil, tape grass, the various species of *Hydrophila* and *Nitella gracilis*. Both sticklebacks are widely tolerant of different water conditions (and have often attracted the attention of scientists for this and other reasons) and eat virtually anything. They are particularly partial to livefood and minced beef. However, do be careful not to give them a temperature shock when you first collect them, for even unheated tanks may be much warmer than the water from which the fish came. They can be heavily parasitised. The fish louse *Argulus* and the tapeworm *Schistocephalus* are common in *G. aculeatus*. Indeed, you may mistake a stickleback infected with *Schistocephalus* for a gravid female, as the abdomen of parasitised fish can be greatly distended. It may relieve you to learn that *Schistocephalus* affects very few species. If you get any problem keeping the fish for long periods, try putting them in one third strength seawater.

In my local populations of Three- and Nine-spined Sticklebacks, the fish rarely exceed two inches in length or live longer than three years. They become sexually mature in their first year and the fry quickly reach adult size (in under three months in *Pungitius*). I usually reckon on finding the largest fish between March and May, but many of these die after the breeding season.

Letters

The Tiger Perch . . . or is it the Pirate Perch?

I was most intrigued with the reference made to a certain rather unusual species of North American fish in the coldwater section of the 'Your Questions Answered' column in the June issue of the *Aquarist*. The fish in question is the 'Tiger Perch'. The name Tiger Perch strikes no chords with me and, having a considerable library of books on the subject of North American fishes, I can reasonably assume there is no fish of that particular name, having seen no reference to it in any of them. The actual species referred to in your magazine, i.e. *Aphrododermis sayanus* is commonly known as the Pirate Perch and it has a much wider distribution than indicated. True, it is found in the southern states of the United States of America, but it is equally distributed in the north throughout the southern ends of Minnesota, Wisconsin and Michigan, eastward to New York and into Canada. I have made several 'fish safaris' to the U.S.A. over the past twelve years and, on occasion, have caught this fish; each time in the Pine Barrens of New Jersey. Needless to say, I have imported several species, this particular one included.

Your temperature reference is misleading, to say the least; electric light bulbs are hardly necessary to ensure it has a reasonable temperature. 65 degrees F? It requires no such limitation. In actual fact, my charges comfortably endured temperatures down to freezing and, in view of the part of the

OPEN INVITATION

We are always pleased to receive your views, comments and opinions on features published in *A & P*. We also welcome letters on any aquatic topic would benefit from public airing. If you have strong feelings about any aspect of the hobby, then don't hold them back — write to us. We will regularly publish a selection of the most interesting letters on this page. All correspondence should be addressed to **Letters Page, Aquarist & Pondkeeper, 58 Fleet Street, London, EC4Y 1JU.**

world they came from, it was essential they were wintered properly. My coldwater fishes are in a fish-house without heating and my prime concern when the temperature does drop to near freezing is to ensure that very little ice forms on the aquarium glass; the fishes can look after themselves. I do not, however, advocate a subjection of my charges to the frozen conditions of my outside ponds!

Although I was able to keep Pirate Perch for a number of years I failed to breed them. I admit I didn't try particularly hard, though the water conditions were never to my advantage; Portsmouth water is very hard and this particular species is used to soft, acid water. It lives in swamps, ponds, ditches and muck-bottomed pools of low-gradient creeks and small rivers. It appears to be a quiet, retiring predator of nocturnal inclination, feeding largely on insect larvae and the like, and occasionally on small fishes.

The coloration described in your magazine is also misleading. It appears more descriptive of a distantly related species, the Trout Perch, *Percopis omiscomaycus*. The actual colour of the Pirate Perch quoted in my books is iridescent purple to black and my specimens were more inclined towards the latter. Incidentally, there are no markings worthy of note apart from a dark vertical bar

on the caudal peduncle and a pronounced 'tear drop' beneath the eye. Yes, the head is large, the lower jaw does protrude and the fish, as in the case of the Trout Perch incidentally, grows to a length of about five inches. There is, however, one remarkable feature of this species which has been overlooked. I refer to the position of the anal vent as it approaches adulthood. When born, the anal vent is in the conventional position, i.e. immediately in front of the anal fin but, as the fish develops, it progresses forward to a final 'resting place' directly beneath the gill cover. This, of course, is reminiscent of the eye transfer as seen in flat fishes like the Flounder and Plaice.

On the subject of keeping this species, a tank in a relatively dark position would be preferred and frequent water changes are totally unnecessary, provided, of course, there is an abundance of aquatic plants. *Sagittaria subulata natans*, which doesn't necessarily require a lot of light, is ideal.

Finally, on the subject of availability I would be most surprised if the Pirate Perch is ever on sale at all unless a couple of specimens arrive occasionally in a consignment of Goldfish purely by accident!

V. B. Hunt,
Widley, Hants.

Editor's Note

Common names have always constituted a major source of confusion, particularly where unusual or rarely seen species are concerned. Nevertheless, whether you call this fish the Pirate Perch or the Tiger Perch, it is a most interesting species indeed. We are grateful to Mr. Hunt for his comprehensive, informative letter which probably represents the most extensive piece ever published on *Aphrododermis sayanus* in a popular aquarium magazine.

Toads and the Law

We have two largish, plastic-lined lakes at our Organic Gardening Demonstration Centre and Research Station which we would like to stock with toad tadpoles. Is this feasible and, if so, is it possible to buy toad tadpoles?

Since toads have a homing instinct, we would like to establish a population which will return to our lakes every year. Do you know at which state the homing instinct develops?

Neither of our lakes will be stocked with fish and there will, of course, be no spraying of any kind.

Lawrence D. Hills,
H.D.R.A.,
Ryton-on-Dunsmore,
Coventry CV8 3LG.

Editor's Note

Mr. Hills' letter raises some very fundamental issues concerning the Law and the necessity to follow proper procedures when dealing with native wildlife. We passed his letter on to Eric Hardy, author of our Naturalist's Notebook series and highly respected authority on British natural history, for his comments. He points out that:

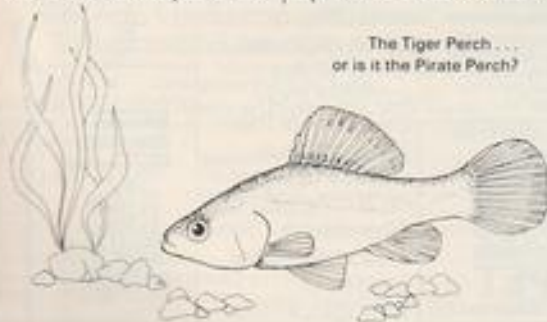
1. It is illegal under Schedule 5 in Section 9(5) of the Wildlife and Countryside Act, to sell toads or their tadpoles.
2. Licences either to collect some specimens or have some allocated form surplus stock, must be applied for by writing to The Nature Conservancy Council.

In Mr. Hills' case, his nearest department would be:

Nature Conservancy Council,
West Midlands HQ,
Attingham Park,
Shrewsbury SY4 4TW.
Tel. 074 377 611.

The Regional Officer is Mr. J. A. Thompson.

3. The breeding locality for homing is imprinted on young toadlets when they leave the pond in autumn. Therefore, spawn or tadpoles should develop into toads which will return to the rearing pond.



The Tiger Perch . . .
or is it the Pirate Perch?

FISH IN THE INVERTEBRATE AQUARIUM

Fish and invertebrates can live happily together — as long as you follow the rules. Experienced marine aquarist and photographer, Tim Hinitt, explains how this can be done and introduces suitable species for the mixed community.

After some success in keeping fish with invertebrates in my small twelve-gallon aquarium, I decided to attempt things on a larger scale in my thirty-gallon tank. The latter had never had much success with fish only as, I suspect, it was in fact too small for the size of fish that I had attempted to keep in it. Species such as *Bodianus*, *Pomacanthus* and a large *Centropyge flammeus* were probably too large for the water volume to support properly.

The existing set-up

For some months the tank has been sustaining, very successfully, *Radianthus*, *Stoichactis* and *Comelyactis* anemones together with *Periclimenes* shrimps, *Stenopus hispidus* and several shrimps that do not appear in the books that I own. There are also two Violet Spotted Lobsters in the tank. These latter would appear to be *Enoplometopus debilius*, a very attractive, small, peaceful lobster covered with violet spots and a definite asset to any invertebrate tank.

Having experienced good results with the small twelve-gallon aquarium it was decided to employ a similar filtration system. This comprises a very straightforward under-gravel filter with Calcium-plus as the basic medium above the filter plates, coarse gravel on top of this and finally a one-inch layer of coral sand as the surface medium, the whole substrate being some four inches deep.

However, in the larger of the two aquariums, power heads are utilised to pull the water through the gravel. They have a high turnover of some 120 gallons an hour but, as they do not aerate the water, a lime wood airstone is also employed. An external power filter is not used as this appears to affect the water quality adversely unless it is cleaned out every one or two weeks. There is a very marked rise in nitrate levels (Merck test) if the filter is not stripped down regularly.



Above, unidentified Blenny, probably a species of *Esocenus*.

Choosing the fish

It was a difficult decision to decide what species of fish to keep in the tank, as anything much over two inches long would probably be a threat to the smaller species of invertebrates and might possibly grow to be much larger. After consulting many publications and local dealers, I decided that I would largely have to rely on my own experience and the help of one particular fish shop in Bedford.

I decided that the tank should have no more than four small fish and that they should be placed in the aquarium all at once to prevent any territorial squabbles with further additions. This meant considerable travelling within my local area to find suitable species as no one dealer seemed to have four specimens that would be likely to



get on with each other and not eat the invertebrates as well.

The Cherub Angel

My first visit, in Bedford, produced



Left, *Centropyge argi* is small, beautiful and not usually aggressive to other forms of aquatic life (other than members of its own species).

Left below, the Chalk Bass (*Serranus tortugarum*) is a peaceful member of the Grouper family.

reportedly quite difficult for collectors to catch and, therefore, commands a fairly high price. Despite the fact that it is caught in deeper waters it acclimatizes well to the aquarium and is very easy to feed on brine shrimp, blood worm and even flake foods.

It is of a dark blue colour with a yellow head and is a very attractive fish for the smaller aquarium. However, no more than one may be kept in a small tank as they are very aggressive towards each other. Although I have attempted to keep them in pairs I have never succeeded. Some publications recommend them to be kept together but, in my experience, they are incorrect in this conclusion and, inevitably, fights will occur. However, *Centropyge argi* is only very mildly aggressive towards other fish and will not bother most invertebrates, apart from certain species of tubeworm. As tubeworms were not to be included in the tank this was of no importance.

The Chalk Bass

Another specimen spotted in the same dealer was the not often seen Chalk Bass (*Serranus tortugarum*) from the Virgin Islands. This very attractive small fish also inhabits deep water, down to 1,000 ft. and more. Although a member of the Serranidae, this mini grouper, growing to no more than three inches, is in fact a very gentle creature. Not at all like some very much larger members of the same family that we often see featured on our T.V. screens.

The Chalk Bass is primarily a plankton feeder, hovering above some safe spot on the reef and darting out to capture small items of prey. It is of a pink colour with blue blotches liberally spaced on its flanks and, together with its violet-tinted eyes, makes a very attractive addition to the aquarium. Although a member of the Grouper family it is not in the least aggressive towards smaller fish and can be kept quite safely with invertebrates half its size. Like the aforementioned *Centropyge*, it feeds readily upon either live or frozen brine shrimp and blood worm. My particular specimen is not so keen on flake food.

Unidentified Blenny

After much travelling I came upon one of my favourite fish. I think every aquarium should contain at least one species of blenny. They are such interesting little fish in that they seem to display a remarkable degree of intelligence. Unfortunately, they are very aggressive towards each other and, like the *Centropyge*, only one should be kept in the small aquarium; unless, of course,

you are lucky enough to find a true pair. I have been unable to do so in twenty years! The fish that I purchased looks very much like *Esocemus bicolor*, one of the commoner blennies offered for sale, but it is, in fact, a different species as it lacks the cirri on the head and is of a different colour in the caudal region. Also, unlike *Esocemus bicolor*, it does not eat algae to any great extent. However, it shows a similar basic coloration in that it is black on the head and lemon yellow posteriorly. Like all blennies, it shows a great liking for brine shrimp and will also eat a good quality flake food very willingly. It has never shown any desire to harm any of the invertebrates and, to my mind, is the ideal fish for the invert tank. It is a pity that they are not more readily available.

The inevitable Clown

My fourth and last fish was located at a dealer near Milton Keynes. An *Amphiprion sebae*. This particular clownfish, hailing from the Maldives and Andaman islands, is one of the more peaceable varieties and, being slow-growing, should not be too much of a problem for a couple of years. It must be said that a large clownfish can be very aggressive and also destructive towards invertebrates, especially small species of shrimp, such as *Periclimenes*. A clownfish is almost a must for an aquarium containing anemones as the relationship between the two is one of the most fascinating in nature. If you are lucky enough to obtain a pair of clowns, breeding is quite possible but this will be to the detriment of the other fish in the tank as the clowns will certainly attack them. *Amphiprion sebae* is usually symbiotic with the anemone *Stichodactyla* but in the aquarium it will readily travel between the species available to it without any apparent harm.

The Pyjama Wrasse

There is one more fish that deserves mention and is, in fact, one that I keep in the twelve-gallon aquarium. This is the Pyjama Wrasse (*Pseudocheilinus hexzonus*). This lovely little fish comes from the coral atolls of the Central Pacific but is not often seen offered for sale in any quantity. It is quite safe to keep in company with larger invertebrates and anemones but I would not trust it with some of the finer corals and tubeworms. It rarely grows larger than about 1½ in. long and has the most beautiful coloration — red and blue stripes and green finnage.

There are many more species of fish that will readily mix with invertebrates to provide a fascinating display. For example, Pipefish and Seahorses are very obvious choices for the invert tank.

A few fish moving amongst a background of living coral, to my mind, provide the complete aquarium. The two go together extremely well and allow us to provide the enchanting picture of a living reef in our homes.



Above, the Pyjama Wrasse can be kept safely in the company of larger invertebrates. (Thanks are due to Mr. Fish of Bedford for allowing me to photograph this specimen in his display tank.)

Left, *Amphiprion sebae* (this is a young fish) will travel readily between species of anemones.

Centropyge argi, a delightful Angelfish that remains below three inches in length and is not generally aggressive to other creatures. This fish comes from the Caribbean and is to be found at considerable depth on the outer reef slopes amongst coral rubble. It is

GUPPIES

PAST AND PRESENT

In 1859 a fish was described by science which was to become one of the most popular aquarium fish in the world today. In the wild this fish has a myriad fin and colour variations unrivalled by any other species. However, once dedicated aquarists who were prepared to work for years perfecting their own strain of a species obtained this amazing little beauty, then anything was possible and still is. I am, of course, referring to the Guppy.

Whilst Peters was responsible for the scientific naming, it fell to Günther of the British Museum (Natural History) to christen it with its common name. When the Rev. Guppy sent Günther several living pairs collected in Trinidad he decided to name them *Girardinus guppyi*, in honour of the collector. This scientific name did not stand the test of time, but the shortened version Guppy did. We can see much the same thing happening in the livebearer world today with *Ilyodon nana* becoming known as the 'Xantusi'.

Because of the Guppy's variability in nature many different scientific names have been ascribed to it as the following list of synonyms show:

Lebistes poeciloides de Filippi 1861.
Girardinus guppyi Günther 1866.
Girardinus reticulatus Günther 1866.
Lebistes poeciloides Günther 1866.
Poeciloides reticulatus Jordan and Gilbert 1883.
Heterandria guppyi Jordan 1887.
Acanthophaelus reticulatus Eigenmann 1907.
Acanthophaelus guppyi Eigenmann 1910.
Poecilia poeciloides Langer 1913.
Lebistes reticulatus Regan 1913.
Glaridichthys (Girardinus) reticulatus Milewski 1920.

However, in the final analysis the name stands as it was first given, *Poecilia reticulata* Peters 1859.

Even more recently mistaken identity has caused problems on the show scene. All of a sudden along came 'Ender's Livebearer'. This is a small Guppy-like livebearer which breeds true to colour and fin type. Some hobbyists claimed it was a member of the *Micropoecilia* genus to explain its diminutive size. To clarify the position S.L.A.G. (U.K.) gave specimens of this species to their Vice-president, Jim Chambers, of the British Museum (Natural History) who confirmed

The Guppy enjoys less respect today than it was once accorded when its potential for various colour patterns and tail shapes was first appreciated. Derek Lambert provides a brief history of this prolific livebearer.

that not only were these specimens Guppy-like but they actually were Guppies.

For a long time the Guppy was known as *Lebistes reticulatus*. This genus was set up by de Filippi in 1861 but was lowered to the status of Sub-genus by Rosen & Bailey in 1963. This sub-genus contains 6 species all of which have in common certain physical characteristics of the gonopodium and a high degree of colour variation amongst the adult males.

Guppies range through a large area north of the Amazon including some of the Caribbean islands. Since the species was first imported it has been recognised as a possible means of controlling malaria-carrying mosquitoes which infest vast sections of the old British Empire. It was for this reason that the Zoological Society bred stocks for distribution to many parts of Asia and Africa in the early 1900s. Now almost anywhere where the climate is suitable the Guppy has found a home.

The first Guppies to be kept purely for ornamental reasons were probably shipped to Germany in 1909. These were very dull by modern standards with only a few spots and the odd stripe of colour in the males. The females were even more drab, being a

dull grey to brownish colour with a few iridescent scales along the sides. Occasionally a good female would have a few black or yellow markings in the tail. Breeders selected the brightest coloured males and females and bred from these. Slowly over a period of years the colours were improved. The hybridisation of different wild populations proved a major step forward, with the male fry exhibiting vastly improved coloration over a greater area of the body. Fins also were being altered at this time, breeding being from those fish having the largest fins. Almost from the beginning aquarists were trying to breed the Guppy to certain standards. The first of these were laid down in Leipzig in 1920 incorporating characteristics principally designed for exhibition purposes. Today some 13 standard fin varieties of male guppy and 3 standard fin varieties of female guppy are recognised.

Every so often the Guppy springs a surprise on the unsuspecting hobbyist. It produces what is known as a sport or mutation unlike anything that has gone before. Some of these have proven to be milestones in the development of the modern Guppy. Just such a milestone occurred in a Swedish aquarist's tanks in 1934. He found a gold coloured baby in amongst a brood of normal grey babies. This was the first time anyone had seen a Gold Guppy and it was from this fish that all of the present-day Gold Guppies are descended. This sort of sport is something that every Guppy enthusiast should be on the lookout for. It can happen anytime and anywhere and if the aquarist concerned either does not spot it or fails to breed from it, then it may be decades later when the same sport occurs again, if at all.

It was not until the 1930s that things really started to move in the Guppy world. 1938 was a momentous year in that it saw the first specialist Guppy Society in the world being formed in London. This was the Federation of Guppy Breeders Societies. In 1954 the 1st International Guppy Show

Top right: Nowadays female Guppies can be as brightly coloured as some males. Right: Fancy Guppies come in all shapes, colours and sizes. This variety, the Pingo, is now quite rare in Britain.



D. BARRETT



D. BARRETT

For items that are so intrinsically essential to tropical aquarium keeping, heaters have changed remarkably little in the last 30 years or more. Some experiments have come and gone, and new electrical regulations caused a slight rethink, but designs remain essentially the same.

With very few exceptions, aquarium heaters are still constructed of a wire heating element wound onto a ceramic or other support, and encased in a tube. Even the tube is still glass in most cases, as it was all that time ago when the electric heater industry must have been a major consumer of laboratory test-tubes.

Separate units

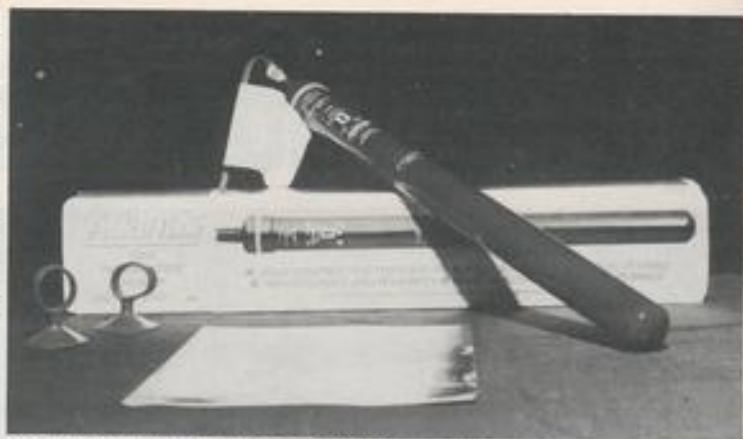
However, I would say that the combination of the old and some new ideas has produced some very good modern heaters, and especially combined heater/thermostats. These latter have now become so popular that there are relatively few producers of separate heaters and separate thermostats, but UNO is the first firm that springs to mind here. A range of heaters from 25 to 200 watts is available, both in heavy duty glass tubes, and in a resin-coated aluminium tube. The latter are a fairly robust option, but the metal tube, albeit coated, means that the heater would be best not used in a marine environment. The new black coating on these heaters, the UNO Regal range, does seem extremely tough.

To have separate heaters, you also need a separate thermostat. Here again, UNO provide the types that would be my first choice. The **Silk-Stat**, with its metal plate that presses against the outside of the aquarium has been around for years, and is extremely reliable. As a 1 kilowatt rated model is available, several heaters could be run from this, for a very large tank, or a bank of identical smaller ones.

The **UNO Nova** thermostat is a very neat newcomer, an electronic model with no moving parts. It has a sensor that dips in the aquarium water itself, although the stat stays out of the water. Very accurate, and with a heater failure warning light, this seems good value at about £18. UNO have responded to earlier criticism of this newcomer by offering a 2 year guarantee.

Combined units

Combined heater/thermostats have taken over for the majority of aquarists: they certainly avoid the joining of wires near water, and the very good ones have masses of cable to get well clear of the tank. They are also nowadays generally extremely reliable, although possibly not quite so long lasting as some of the separated units that I still see around after 10-15 years service. The very best of the "old-fashioned" heaters used to be filled with dry silica sand to dissipate the heat in the tubes. Nowadays, my favourite heater/stat (**Jaeger** — rarely available unfortunately), and my number 2 choice, **Atlantis**, are sand filled. The



Atlantis heater thermostat, sand filled for reliability and robustness.

PRODUCT ROUND-UP

Ian Sellick looks at the variety of tank heating equipment

HEATERS

Atlantis range encompasses 5 models, from 100 to 300 watts, in green glass tubes with a clear area for the inevitable neon tell-tale. The **Atlantis** heater/stats are also one of the makes that have a sensible cable length. I used a 300W unit in a 2 foot deep tank with no problem at all in getting the cable well away from the water. Supplied complete with two good rubber suckers (which must be placed on the marked points on the tube), the **Atlantis Thermostatic Heaters** are extremely competitively priced.

Hagen have recently introduced the **Thermal Compact** range of heater/stats; relatively small, the 50 and 100 watt models being under 10" in length, and very thin, the 150 and 200 watt ones being just under a foot in length. In this respect they are similar to the small **Rena** and **Interpet** models, but possibly even slimmer. The last **Hagen** model I tested a couple of years ago is still going strong, and these are easy to adjust, with a small dial at the top of the unit, a big plus in my book!

Finally, to **UNO** again, who produce both glass cased (**Reliant**), and resin coated aluminium (**Supreme**) models, the latter having the thermostat section encased in green polycarbonate, a tough transparent plastic. I have had a new-style **Supreme** on test for nearly a year with absolutely no apparent problems, the coating on the aluminium is still in very good condition, and this is probably the easiest of all those tested to adjust, with a nice chunky knob on

top that you turn directly (not through a flexible rubber sleeve).

Electronic units

Electronics have not made perhaps the impact many thought they would in this field. However, **Armitages** produce an electronic heater/stat in a tube. The main use is in external thermostats, as already seen with the **UNO Nova**. It is the up-market equipment manufacturers who make most use of electronic control, as exemplified by the excellent **Dupla** thermostat. The standard model has a 1 kilowatt capability with a probe that goes into the water itself. The **Duplatherm Digital** is the only thermostat I have come across that does everything, including displaying the actual temperature as well as switching the heater on and off. Finally, **Dupla** are one of a very few manufacturers to go away from tube heaters: theirs is a low voltage (therefore safe) flexible cable heater that is buried in the base of the tank, providing a gentle warmth to the roots of your plants. I am not sure it is entirely natural for heat to rise from the ground in an aquarium, but for those who like to get away from the run of the mill, but have high performance with safety as well, the **Dupla** is the choice.

Only now then are heaters for aquaria making the same sort of quantum leap that turning from gas jets to electricity must have seen all those decades ago!

News from the societies

Co-operative Aquatic Study Society Portsmouth

Affiliated to A. of A.
Supported by the Co-operative Education Committee.
Formed February 1986.
Meet 1st Monday every month at 8 p.m. at Co-operative Victory Rooms, 72 Fratton Road, Portsmouth, Hants.
Committee:
Secretary: Mrs. Jeanne Atkinson.
Chairman: Mr. Syd Dooley.

Treasurer: Mr. Dave Davis.
Social Secretary: Mrs. Donna Bailey.
Committee: Mrs. Betty Moulds, Mr. Richard Rogers, Mrs. Joyce Mannell.
Full details from the Secretary, 64 Talbot Road, Southsea, Hants. PO4 0HE. Tel: (Portsmouth) 737194.

Exeter & District Aquarist Society
The E.D.A.S. committee would like to extend sincere thanks to all the exhibitors, advertisers, traders and everyone else who

helped to make the society's 1986 Open Show such a resounding success.

Romford & Becontree Aquarists' Society

The committee of the above society would like to extend sincere thanks to all those who donated prizes for this year's Open Show, or who otherwise helped to make the day a success.
For further details of the society, contact Mr. S. Carter, 19 Coniston Way, Elm Park, Romford, Essex.

Diary dates

Nailsea & District Aquarist Society

The 1986 Open Show will take place on **Saturday 6 September** at the Scotch Horn Community Centre, Nailsea. Contact W. Holland, 47 Woodland Road, Nailsea, Bristol. Tel: (0272) 855950.

The East London Aquarist & Pondkeepers' Association

The E.L.A.P.A. will be holding its Open Show on **6 September** at the Catterall Hall, Cecil Road, Chadwell Heath, Romford. For entry forms, please ring Mr. K. Daily on 01-474 4912 or Mr. & Mrs. M. Howells on 01-590 1824.

St. Edmundsbury & District Aquarist Society

Full details of the St. E.D.A.S. Open Show scheduled for **7 September** are available from S. Forrest (Secretary), 70 Northumberland Avenue, Bury St. Edmunds, Suffolk IP32 6LS. Tel: (0284) 703735.

Huddersfield Tropical Fish Society

The new H.T.F.S. committee is as follows: Chairman, J. Duckett; Treasurer, E. Cheetham; Show Secretary, P. Town; Secretary, C. Muff; Public Relations Officer, S. Moorhouse.

The society's 1986 Open Show will take place on **Sunday 7 September** at Slaithwaite Civic Hall, Huddersfield. Contact the Secretary at 51 Wood Street, Longwood, Huddersfield HD3 4RF, for full details.

Salisbury and District Aquarist Society

S. & D.A.S. are attempting something different this year — a Catfish and Cichlid Open Show in conjunction with the society's Annual Open Show on **7 September**. There will be 14 Catfish and 14 Cichlid Classes in addition to the normal quota of Open Show Classes. Full details may be obtained from Mr Ivor Goddard (Club Secretary), 8 Pennys Crescent, Fordingbridge, Hants. SP6 1HN.

Bristol Aquarist's Society

The B.A.S. annual show will be held at St. Ambrose Church Hall, Stretford Road, Whitehall, Bristol, on **Saturday 13 September**. For full information contact the Show Secretary, I. Mildon, 87 St. John's Lane, Bedminster, Bristol, BS3 5AB.

Dunfermline & District Aquarist Society

The society's Annual Open Show will take place on **Sunday 14 September** at the Netherthorn Institute, Dunfermline. Fuller details from Mrs Pauline Hoey, 123 Station Road, Kelty, Fife KY4 0BL. Tel: Kelty 830051.

Ellesmere Port Aquarium Keepers' Society

The E.P.A.K.S. 1986 Open Show will be staged on **Sunday 14 September** at the Water World, Chester Hire Road, Nr. Burton, Cheshire.

12.00 noon - 2.00 p.m. Benching
2.15 p.m. Judging
Car parking space available. Contact Mr. L. J. Bowman (051 339) 6024.

Plymouth & District Aquarists' & Pondkeepers' Society

The 1986 P.D.A.P.S. Open Show will take place on **Saturday 20 September** at Trinity United Reform Church, Tor Lane, Hartley, Plymouth. Show Secretary: Mr. P. Smith, 5 Beech Avenue, Cattedown, Plymouth.

Blyth Aquarium Society

The B.A.S. second Open Show is being held this year at Ridley County High School, Blyth, on **Sunday 12 October**.

11.00 a.m.-1.00 p.m. Benching
1.15 p.m. Judging
Full details from the Show Secretary, Keith Stenton, 2 Kielder Close, Newsham Farm Estate, Blyth, Northumberland. Tel: (Blyth) 351163.

Northampton & District Aquarist Society

The 1986 Open Show will be held on **Sunday 21 September** at the Gladstone

Centre for the Physically Handicapped, Gladstone Road, Northampton. For details of the Show, which is being run in conjunction with the Disabled Drivers Association, contact Mr. & Mrs. B. Adkins (Show Secretaries), 179 Bush Hill, Weston Favell, Northampton NN3 2PF. Tel: (0604) 403300.

North East Federation of Aquarist Societies

N.E.F.A.S. will be holding its annual Open Show on **Sunday 28 September** at the Robert Atkinson Community Centre, Throentree Road, Thornaby, Cleveland.
12.00 noon - 2.00 p.m. Benching
2.00 p.m. Judging
Details from Harry Kennard (Secretary), 22 West Parr, Morpeth, Northumberland NE61 2JP.

Darwen Aquarist Society

The D.A.S. 9th Open Show will be staged on **Sunday 28 September** at Darwen Library Theatre, School Street, Darwen Town Centre.

Wolverhampton Aquarists' Society

The W.A.S. 8th Open Show will be held on **Sunday 28 September** at Pendeford High School, Marsh Lane, Fordhouses, Wolverhampton. Further details from Steve Whitehouse. Tel: (09074) 3884.

Bristol Tropical Fish Club

The B.T.F.C. 1986 Open Show will be held on **Saturday 4 October** at All Saints Church Hall, Grove Road, Fishponds, Bristol. Show schedules and full details may be obtained from Mr T. E. Davis (Secretary), 264 Badminton Road, Coalpit Heath, Nr. Bristol BS17 2QW. Tel: (0454) 775432.

Torbay Aquarists' Society

The T.A.S. 1986 Open Show will take place on **12 October**. Venue: Newton Abbot Community Centre, Kingsteignton Road, Newton Abbot. Contact Lee Stevens (Show Secretary), 77 Howards Way, Wildwood Copse, Newton Abbot, Devon.

FISH COLLECTING IN LAKE TANGANYIKA

Glen Melhuish recalls an eventful trip to one of Africa's prime fish-collecting sites.

While waiting for our departure from Zambia after having worked there for fourteen years and knowing the length of time it took for one to have one's immigration papers, we decided a fish collecting trip to Lake Tanganyika worthwhile. During this period of our imminent departure we had taken up temporary residence in Mufulira after having vacated our premises at the local agricultural research station. This move had necessitated moving some of my holding tanks containing very rare Zambian barb species which I had planned to bring back to the U.K. However, before this trip could be undertaken it was necessary to call upon the packers to collect all the fishing gear that I would require for this trip.

I had been forewarned that the chalets used for accommodation at the Lake had their electrical supply from a generator switched off at 10 p.m. which necessitated taking a few battery operated pumps in order to maintain the wild-caught cichlids. In addition, keep nets were also utilised for this purpose.

On confirmation of our booking we left Mufulira and boarded the aircraft at Ndola Airport and headed for Kasaba Bay, the holiday resort on the shores of Lake Tanganyika. The flight in the Hawker Siddeley 748, an aircraft used by the country for

internal air travel, took one and a half hours with the only stop at Kasam, the provincial capital of the Northern Province and railway junction of the Zambia-Tanzania railway complex.

During the flight up to the Lake we passed over the wide expanse of Lake Bangweulu with its myriad swamps and waterways and I could not help wondering what unstapped aquarium fish fauna remained below.

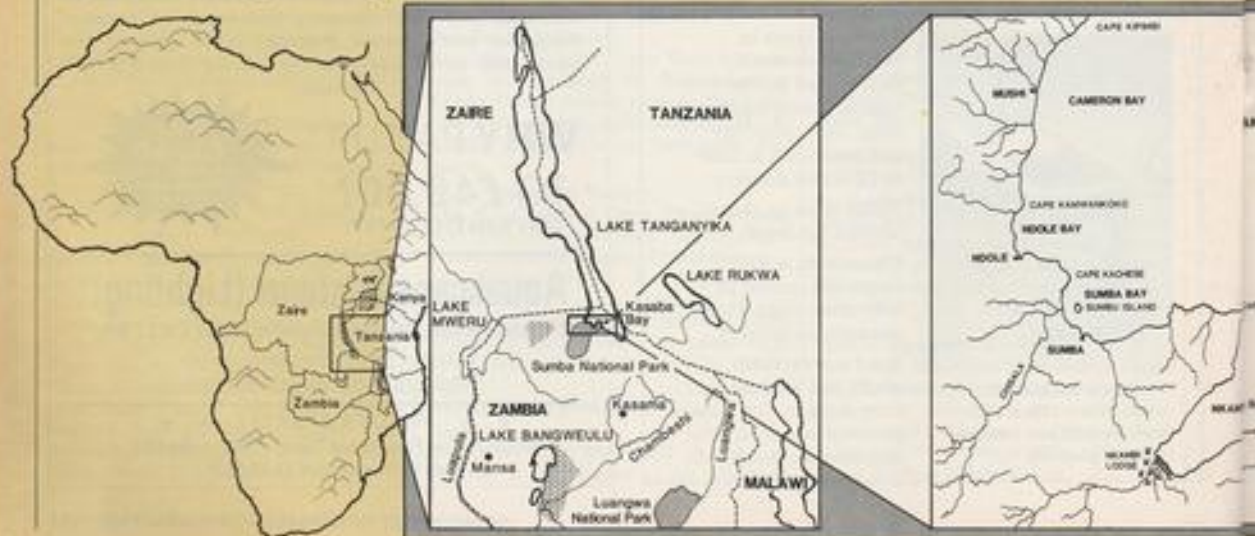
On arrival at the Kasaba Bay airstrip we were awaited by the Zambian Tourist Board landrover which immediately whisked us away to a hearty meal and then allocated to our sleeping quarters, whereupon a frantic rush ensued to unpack all my fish collecting equipment. Later enquiries revealed that Mr. Pierre Brichard had packed up his fish collecting station in November 1978 following an outbreak of cholera which prohibited the exportation of tropicals from this area of the Lake. This was my only disappointment, for I was very keen to meet this famous collector and exporter.

The first day's activities were spent fishing in the immediate vicinity of our chalet and, after a preliminary survey, the best and closest proximity happened to be the jetty. A fish collecting assistant was immediately taken on by the name of 'Diamond' who was later to prove invaluable. This was, after all, to be expected, for most

of the people from this remote part of Zambia are adept fishermen, since fishing is their only livelihood.

The first fishes to be landed were *Lamprologus temporalis* caught readily on hook and line and using worm as bait. This method, however, would not tempt the various *Tropheus moorei* colour varieties which abounded, particularly among the rocky substrate of the jetty. Shortly afterwards a pleasant surprise met my eyes when a pair of *Chalinochromis brichardi* came into view. The pair was distinguished by their different sizes coupled with the fact that they kept very close together wandering in and out of the crevices of the rock foundations of the jetty. I finally succeeded in catching this pair by chasing them into a monofilament net. This method was similarly used to catch the Rainbow *Tropheus* colour morph.

It is interesting to note that the only rocky outcrop lay at a distance of 250 metres and that the capture of *C. brichardi* indicated the loose binding of this species to its ecological niches. It was also observed that species of the other genera, particularly *Lamprologus*, tended to be more fluid in their association with their habitat. Since the jetty was built in 1956 the present population can be safely assumed to have migrated from the above-mentioned rocky outcrop — crossing an area of mud flats with swamp-like conditions on the periphery.





Left, a 'rainbow' morph of *Tropheus moorei*. Right, *Lamprologus sexfasciatus* showing shock symptoms (see text for details).

On the muddy bottom, numerous *Cyathopharynx furcifer* were to be seen hovering over their nests and a number of them were caught. Towards evening further *Tropheus* species were caught, together with a further *C. brichardi* specimen. With the trap baited and left in position alongside the jetty the day's prized specimens were housed for the night in polystyrene boxes. All fishing activities ended for the first day. Not quite! After supper a quiet stroll was made down to the jetty with rod in hand to see what night fishing conditions would yield.

After a few negative casts my daughter, Sorrel, spotted a slimy object not a metre away from us. This was promptly killed and preserved in formalin. Needless to say the snake turned out to be the infamous poisonous snake found in Lake Tanganyika, namely Storm's Water Cobra — *Boulengerina annulata* v. *stormi*. Each morning a few specimens were to be found beneath the floorboards of boats moored alongside the jetty. Although no reported snake bite fatalities have been recorded over the past number of years, it is a known fact that this cobra's venom is highly toxic. Despite the fact that the neutralising effect of the serum I carried had yet to be assessed it was, nevertheless, reassuring to have it with me just in case. I have had a number of close calls with poisonous snakes in Zambia, e.g. brushing against a Black Mamba after disturbing its

predations during the night; spat at by a Spitting Cobra, etc., but to be bitten up on the Lake at such a distance from civilisation, with its limited locally available medical facilities was another matter.

During our first night we were constantly awakened by the incessant grunts and howls of warthogs and elephants foraging for food in very close proximity to our chalet. This only enhanced our excitement at being in the very heart of Africa. It is to be noted that apart from being a fisherman's paradise Kasaba Bay is also a Game Park and so offers the tourist an added attraction.

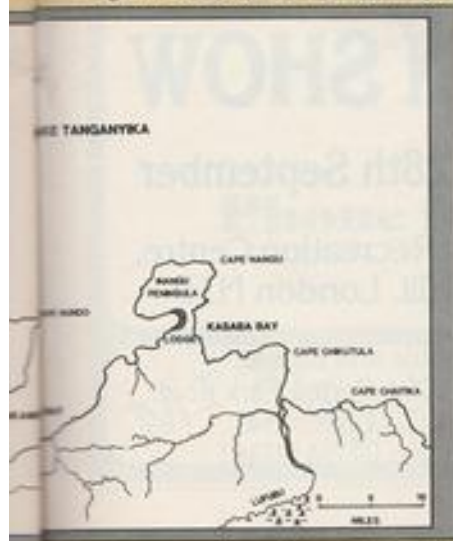
To take advantage of a boat trip which was included in the itinerary for this excursion, we decided to leave early next morning to meet Adrian Carr who is now exporting cichlids from the Lake. His fish collecting station is based adjacent to a pebbly shore directly opposite Kasaba Bay and, in this habitat, the Lake gobies are to be found, namely *Eretmodus cyanostictus*, the other two genera of this group being absent in this southern region of the Lake. While snorkelling or diving in the Lake one is amazed at the clarity of the Lake waters which made fish identification much easier. In this location we caught a beautiful male specimen of *C. furcifer* with long ventral trailing fins tipped in yellow. However, this species proved to be a problem during transportation and succumbed during the return journey. The beautiful cyprinodont *Lamprochthys tanganyicensis* was found abundantly here, swimming in shoals below the water line. This species too does not travel well. I was fortunate to have one sole survivor of the specimens caught at the Lake on our arrival back at Mufulira.

After inspecting Mr. Carr's holding tanks and being given some rarer species, e.g. *Julidochromis dickfeldi*, which I failed to obtain myself, we returned to Kasaba Bay under the hot blazing sun. During what time remained before embarking on the return flight I decided to use my 18 metre monofilament net alongside the jetty and, to our utter amazement, with just one haul we landed over 200 fishes, comprising mainly *Cyathopharynx furcifer*. This was to prove a major headache in their removal since many specimens were badly caught in the region of their gill filaments. However, top priority was given to removing two very large spiny eels belonging to the genus *Mastacembelus*

and to a *Tropheus* colour morph with a yellow dorsal. A male *Haplochromis horii* was also caught with this haul. These specimens were quickly bagged and 'Diamond' was left with the task of removing all the other fishes, a task he readily accepted, as the nondescript species provided him with food for the week. During this period I succeeded in landing further specimens of *L. sexfasciatus*. I was also able to hook a solitary 'yellow dorsal' *Tropheus* after teasing it with worm bait. It was observed that all *Tropheus moorei* varieties are difficult to catch by this method and, on the rare instances that they were caught, this has been attributed to their aggressive response to foreign objects encroaching upon their territories.

After lunch all specimens were bagged, oxygenated and made ready for the flight home. Our one regret was that we wished we could have spent more time at the Lake and annoyed that we had not gone up earlier during all those years of residence in Zambia. On our return to Mufulira all fishes were placed into tanks already prepared for them. The fishes appeared to have settled down nicely but on the third day some species, particularly *Chalinochromis brichardi*, *Lamprologus sexfasciatus* and *Lobochilotes labiatus* went through traumatic shock symptoms which manifested themselves with very rapid gill beats, sudden and erratic movements in a haphazard manner, and culminating with distended jaws. Such conditions were often successfully rectified by placing these fishes to receive the full blast from an airstone. However, despite these remedial procedures, certain species eventually succumbed, e.g. *Lamprologus sexfasciatus*. In order to determine the causative effects for such a condition, checks on water hardness, pH and other chemical parameters were made. By the addition of small amounts of magnesium and calcium bicarbonate, water conditions appeared now to be suitable for the inhabitants, so resulting in fewer deaths.

On our final departure from Zambia I was able to bring back to the UK survivors from this unforgettable fish collecting expedition to the southern shores of Lake Tanganyika. The satisfaction of collecting and bringing back live fishes from any area is one of the most rewarding experiences that can befall any aquarist.





THE PEACOCK-EYED BUSHFISH (*Ctenopoma oxyrynchum*)

The Sharp-nosed or Peacock-eyed Bushfish is an interesting, friendly boisterous species which can be easily maintained in aquaria. David Armitage of the Anabantoid Association of Great Britain explains how to keep and breed this African anabantoid. Photograph: David Allison

If there is one thing we sometimes lack as aquarists, it's patience, yet this is the quality we need most of all when attempting to breed the larger African anabantoids or labyrinth-fishes such as *Ctenopoma oxyrynchum*. The *Ctenopomas* are the African equivalent of the Asian gouramis, paradise fish, fighting fish, etc. Some build bubble-nests which they guard, like most of their Asian counterparts. Others spawn with few preliminaries and leave their offspring to their own devices. The subject of this article is one of the latter group.

This fish was first described in 1902 by Boulenger, yet, not until 1952 did specimens arrive in Hamburg for the hobby. The species name means 'sharp-nosed', hence one of its official English common names. The normal coloration of the adult is shown in David Allison's excellent study. The main feature is the central black body spot on the brown body. The resemblance of that spot to the eye on the peacock's tail gives the fish its common German name. You should also note the black edge to the caudal, dorsal and ventral fins and the silvery chest. A fairly characteristically marked species, you might think, but it can, and has been, confused with another species, *C. maculatum*. This lacks the black edging to the fins and has a more predatory head profile. There is also the small point that it achieves a length of 20 cm, compared to a moderate 10 cm by *C. oxyrynchum*. (This difference wasn't enough to stop Steindachner in 1913 from describing the former under the name of the latter, however).

The Sharp-nosed Bushfish has another body pattern, however, for when it is frightened, sparring or spawning, the body spot will fade and a darker cryptic marbled pattern will spread across the fish. In this colour phase it resembles the Leaf Fish, possibly for the same reasons of predatory camouflage.

Aquarium maintenance

The deep body is in contrast with the streamlined, aggressive river dwelling *C. kingleyae*, *C. nigroparvum* and *C. multi-spinis* but resembles *C. ocellatum* and *C. acutirostre*. However, its temperament is altogether different from the last two. Where they are shy and reclusive, hinting at their alleged nocturnal habit, *C. oxyrynchum* is a boisterous and friendly subject for our aquaria. It can be kept in aquaria furnished with bogwood or dense vegetation along with other moderately sized species. I prefer to keep pairs in densely planted 2-3 ft. un-aerated and unfiltered tanks. Try not to net this species though, as its serrated gill cover will invariably become entangled in the mesh. Although the water in its natural habitat is generally soft and acid, like most *Ctenopomas*, it is almost equally at home in aged tap water kept at 22°C. It will eat all foods but only the smallest adult fish, a characteristic that makes it safe/suitable for many types of mixed communities.

Ctenopoma oxyrynchum comes from Zaire (formerly Congo) in the region of the River Ubangi and Stanley Pool. Like many Asian species it appears to migrate or be dispersed into streams and marshes in the rainy season but in the dry season it finds its way back towards the main water courses.

Sexing and breeding

There are no instantly visible clues to sexing these fish; the colour and fins of male and female are identical and, although a female can be more portly and a male more aggressive, the reverse can often be the case. The only sure way is to look closely for a special sign in the adult male. Usually, between 1 and 3 scales back toward the tail from the eye there will be quill-like scales on the male which may help in the spawning embrace. The female does not have these.

As I said at the start of this article, patience is needed for breeding. It is doubtful that this fish matures before the age of 2-3 years (the only specimens of its relative, *C. acutirostre* that spawned in captivity were over 10 years old). Spawning has been achieved in 50-100 litre tanks, the pair obviously being put in alone. Generally *Ctenopoma* species will spawn between Autumn and Spring, many after the hours of daylight. Even with a fish like this, with no elaborate courtship, you will detect a change in behaviour prior to spawning. The pair will circle each other near the tank bottom, the male biting at his mate's flank at a point just in front of the tail. Finally she allows him briefly to curve round her, although by no means as completely as in the Asian bubble-nesters; for instance the female is not turned upside down. A series of such embraces will result in up to 4,000 clear, amber-coloured eggs which float to the water surface.

They hatch after one day and the fry take 3 days to become free-swimming, when they require enormous quantities of infusoria. After a week they will require *Cyclops* and microworm and at this stage the front of the small fishes' body is jet black, the rear clear. After only 2 weeks the fish will be 1-2 cm. It is interesting to note that these youngsters avoid light and will hide under leaves and stones all over the aquarium.

References

- Richter, H. J., 1974 Spawning *Ctenopoma maculatum* TFH, 22, 4-12: 88-89.
 - Studer, W., 1983. 1600 Junge auf einen streich-der Pfauenaugen Buschfisch geizt nicht mit Nachkommen. Aquarien Mag. 17, 466-68.
- Further information on *Ctenopoma* and other anabantoids is available from The Anabantoid Association of Great Britain, 141 Military Road, Colchester, Essex CO1 2AT.

Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope the name of the expert to whom your query should be directed. All letters must be accompanied by a S.A.E. and addressed to:
Your Questions Answered, The Aquarist & Pondkeeper, Buckley Press Ltd, 58 Fleet Street, London, EC4Y 1JU

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Marine Success with invertebrates

I would like to keep live coral and invertebrates. Would you please give me some information on how to do this successfully?

The first thing I would bring to your attention is that, except for the Copperband Butterflyfish (*Chelmon rostratus*) and the Yellow Longhead Butterflyfish (*Forcipiger longirostris*), all other Butterflyfishes tend to eat many species of invertebrates and so I would not recommend you to attempt to keep living corals, anemones, polyps, etc., in the same aquarium as these fishes.

The special requirements of invertebrates in an aquarium environment may be summarised as follows:

1. **Lighting.** This has to be exceptionally brilliant and should be run for at least 12 hours daily in order to ensure that the symbiotic algae in the tissues of the light-requiring species such as the living corals, anemones and other coelenterates, are able to photosynthesise much of the invertebrate's food. In an aquarium having a surface area of 4 square feet and 18 in. vertical depth (average water depth = 12 in.) you will need at least four 36 in. colour-balanced fluorescent tubes. I suggest that you use one Gro-Lux tube and three Nothlights.

Please remember that running these tubes for 12-16 hours each day means that they will have to be replaced every six months.

2. **Feeding.** Invertebrates may be divided into three broad categories with regard to their feeding habits as follows:

(i) **Filterfeeders** such as sponges and tunicates inhale seawater and, after extracting the edible

plankton material, pass the seawater back out of their bodies again. These are best catered for by using proprietary liquid foods. Similar foods are also available in fresh frozen gamma ray irradiated form.

(ii) **Browsers**, such as many starfishes and sea urchins, will also pick up particles of liquid food from the surfaces of rocks and corals.

(iii) **Grazers/Feeders**, such as many anemones, shrimps, crabs, prawns and lobsters will deal with relatively large garden pea-sized chunks of irradiated shrimp, squid, lance-fish, etc.

Finally, I cannot stress enough with regard to the food to be used in an invertebrate aquarium containing coral fishes as well, that, because of the difficulties of medicating fishes in the same tank containing delicate, non-medication tolerating invertebrates, that, firstly, you must only use irradiated seafoods, sterilised liquid

foods or flake foods, and secondly, you must set up a separate hospital/quarantine aquarium in which sick fishes may be safely treated for disease.

3. **Additives.** It is very important for the welfare of all invertebrates and coral fishes that you remember to treat the seawater with a vitamin supplement and trace element booster in the quantities and at the intervals recommended by the manufacturer.

Tropical Breeding Bettas

I have successfully bred livebearers, egglayers (Kribensis), and mouthbrooders but seem to have come nearly to a halt with Betta splendens. I have bred them once but have lost all but four of the babies

which do not seem to be growing. These are in a heated and lightly aerated tank and are being fed Liquifry and fine foods.

Advice would be much appreciated.

Bettas can be bred if certain rules are obeyed. First, choose young fish — the best time is at 20 to 30 weeks of age. Condition them on livefoods and good quality flake, and house them separately. The male is ready when he starts blowing a few bubbles and the female when she becomes fat with eggs. Often a white spot can be seen at her vent (this is the end of the egg-tube).

The breeding tank should have a tight-fitting lid with water only 4 to 6 inches deep. Aeration should not be used — it may break the nest — but a few floating plants help as an anchor. Ideal temperature is 28 to 30°C.

The separated fish can be in the same tank by using a divider or placing the female in a glass jar. If introduced from different tanks, a divider is still useful so the female can be seen to respond to the male's advances before they are allowed to meet. Courtship can be quite violent and it may prove necessary to separate the female again. Eventually the pair will fold together under the nest and release some eggs. This spawning can last two or three hours, after which the female must be removed.

The male should be left with the eggs and the tank kept closed to prevent cooling air affecting the eggs and then the fry. The eggs hatch in 36 hours and the fry are free-swimming on the second or third day and then the male should also be removed. Now start feeding the fry — this must be livefood for the first crucial few days. Have several Infusoria cultures ready and draw off the clouds of animals with an eyedropper,



A male *Betta splendens* retrieving eggs after the completion of a successful spawning embrace.

squirting them into the breeding tank three or four times daily.

After one week, proprietary foods can be given as well as the ever-useful hard-boiled egg yolks. Aeration can be introduced but beware of cooling draughts of air for up to two weeks from hatching.

After a few weeks, the longer fins of the males begin to show and these can be separated to prevent fights.

Coldwater

Pond repairs

I installed a fibreglass pond in November, noticing, at the time, that, although the pond was generally sound, the surface appeared to be covered with minute hairline cracks none of which seemed to be very deep. I

took this to mean that it was just the surface glaze that was cracked. I have now found that the pond leaks. It loses about five inches of water over a period of about two weeks and then stops leaking.

Is it possible to get a paint or sealant which I can paint onto the outside of the pond to waterproof it? It seems a shame to get rid of the pond as it forms an attractive feature in the garden. I have three small fish at the moment so anything I use will have to be harmless to the fish.

I suppose that my only other alternative would be to remove the pond and replace it with a liner. Your help would be much appreciated.

Unfortunately to repair the cracks in your fibreglass pond will mean that the repair will have to be carried out from the outside which requires the pond to be taken out and the area to be cleaned off and thoroughly dried.

The cracked area should then be repaired using a fibreglass repair kit of the type used to repair body work on motor cars, such as Isopon, obtainable from any of the D.I.Y. shops. After the repair, the inside of the pond can be smoothed down with glass paper. This should prove to be a very satisfactory repair and well worth the effort.

Leeches

Our pond becomes infested with Leeches from time to time and they attack our fish. Is there any species of coldwater fish that will eat the Leeches and is the only alternative to clear the whole lot out and start again?

Unfortunately I know of no fish which feed off these creatures and, as you suggest, the quickest and safest way to rid the pond of these very unpleas-

ant pests is to empty it completely and start again.

There are thirteen different kinds of freshwater Leeches in this country. They can generally be found attached to stones or plants and can often be mistaken for lumps of jelly. As you are well aware, they live by sucking the blood of other animals. When they have had their fill of their host's blood, they release their sucker, drop off and spend the next few weeks digesting their meal.

It is more than likely that the Leeches were introduced into the pond with plants. It would therefore be a good idea to clean all the plants before they are put back. A plant-cleaning agent can be obtained from your aquatic retailer. Alternatively, you can put them into a container with enough potassium permanganate crystals to colour the water a deepish pink. Make sure that the plants are well rinsed after treatment.

Next month

COMING UP IN OCTOBER

- Fully illustrated **Beginners' Supplement** packed with everything you need to know about setting up — from a survival kit to the best species to choose for fresh water and marine aquaria and the joys of building a first pond
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Deepools Competition Winner

Our two-part £1500 competition (June and July) sponsored by **Deepools of Bugle, Cornwall**, drew a tremendous response from **A & P** readers. We asked you six questions (three in June and three in July) and placed the names of all those who answered the two lots correctly in our "competition hat" on 1 August.

The correct answers were:-

- June**
1. Tench.
 2. Water Forget-me-not.
 3. *Melanotaenia boesemani*.
- July**
1. Shelf.
 2. Lake Malawi.
 3. *Silurus glanis* or Wels.

First out of the hat, and, therefore, the lucky winner of a Deepool of his choice is: **Mr Fred Cripwell of 41 Main Street, Rosliston, Nr. Burton-on-Trent, Staffs. DE12 8JW.** Fred's choice of prize from the **Deepool Island Range** of ponds is the 'Shikoku'. Congratulations to Fred,

commiserations to the losers and sincere thanks to our sponsors, **Deepools.**



Shikoku

Koi

Mixing Koi with other fish

Having decided to try some Koi in with my collection of other coldwater fish, I was informed that it is not possible to mix the different species. Is this correct?

The simple answer is no. Koi and other coldwater pond fish will mix quite happily but problems of damage can arise, not through intentional aggressiveness, but just through the difference in size. Small Koi mix very well as they are not usually larger than their pool mates and, in fact, can sometimes become more tame when kept with other fish. The problems arise as the Koi grow. Adult Koi can reach 20 in. or more and when compared to the 6 in. or so of goldfish, their size, alone, can cause damage to occur.

Koi also tend to create more of a mess in the pond, hence one of the reasons most Koi pools are filtered. Another reason for filters is that Koi tend to eat or damage any plants, other than lilies, kept in the pond. Because of these problems, most people decide that if they are going to keep Koi, then they will set up the pond especially for them.

Company profile / Wholesale Tropicals

A rewarding experience for the discerning fishkeeper

Behind an "unrevealing" façade lies a truly amazing shop. The only hint that something out-of-the-ordinary might await you is provided by just one word — 'Killifish' — on the bottom lefthand corner of the window board (very few shops, sadly, sell sufficient quantities of Killies to warrant advertisements of this kind).

Yet, this is no more than the tiniest tip of a substantial iceberg — so to speak — consisting of around 200 tanks which house what must certainly be one of the most wide-ranging selection of fish anywhere in the country.

Terry Jones started trading as Bonner Aquariums twenty-five years ago, changing the company's name to Wholesale Tropicals in 1968. At the time, this was a true reflection of the company's business. However, Terry's growing desire to specialise in other than "bread and butter" species gradually led to a shift in the balance so that, by 1983, Wholesale Tropicals was doing more retail than wholesale trading. Today, very little of the wholesale side of the business remains.

In its place is a shop stacked with more aquaria than one would think possible, judging from the modest size of the shop front. If the sheer number of fish is impressive, this pales into insignificance when compared to the actual range of species available.

You can, of course, buy Guppies, Platies, Angels and all the other common tropical and coldwater species, as well as every conceivable accessory you could imagine. What makes this shop remarkable is that it can cater for the absolute beginner as well as the out-and-out specialist with equal ease.

How is this for starters? At any one time, Terry can stock no less than 36 species of *Corydoras* alone, and nearly the same number of *Synodontis* species, including some of the more uncommon ones such as *S. clarias*, *S. waterloti* and *S. petricola*, along with the highly coveted *Hemimysodon membranaceus*, *Brachymysodon batemoda*, *Mochokiella paynei* and numerous other "specials".

Not every hobbyist is a catfish enthusiast, though. For cichlid fans, therefore, there are equally mouthwatering prospects, notable among which is a selection of around 20 species of *Astatogramma* (to add to the 40-odd South and Central American and African Rift Lake species).

On the Killifish side, there are about 30 species to choose from; in the Rainbowfish "department", the figure is around 12; Barbs work out at double this figure; Tetras and Characins at nearly 30 and Anabantoids

around 15 (including, at least, three species of *Betta*). Livebearer enthusiasts are not forgotten either, and Wholesale Tropicals is one of the very few places in Britain where you can end up buying *Ameca*, *Skiffia*, *Priapella*, *Phalloceros*, *Alfaro*, *Phallichthys*, Mosquitoes and Blue Limnias along with your more usual Swordtails, Mollies, Guppies and Platies.

As the above sampler demonstrates, Wholesale Tropicals is not a shop to visit in a hurry. You need time — plenty of it — to go round peering into each tank in turn. As you do, you discover little gems such as the delightful Goby, *Strigatogobius hoeveri*, or the rarely-available Odessa Barb.

Over the past few years, Terry Jones' reputation as a retailer of unusual fish has steadily grown, so that it comes as no surprise to discover that people travel (often in parties — by prior arrangement) from all over the country and even abroad to his shop.

Clubs and large groups are encouraged to visit during the evening or, in the case of "non-locals", on Sunday afternoons. Discounts are available on such occasions.

Existing facilities make it awkward for wheelchair-bound aquarists to gain access to the lower ground floor of the shop.

Nevertheless, Terry Jones and Cliff Palmer will do everything they can to make such visits worthwhile — ring beforehand and talk things over with them.

Below, inside the shop every available space is taken up with something worth seeing. Bottom of page, *Heros* (formerly *Cichlasoma*) *salvini* — just one of the more uncommon delights in store for the dedicated aquarist.



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