

JUNE 1987 95p

# AQUARIST

AND PONDKEEPER

**FISHKEEPING AT ITS VERY BEST ESTABLISHED 1924**

**Two NEW fish species (Special announcement)**

## **FOCUS ON CICHLIDS:**

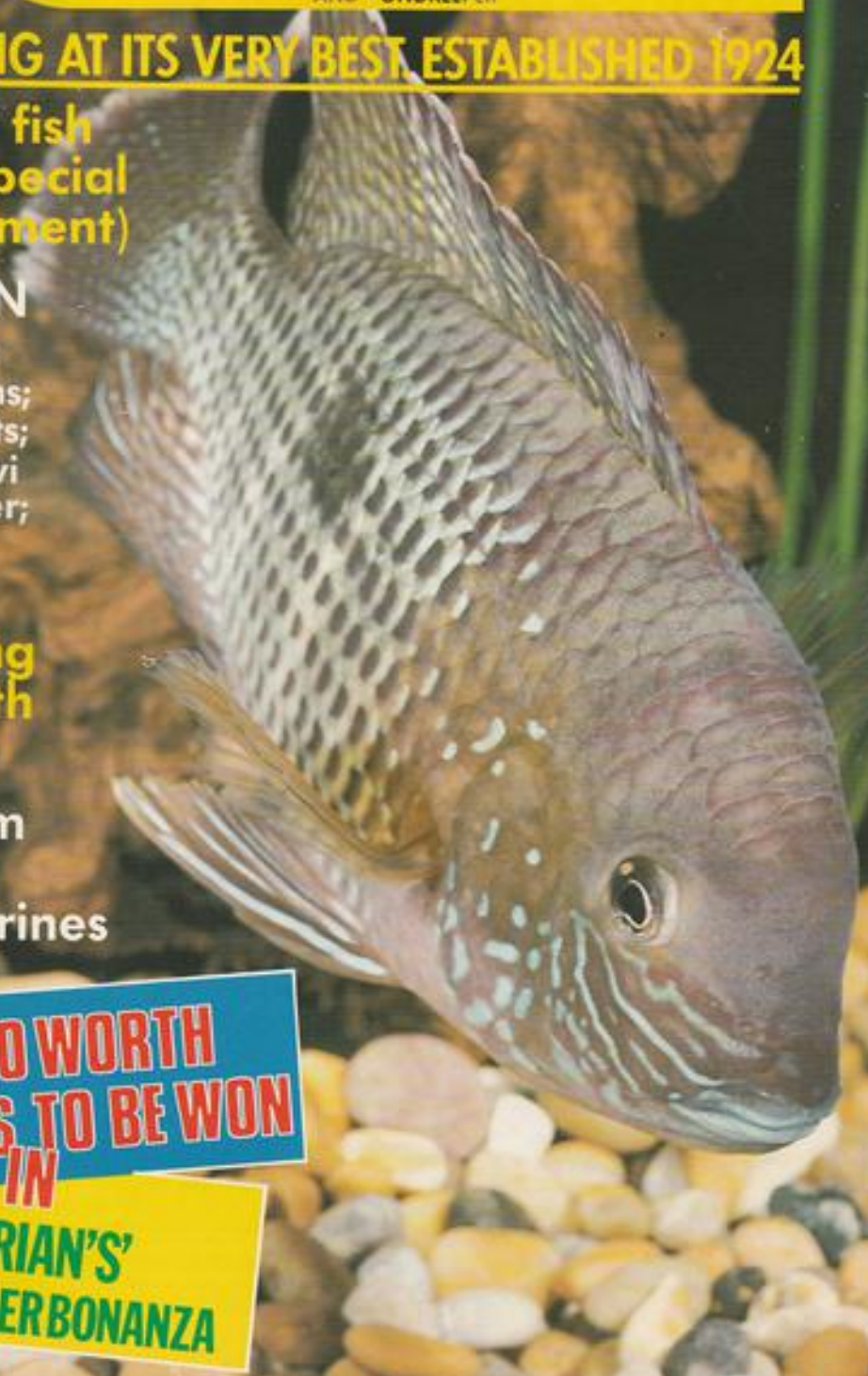
Growing pains;  
Pygmy Parrots;  
a Lake Malawi  
mouthbrooder;  
Discus  
masterpiece

**Fishkeeping in the South East**

Home from home —  
native marines

**£1,000 WORTH  
OF PRIZES TO BE WON  
IN**

**'AQUARIAN'S'  
SUPER SUMMER BONANZA**





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## Cover Story

Photograph Michael Gilroy

Have you seen this fish before? If so, we'd like to know, particularly if you can supply some background information. The specimen on our front cover is a White Saum, an "Aequidens-type" cichlid imported some months ago by 'Fish World' of Edinburgh. Bearing in mind the "fluid" state of Aequidens and Cichlasoma classification, there could even be some doubt as to which, if either, of these genera, the Saum belongs to. Several photographs of a Golden Saum have appeared in aquarium literature recently but, as far as we know, our front cover represents the first-ever colour photograph published of the magnificent "White" variety.



# AQUARIST

AND PONDKEEPER

FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924

JUNE 1987 Vol. 52 No. 3

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Pompon Goldfish have highly developed nasal septa known as narial bouquets — but does this enhance their sense of smell?

# THE OLFACTORY WORLD OF THE GOLDFISH

Having a good sense of smell is absolutely essential for survival in the murky waters where goldfish live in the wild. As **Dr Andrew Allen** demonstrates, evolution has provided many fish with a sense (olfactory capability) which places our own, inefficient, human system firmly in the "postage stamp" bracket.

**H**ow keen is the sense of smell of the goldfish? The question is difficult, but even so, it is possible to give a precise, and indeed a numerical, answer.

A first clue to the smelling ability of an animal can always be found by looking at the proportions of its brain. At the front of every vertebrate brain are paired olfactory ("smelling") lobes which analyse information from the olfactory membranes. The olfactory lobes of the goldfish brain are enormous — considerably larger than the visual lobes, which suggests that, although the goldfish has fairly good eyesight (I shall write on another occasion of how the world looks seen through the eyes of a goldfish), it is primarily an olfactory rather than a visual animal.

A second clue to the smelling ability of an animal can be found by counting the olfactory cells in its nose. Man has about five million olfactory cells covering five sq cm of sensory epithelium (sensitive tissue) — roughly the area of a postage stamp. The goldfish has some 270 million olfactory cells packed into 170 sq cm of involuted olfactory labyrinth.

270 million cells against five million: a snap commonsense calculation might suggest

that the sense of smell of the goldfish is something like 54 times keener than our own. But this would be a grave underestimate. For various rather abstract and complicated reasons to do with the way networks of cells analyse incoming data, the sense of smell of the goldfish is calculated to be at least two million times keener than ours!

## Research findings

This is all very well, but abstract mathematical calculations of this nature are always a bit suspect until they have been tested experimentally. A few months ago, researchers were able to do just this, using newly developed techniques of 'nerve-tapping'.

Nerve-tapping is like telephone-tapping on a much smaller scale. A minute electrode is inserted into the body of an animal, which is equivalent to earthing it, and another electrode — a microelectrode a thousand times smaller than the head of a pin — is connected to a nerve cell in a sense organ or one of the sensory lobes of the brain. The electric currents passing along the nerve can be picked up, and amplified as a trace on the screen of an oscilloscope.

With a labyrinth of electrodes in position, a wide range of stimuli can be applied to a particular sense organ in a relatively short

space of time, and we can learn which stimuli produce a reaction: which scents, for example, produce a reaction in the goldfish's nose or the olfactory lobes of the goldfish brain, and above what threshold concentration.

The results of this work show that the sense of smell of goldfish and ecologically and taxonomically related carp (Common Carp and Koi, *Cyprinus carpio*, Crucian Carp, *Carassius auratus*) really is, in round figures, two million times keener than ours. A goldfish can detect an extract of shrimp in water at dilutions well below one nanogram per litre (a thousand millionth of a gram of shrimp extract dissolved in a litre of water).

That is better than a tracker dog — a bloodhound, for example — which has some 200-220 million olfactory cells and a sense of smell a million times keener than ours (just for the record, dachshunds have 120 million olfactory cells, fox and fox terriers about 180 million, wolves about 200 million).

Visibility under water is rarely very good, a few feet in really clear water, a few inches at best in the murky water of eutrophic lakes and slow-flowing rivers. The problems of seeing underwater no doubt explain why fish as a group have evolved such remarkable powers of olfaction.

## Other sensitive "smellers"

The trout, a 'clearwater' species, has a sense of smell a million times keener than ours. Carp (Common and Koi, Crucian Carp and Goldfish) which live in murkier, more eutrophic, waters than trout have a sense of smell two million times keener than ours. But even carp are nowhere near as good as catfish and eels. The many-barbelled European Catfish or Wels *Silurus glanis* (310 million olfactory cells in its nose, 140 million on its barbels, and a further 90 million scattered all over its body) and the Common Eel *Anguilla* have a sense of smell a hundred million times keener than ours. An eel is able to detect an extract of shrimp at a dilution of one part shrimp per three million million parts water!

For the goldfish in its underwater world, every plant and every stone has its own individual odour different from the odour of every other plant and every other stone and every other patch of mud on the stream or lake bed. For we humans, more or less devoid of a sense of smell, it is almost impossible to imagine what it would feel like to pay a visit to the inner world of the goldfish which not only has, like ourselves, a visual map of its surroundings mapped into its brain, but also an olfactory map, a cartography of odours. With the help of this olfactory mental map the goldfish is able to find its way around and hunt prey and other food items at night and in turbid waters where visibility is no more than a centimetre or two, where a pair of eyes, however good, would be no use at all.

As G. K. Chesterton remarks in his poem *Boodle: They haven't got no noses, The fallen sons of Eve*.



# PRODUCT ROUND-UP

By Dick Mills

## Internal Power Filters

For those aquarists with limited space around the aquarium, the continuing development of internal power filters has proved to be a boon. Made in a variety of sizes (in both physical and water flow senses), the ideal filter can be found for any particular aquarium application (internal power filters should be capable of filtering the whole aquarium capacity at least 2-4 times an hour).

Most manufacturers' filter performance figures are based on 'no load' conditions: tightly packed (or over-dirty) filter medium will, quite naturally, restrict the water flow considerably. Over-capability in a power filter is better than under-performing.

The modern filter design trend is to have a motorised submersible impeller on to which may be attached a succession of modules containing the actual filter media. This is very useful when cleaning, as proportionate maintenance can be affected without disturbing the bacterial balance of the whole filter medium. Pre-formed sponge is the usually-provided filter medium, completely 'fry-proof' when used in spawning or rearing tanks.

Some filters are specifically designed to fit into a corner of the aquarium, others may be fitted anywhere including directly to sub-gravel filtration systems for 'reverse-flow' use. Many have a device (Venturi) built in which allows controlled amounts of air to be drawn into the cleaned water flow, thus increasing the aeration of the aquarium. It is important that the filter motor is always operated two inches or so below the water surface, especially when this extra aeration is utilised: if excessive air is bled into the tank there is a danger, if the motor is not kept well immersed, that it will run 'dry', with the result that the bearing will wear more quickly and the filter become noisy. Most internal power filters have the provision for the attachment of a spraybar on the output side which allows filtered water to be either distributed (at a lower pressure) across the whole water surface, or returned to the far side of the aquarium to set up a cross-tank water current.

A final diversity of use — the motor unit can always be used separately as a power-head for use with undergravel filtration systems.

### Models and types available 'ATLANTIS'

#### 'F' range

Triangular shape makes vertical, corner-fitting easy, retractable suction discs hold filter in any desired position. Easy to clean sponge filter medium acts as



Interpet's new Powerstream cartridge filters

both biological and mechanical filter. Spraybar facility, although not at extreme top of filter (water surface level) as in some other designs. Extra aeration of output possible by fitting an airline tube to pump top — but this will affect flowrate. This modification is best restricted to the larger F480 F600 models). None of the models are capable of expansion by the addition of extra modules.

**Model F180:** suggested tank size 18 inches or over. Flowrate 180 l/hour (40 gallons/hour).

**Model F240:** suggested tank size 24 inches or over. Flowrate 240 l/hour (53 gallons/hour).

**Model F360:** suggested tank size 36 inches or over. Flowrate 360 l/hour (80 gallons/hour).

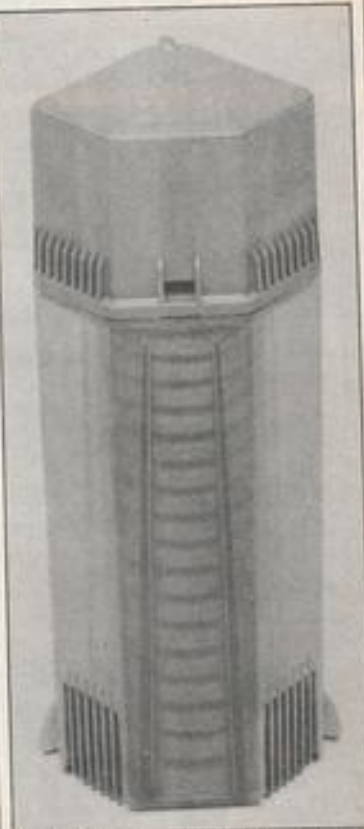
**Model F480:** suggested tank size 48 inches or over. Flowrate 480 l/hour (105 gallons/hour).

**Model F600:** suggested tank size 60 inches or over. Flowrate 600 l/hour (132 gallons/hour).

### EHEIM

Features include large surface area of filter medium with 360° admission capacity, spraybar facility and selective surface movement. A closable shutter makes for a tidier cleaning process and also allows a temporary shut-down of the filter (useful in marine aquaria when feeding filter-feeders.)

**Model 2007:** for tanks 50-60 litres. Flowrate 180 l/hour Electrical consumption: 3 watts. Number of modules: 1.



The 325, one of Rena's four-model internal filter range



**Model 2009:** for tanks 70-100 litres. Flowrate (variable) 210-480 l/hour. Electrical consumption: 10 watts. Number of modules: 2.

**Model 2052:** for tanks 200 litres and upwards. Flowrate 1200 l/hour. Electrical consumption: 28 watts. Number of modules: 2. Two water flow options: for increased surface turbulence or increased aeration.

## HAGEN

Fluval high performance, energy-saving internal filters — **Models 42 and 52.** Both have supplied filter medium. Aeration injection and variable flow facilities on both models. Spraybar facility on **Model 52** (spraybar kit an optional extra). Triangular section of rear body for easy aquarium corner-mounting. Models easily distinguished from each other — **Model 42** motor assembly at bottom of filter; **Model 52** at top. Flowrates and electrical consumption figures not available.

## INTERPET

Based on a small submersible pump drawing water through a sponge filter medium. Economical to run, suitable for freshwater and marine applications.

**MINI-POWERSTREAM range:** The sponge medium acts as biological filter. Filter can be used on its side in shallow tanks (terrapien tanks etc). Not expandable.

**Model IF108:** for 55 litre aquarium. Flowrate 108 l/hour. Electrical consumption 4 watts.

**Model IF130:** for 100 litre aquarium. Flowrate 180 l/hour. Electrical consumption 5 watts.

## POWERSTREAM COMPACT range:

Expandable system by means of extra cartridges. Extra aeration facility, spraybar outlet, and variable flow controls on some models. Optional adaptor allows direct connection of filter output to sub-gravel filter plates, allowing pre-filter action for 'reverse-flow' biological filter systems.

**Model IF400:** for 50 litre aquarium. Flowrate 400 l/hour. Electrical consumption 4 watts.

**Model IF500:** for 100 litre aquarium. Flowrate 500 l/hour\*. Electrical consumption 6 watts.

**Model IF800:** for 150 litre aquarium. Flowrate 800 l/hour\*. Electrical consumption 8 watts.

**Model IF1200:** for 200 litre aquarium. Flowrate 1200 l/hour\*. Electrical consumption 11 watts.

\* denotes variable flowrate control.

## RENA

**Four-model range.** Special features include double cannister which prevents dirt falling into aquarium when removing for cleaning; hollow, large surface area sponge foam filter can be filled with activated carbon for extra filtration.

**Model 225:** Suitable for small tanks up to 25 gallons (112 litres). Flowrate adjustable

up to maximum of 300 l/hour. Electrical consumption 3 watts.

**Model 325:** Suitable for tanks up to 50 gallons (225 litres). Flowrate adjustable up to maximum of 400 l/hour. Electrical consumption 8 watts.

**Model 245:** Suitable for tanks up to 44 gallons (200 litres). Flowrate adjustable up to maximum of 400 l/hour. Electrical consumption 5.5 watts.

**Model 245S:** Identical to model 245 but flowrate is non-adjustable. Has spraybar facility.

# PRODUCT NEWS

## T.A.P. Pond Treatments

(Details as promised in May issue).

**T.A.P. Pond Conditioner** is specially formulated to neutralise chlorine, chloramines and heavy metals such as copper. Further benefits, by action of additives present, include prevention against nitrite poisoning, the rendering of insecticides (from garden sprays etc) harmless and help for osmoregulation in pond fish. The Conditioner also prevents fungus and promotes perfect fin and gill regeneration. Added vitamins, phosphates and protective colloids increase vitality, reduce stress and safeguard against wounds respectively.

**T.A.P. Pond Medication** has a well-proven formula, very effective against most external protozoa, especially White-Spot. It also destroys Skin- and Gill-Flukes and acts as a fungicide and general bactericide, destroying harmful bacteria in the pond for up to a week.

In ponds equipped with external filtration, unsightly summer months' algae can usually be controlled by Spring and Autumn applications of **T.A.P. Pond Algicide**. Unfiltered ponds may require extra treatment to discourage Blanket-weed. The Algicide reduces photosynthesis action, and lowers the reduction potential of the water while chemically attacking the algae; it also contains a special polymer to eliminate green water.

## The UNO Range — something for everyone

Give the customer the product(s) he wants has always been a good policy. Applied in an indirect way, through the wholesaler, it has proved successful for **Uno Products** over the years.

Aquarium heating equipment and **Uno** are synonymous but they also market the **Polyfilter** — a name that has become a widely used fish-household name and one that has attracted many would-be imitators. The internal range of heating equipment is comprehensive. The **Regal** heater is available in 25-200 watts. It is fully earthed and has a black epoxy resin protective coating. Its low voltage, flotation-collar equipped pond counterpart will keep an area of water surface ice-free in the severest of weathers.

The **Supreme** is a combined unit, virtually unbreakable in a polycarbonate upper section with a non-perishable, easier to use, nylon temperature adjuster. Complete with integral fixing unit, it comes in a 50-200

## SERA

**Titan High Speed Filter.** Non-cannisterised, sponge filter system mounted below a high-speed impeller. Oil-cooled motor can be operated wholly or partially below water. Fresh- or saltwater use.

**Model 8200:** Flowrate 800 litres/hour. Electrical consumption 18 watts. Additional sponge filter cartridges available, part number 8300, can also be used on Titan Pond Filters (see *A&P*, **Product Round-up**, May 1987).

watts range.

The **Supreme's** thermostat is available in a separate format, the **Popular**, for those hobbyists who still hanker after the old times. It has a rating of up to 300 watts.

A new range has been added — the toughened glass range; it consists of the **Reliant** (Heater-stat), the **Accurist** (thermostat) and **Regal Glass** (heater) all equivalent in design and specification to the earthed range.

External thermostats are represented by both the old and the new — the bi-metallic operated **Silk-Stat**, and the completely electronic **Nova Stat**, the latter being eminently suitable for temperature control both in photography and home brewing! Measurement of temperature is well taken care of with **Blue-Line** (spirit — 82p) and **Silver-Line** (mercury — £1.09) thermometers. Marine fishkeepers will find the **Uno Glass Hydrometer** especially useful as it has been calibrated at the 'normal' aquarium temperature of 75°F instead of the usual 68°F.

Details of these, and the many other products can be obtained from **Uno Products**, Arnold Street, Nantwich, Cheshire CW5 5RB (Tel: 0270 623674).

## APOLOGY:

Conspicuous by their absence in the Pond Pump survey (**Product Round-up**, *A&P*, May 1987) were the following: **Sicca Ekto Pond Pump** from 'Atlantis'. The kit includes a mushroom fountainhead attachment and a transformer for safe 24 volt Operation.

When used in the 'mushroom' mode, the normal 'jet' impeller is replaced by a different type (supplied) in order to deliver more volume at less pressure required by the different display. A mains voltage model, **V300**, (300 l/hour) is available for use with indoor ponds or those within easier reach of mains electricity supply.

**Rena S20 and S40 Fountain Kits.** The **S20** comes with 2 different nozzles or can be fitted with an optional 4 rose kit or mushroom dome kit. The **S40** comes with 3 different nozzles (maximum height 4.25ft) or, again, can be fitted with similar optional kits as the **S20**.

We apologise for these omissions — will try harder in future to track down all current information before going to Press!



# HOME FROM HOME FOR NATIVE MARINES

Andy Horton's popular occasional series continues with his second article offering expert and sensible advice on the stocking and maintenance of a 20-gallon tank.

## Maturation and first introductions

It takes about three weeks for an under-gravel filter bed of a properly installed aquarium to reach the condition where it is safe to introduce fish. If fresh seawater is used, there should be enough suspended organic matter to start the nitrifying bacteria in the gravel on the valuable job of converting the harmful ammonia and nitrites to the safer nitrates.

In the sea, the nitrates would be assimilated by plants and bacteria. However, it is not possible to mimic these conditions in home aquaria. It is therefore necessary to replace 20% of the water every two months to ensure the nitrate level does not reach toxic proportions. This is important. If you do not have ready access to fresh seawater, or if you are unable to purchase and prepare the commercial marine mixes, your native marine aquarium is doomed to failure.

When I install a new tank, I introduce a few prawns or shrimps, and feed them adequately on boiled mussel. Gradually, over a period of one month, I add the rest of the fish and invertebrates. A large introduction all at one time can precipitate a crisis, with a sudden and fatal build-up of ammonia.

Alternatively, the commercial preparation "Sea Mature" can be used to activate the growth of beneficial bacteria.

## Stocking the aquarium

How many fish — and what types, can be kept?

Fish and invertebrates commonly found in rock pools are the hardiest and most attractive in the aquarium. A reference book on seashore life is essential to identify the various life forms, and to exclude the most predatory and destructive creatures. Some fish, sponges, cowries, sea slugs etc. are for various reasons difficult to keep.

## PART TWO

In my principal 20 gallon tank, thirteen flint boulders have been aesthetically arranged. Mostly, they have been directly placed on the coral sand and gravel substrate. Two are wedged firmly on top of the others to form caves, while others are judiciously placed to provide hiding places. Oyster, whelk and scallop shells rest on the sand.

Static colour is provided by twelve Beadlet Anemones, *Aequorea equorea*, in a decorative mixture of crimson, reds, greens, and browns, including the larger 'strawberry' variant. One specimen of the beautiful Dahlia Anemone, *Urticina felina*, three small brown and one white Plumose Anemone, *Merridium simile*, two Daisy Anemone, *Cerata pedunculata*, three *Sagartia* species, one small green Snakelocks Anemone, *Anemonia sulcata*, and one little-known *Sagartio-*

*geton undatus*, with an orange column and pale graceful tentacles, add further colour and attraction. A Cockle, *Cerastoderma edule*, is buried in the sand, and a Limpet, *Patella vulgata*, browses algae from the rocks.

Shoaling in the area free of rocks are five pencil-slim 2-spotted Goby, *Gobiasculus flavescens*, 4 cm long. Swimming in mid-water, but more inclined to haunt the rock ledges, three full-bodied and handsome Corkwing Wrasse, *Crenilabrus melops*, are 5 cm, 4 cm, and 3 cm long respectively. Two snake-like Butterfish, *Pholis gunnellus*, 8 cm, hide under rocks with a pair of 5-bearded Rockling, *Gilgata mustela*, 6 cm, and a very small Rock Goby, *Gobius paganelus*, 4 cm. Sheltered under empty oyster and razor shells, two Sand Gobies, *Pomatoschistus minutus*, 6 cm, and 5 cm, are camouflaged to blend in with the coral sand substrate.

Skitting hungrily between the rocks, gorging mussel flesh before any other fish, are two juvenile Blennies, *Lipophrys pholis*, only 4 cm long. (Blennies and Wrasse have sharp teeth and larger fish of these species would attack the various crustaceans: four Squat Lobsters, *Galathea squamifera*, the Hairy Crab, *Pilumnus hirtellus*, the Hairy Porcelain Crab, *Porcellana platycheles*, the three Long-legged Spider Crabs, *Macropodia rostrata*, the Short-legged Spider Crab, *Pisa armata*, and the seven Hermit Crabs, *Pagurus bernhardus*, resident in the aquarium.) Two Hermit Crabs inhabit Whelk shells, their smaller adversaries housed in the univalve shells of the periwinkle (two), Nettle Dog Whelk, Flat Winkle, and Grey Topshell. The Common Starfish, *Asteria rubens*, each arm 25 mm, and two Purple-tipped Sea Urchin, *Psammechinus miliaris*, are rarely seen, hidden under flint rocks. Half a dozen small prawns, *Palaemon serratus* and *Palaemon elegans* are useful scavengers.

It is a pleasantly busy aquarium, but not as crowded as a tropical freshwater tank.



One of my resident Squat Lobsters (*Galathea squamifera*). Also shown is the little-known anemone, *Sagartiogeton undatus*.



Left, beware of the Bullhead or Sea Scorpion (*Taurulus bubalis*) — it can swallow fish as large as itself. Right, this Corkwing Wrasse (*Crenilabrus melops*) is exhibiting the sleeping coloration which it adopts as it rests under shelter at night. During the day, it looks quite different (see A & P, February 1987, p31).





There is sufficient spare capacity for a shoal of small Grey Mullet fry, *Chelon labronus*. Also, many of the fish are undersize. The Corkwing Wrasse and 5-Bearded Rockling will eventually need a larger aquarium. As they grow, the Wrasse, Blennies, and Rock Goby, will prey upon the smaller Gobies and crustaceans and will therefore be removed before they get to that stage.

Certain common shore inhabitants have been vigilantly excluded. Notably, the larger crabs; the omnipresent Shore Crab, *Carcinus maenas*, the attractive red-eyed Velvet Swimming Crab, *Liocarcinus puber*, and the Edible Crab, *Cancer pagurus*, which will attack other crabs and crustaceans, and cause an appalling destructive effect upon the tank. Unless they can find a safe hiding place when moulting, or changing their carapace, all crabs are liable to be eaten, while crabs of the same species will usually fight.

Beware of the Bullhead or Sea Scorpion, *Taurulus bubalis*, a veritable terror of rock pools and aquariums. It will attack and swallow fish as large as itself. Almost as voracious are the larger Gobies, the previously mentioned Rock Goby and the similar Black Goby, *Gobius niger*. The fry of Grey Mullet and BlackSea-Bream, *Spondylusoma cantharus*, thrive well in captivity. Lump-sucker, *Cyclopterus lumpus*, and Codling, *Gadus morhua*, are virtually impossible and are not advised. Bass, *Dicentrarchus labrax*, will grow rapidly and become fiercely predatory.

Avoid the Common Whelk, *Buccinum undatum*, which will expire between 15° and 20°C and quickly pollute the tank. The Grey Sea Slug, *Aeolis papillosa*, feeds solely upon anemones, so watch out.

### Feeding

Boiled mussel flesh is the staple aquarium diet of most of the fish, crustaceans, and anemones of the British seashore. This bivalve mollusc is readily available on nearly all rocky coasts, and even on sand and shingle coasts where groynes have provided the minimum of shelter and attachment. In some areas where mussels are not found, cockles or limpets will suffice. Inland aquarists are advised to feed raw white fish, cod and plaice, or prawns. Do not use oily fish like herring and mackerel, as these will foul the water. Frozen gamma-irradiated shrimp food is ideal.

Although most of the fish seem to thrive quite happily on mussel, I always supplement their diets with ample live natural food. Live shrimps provide excellent nutrition and roughage to aid digestion. They will be chased around the tank frantically. Chameleon shrimps, small prawns, sandhoppers, ragworms, mysids, prawns and fish larvae are consumed eagerly. Lugworm and Sea Lice, or Sea Slaters, *Ligia oceanica*, are not recommended. Sea Slaters are killed, but not eaten, and Lugworm tend to make the water murky with sediment. In addition, uneaten remains often pollute the tank. Very small live mollusks are included for the Starfish.

Anemones will consume small pieces of mussel, broken off in the mayhem as the

### Stocking levels summary for a 20-gall tank

The aquarium could support the following: 12 to 15 Beadlet Anemones, or similar-sized anemones. PLUS: 6 to 8 Medium sized fish (i.e. equivalent in bulk to 10 cm Goldfish) e.g. Blennies, Wrasse, Rockling, large Gobies. OR: 12 to 15 smaller (Guppy-sized) fish, e.g. small Gobies, juvenile Wrasse & Blennies, young Rockling, Clingfish. PLUS: 15 to 20 small crabs, prawns, shrimps, (or a lesser proportion of larger crustaceans). PLUS: 5 other creatures: Starfish, Urchins, Sea Slugs etc.

fish and crabs fight over the choice food. The larger Beadlets and Dahlia Anemone may also require individual feeding of larger pieces.

Many of the invertebrates have specialised diets: Sponges are filter feeders, Cowries feed on Colonial Sea Squirts, the Sea Lemon, *Archidoria pseudosargus*, feeds on Breadcrumb Sponge, the Sea Slug, *Onchidoris bilamellata*, on Acorn Barnacles, and the Dog Whelk, *Nucella lapillus*, feeds on mussels and barnacles. These specialised feeders have no place in the community aquarium.

Dragonet, *Gallionymus lyra*, Sea Stickleback, *Spinachia spinachia*, the Greater Pipefish, *Syngnathus acus*, Lesser Pipefish, *Syngnathus rostellatus*, and three other species of Pipefish will only take live food of a suitable size. They therefore need to be kept in separate tanks and watched carefully to ensure they are feeding.

### Maintenance

If the first month saw the gradual introduction of the fish and invertebrates, by the second month the spotlessly clean new tank is beginning to show signs of use. Crabs and Blennies demonstrate their own ideas of what constitutes a well-designed tank, algae need to be scraped off the front viewing glass, detritus will appear on the rocks and gravel and needs to be siphoned off.

There is no hard-and-fast rule of how much water and how often it should be changed. This depends on stocking levels and what types of fish and crabs are kept. 20% every two months should be treated as a minimum figure. In the summer, when

## EQUIPMENT CHECKLIST

- 1) ALL-GLASS AQUARIUM: (minimum 20 gallon) with hood, polystyrene sheets or carpet underlay.
- 2) FILTRATION SYSTEM: Undergravel system with 2 powerful air pumps or powerheads, air-tubing, airstones. (Alternatively: external power filter.)
- 3) HYDROMETER.
- 4) THERMOMETER: calibrated 0°C to 25°C.
- 5) MULTIPLE ELECTRIC SOCKETS: plugs, etc. or Cable Tidy, for lights pumps and other pieces of electrical equipment.
- 6) LIGHTING: fluorescent, tungsten or mercury vapour.
- 7) AQUARIUM NET.
- 8) SCRAPER: or sponge to clean glass.
- 9) SEAWATER: freshly collected or commercial marine mixes.
- 10) PLASTIC DRUMS: for collection or mixing of seawater.
- 11) ROCKS AND SEASHELLS: for decoration and to provide hiding places.
- 12) SIPHON: or Gravel Cleaner, to extract detritus and change water.
- 13) CORAL SAND OR SHINGLE: (1 mm to 4 mm) to the minimum depth of 4 cm on the floor of the tank.
- 14) REFERENCE BOOK: to identify creatures of the seashore.
- 15) SPARE PARTS FOR AIR PUMPS: filter pads and diaphragm, reserve airstones.

#### Important extras:

- 16) Nitrite/Nitrate/p.H. test kits
- 17) Additional tanks.
- 18) Spare air pump.
- 19) Brine shrimp hatchery.

the temperature rises above 15°C, the fish and invertebrates have a far greater appetite and will consume an astonishing supply of food. Furthermore, the dissolved oxygen levels decrease as the temperature rises. Ideally, 25% water changes every month would then prove beneficial. In winter, when the temperature could fall to 10°C, the aquarium could keep the same water from the beginning of October to the end of February. During this period, collected seawater tends to be murky with storm-churned sediment in suspension.

Most problems arise in the summer when the temperature rises. Above 17°C certain fish will always have problems. Bullheads, *T. bubalis*, other Coetids, and (if the high temperatures persist), Butterfish should be returned to the sea. Blennies will want to bask on rocks out of the water. If the water is too warm, the metabolism of the cold-blooded fish accelerates to such an extent that they will not survive. Rock pool inhabitants are remarkably hardy to rapid temperature changes, but are sometimes unable to endure continual high temperatures. Something else to watch out for is that overcrowding may not appear to be a problem — until the hot weather arrives.

Old water will turn an orange algae tint but an influx of fresh seawater will produce a visible improvement. If the water turns cloudy, this may be sediment churned up by crabs, or introduced with unrimed rocks, or more seriously, a bacterial explosion caused by a dead animal. If this applies, urgent action is required. An immediate 90% water change is essential, with removal of the cause of the contamination.

Water will evaporate during summer, and needs to be replaced with cold tap water. Use your hydrometer to test the specific gravity. For a precise reading, turn off the air pumps so the water is completely still. At the correct 3.4% salinity, from 9°C to 13°C, the reading should be 1.026; from 14°C to 18°C: 1.025, and from 19°C to 21°C it should read 1.024. The reading from 22°C to 28°C is 1.023, but you should not let the water get this hot. It is preferable that the salinity should be on the low, rather than the high side.



# Letters

## The 'Educational' Aquarium

The aims of the modern public Aquarium should include *entertainment, education and conservation*. These aims are linked, inasmuch as if the displays entertain the visitors, they will be more receptive to any information that is provided. Furthermore, the conservation of aquatic animals can be served by the public Aquarium, either directly by captive breeding programmes, or by using displays of non-endangered species to inform the public of the threats faced by aquatic habitats across the world.

However, the display of information, and thereby education, has never figured prominently in British public Aquaria. In fact, it might be argued that many such Aquaria are nothing more than 'menageries' in the old-fashioned sense of the word, often featuring weird and truly wonderful creatures, but with little more than identification labels on the tank fronts.

With over 20,000 fish, and countless aquatic invertebrate species (from a rich and varied selection of watery habitats) to choose from, the potential value of an Aquarium as an educational tool is phenomenal. For example, using fish an enormous number of feeding methods can not only be described, but also actually be demonstrated. The same can be said with regard to breeding habits, and where else (other than in an Aquarium) could an almost complete community be simply and effectively displayed?

There are, of course, problems associated with the display of information for any kind of public exhibit, and this is especially true in Aquaria designed and built in a bygone era, when no more than a scientific label was thought necessary. In an effort to (at least) temporarily solve the problem in the existing Aquarium at London Zoo, a series of simple but effective information labels have been produced. Preparation of each label was quite straightforward. The text was type-set and then



photographed and enlarged, usually along with a black and white line drawing. Each label was then stuck to a firm waterproof backing and wrapped in clear waterproof film. This approach is not a new idea, and neither is it ideal, but these labels do enable information on each display to be made available to the Aquarium visitors, and they are relatively easy to replace or modify. As a result, a number of adjacent tanks in the Aquarium have been arranged along a common 'theme' (including 'fish breeding', 'artificial selection'), and it is hoped to develop this idea further in the future. In addition to labels about the fish and invertebrates on display in the Zoo Aquarium, a series of information labels, entitled 'How the Aquarium Works' are in use — and have been very well received by the public.

Various methods are currently being investigated for the display of information in the planned New Aquarium at London Zoo, but utilising modern up-to-the-minute techniques will be made easier by a new, purpose-built building.

**Dr C. R. Andrews**  
Assistant Curator,  
Aquarium, Regent's Park,  
London NW1 4RY

## Praise for John Cavellier's Koi articles

I have been following John Cavellier's articles on Koi in *A & P* with keen interest and have enjoyed them enormously.

Following his advice, I have expanded my library of books on the subject and have learned a great deal about Koi.

A selection of London Zoo Aquarium's new educational labels (Photograph: London Zoo Aquarium).

Due to his helpful articles and his kind replies to my letters on pool construction, I am well on the way to establishing my interest in these fish.

I look forward to reading more articles from John in future editions of *A & P*.

**Tim Swatridge**  
Merseyside

Thank you Tim, for your kind comments. You will, no doubt, be pleased to know (as will all our other "Koi-readers") that John's entertaining and highly informative articles are scheduled for a very long, regular run in *A & P*.

**John Dawes (Editor)**

## "Geometric" leeches

I have recently had my Koi infested with a freshwater leech which either arrived with the fish from North America, or else from the plants which I received from a supplier.

I first noticed the presence of the leeches on my fountain during the autumn, but did not

notice any at that time on the fish. However, with the onset of winter, I decided that there was nothing much to do except wait until the worst of the frosts were over, so it was something of a surprise to find that they had multiplied and attacked the fish by the end of February. One fish had no less than 25, while the rest had about six each.

After physically removing the leeches, I treated the water with Sterazin P, and, after consulting Waterlife Research Ltd, gave them a half-strength dose of Pondsal.

This treatment seems to have had the desired effect, but will of course have to be repeated in a few weeks time.

Little seems to be known about this leech, *Piscicola geometra*, which is endemic to North America, though earlier reports had shown them to have been found in Lake Windermere. Since my discovery, I have heard that they have also been found in Ayrshire. I would therefore be interested if any *A & P* readers would like to write to me should they find any of these leeches in their ponds.

Although little is known, it appears that copulation occurs towards the end of winter, and that the cocoons are dark brown, about 1.5mm long with a shaggy appearance, being found from March to July. Hatching can take two or three weeks depending on the water temperature. *Piscicola geometra* are high consumers of oxygen and are often found in fast-flowing water. If placed in a container they will adhere to the bottom or sides and any attempt to remove them seems to result in their breaking in two. When taking them off fish they, unfortunately, take the fishes' scales with them.

**B. M. Watt, M.B.E.,**  
Inverness



***Piscicola geometra***  
Alternate bands light  
brown across body



# News

## India bans frogs' legs trade

As reported in our Letters page (*A & P*, February 1987), over 300 million frogs are killed each year to supply restaurants in Europe and the USA with the frogs' legs delicacy.

Almost all of these frogs are captured from the wild in India, Bangladesh and Indonesia, and have their legs cut off while the animals are still alive and conscious. The legs are then skinned and frozen, ready for export, while the still living head and torso of the frogs are discarded to die slowly, which can take an hour or longer!

The World Society for the Protection of Animals (WSPA) has been campaigning against this trade for over 10 years. WSPA's principal opposition is the cruelty involved, but there is also considerable concern over the devastating effect on the environment when millions of frogs are removed for this industry. WSPA says that there is clear scientific evidence proving that frogs feed on insect pests in agricultural croplands.

WSPA's continued pressure on the Indian Government over this industry resulted in the 'First World Conference on the Trade in Frogs' Legs' being held in Calcutta, India, last April. WSPA's Field Officer, Victor Watkins was invited to attend the conference and present the Animal Welfare and conservation view of the frogs' legs trade.

WSPA has now been informed by the Indian Government that the commercial killing and export of frogs' legs from India has been banned with immediate effect. This humane decision is applauded by WSPA and its 350 member societies worldwide. The success of WSPA's campaign will now spur the World Society to urge Bangladesh and Indonesia to impose a similar ban.

**Note:** The UK currently imports around two million pairs of frogs' legs annually from Asia.

For further details, contact: Press Office, WSPA. Tel: 01-839 3026 or 01-839 3066.

## Major Honour for Officer in Charge of Edinburgh Prison's Aquarium

Regular readers will, no doubt, remember our major feature on the Edinburgh Prison/University of Stirling Institute of Aquaculture Link Project (see *A & P*, August 1986) involving the breeding of thousands of Tilapias by long-term prisoners for distribution to fish farms all over the world.

The "lynch pin" in the project was (and still is) Jim Herkes, a dedicated, enthusiastic and impressive man, whose efforts over the past years have recently been, deservedly, recognised by the University of Stirling.

Like all other Universities, Stirling offers a small number of Honorary Degrees to "persons who have rendered outstanding services to the University, or to persons of great distinction in the field of learning, the Arts, or public affairs."

It is with great pleasure,

therefore, that we report the award of an Honorary Master of Arts degree, conferred on Jim Herkes by Sir Monty Finnieston, the Chancellor of the University, at this year's ceremony held in the Albert Hall in Stirling.

Congratulations, Jim, on a well-deserved honour.

According to Jim, since our visit to the Unit last year, "demand for Tilapia has tapered off, but we still produce some (probably in the region of 50,000 per annum). Production of Freshwater King Prawns (*Macrobrachium rosenbergii*) has now started although, to date, we have only produced some 15-20,000. This will increase eventually. We are now awaiting the arrival of Common Carp and *Clarias lazera* broodstock for the next part of the project. Should be interesting!"

It should indeed.



Jim Herkes

## Lord Skelmersdale Opens Britain's First Toad Tunnel

At 11.30 a.m. on Friday 13 March, Lord Skelmersdale opened Britain's first toad tunnel in a joint venture by the Fauna & Flora Preservation Society and ACO Polymer Products Ltd to help save some of the estimated 20 tons of toads squashed on Britain's roads each year.

The tunnel, under the A4155 at Hambleden, just north of Henley-on-Thames, has been laid by Buckingham County Council Engineers Department, with support from the Department of the Environment, the Department of Transport and local landowners.

The tunnel may also be used to save the lives of badgers, hedgehogs and other animals that are killed on roads. In addition, the 'wildlife' tunnel is good for road safety, since motorists will no longer skid

on, or be forced to swerve to avoid killing toads and other animals.

In spring, toads migrate to ponds to spawn, but they need help because the number and quality of ponds in rural areas is declining. Toads tend to use familiar, traditional migration routes to the ponds and the new toad tunnel will help save toads from death on the road because guide fences funnel the toads into the 20 cm diameter tunnel entrance allowing them to pass safely under the road.

Fauna and Flora Preservation Society, c/o Zoological Society of London, Regent's Park, London NW1 4RY. Tel: 01-387 9656.

Toad traffic builds up as the first users take advantage of the first specially built tunnel at Henley on Thames.



Photograph: Flora and Fauna Preservation Society.



# Books

## Books to Get Your Teeth Into

### 1. The Undersea Predators

By: Carl Roessler  
Published by: Facts on File Publications  
ISBN: 0-87196-893-2  
Price: £14.95  
This is a gorgeous book — worth every penny, and more.

One of the many things I really like about this publication is that it does not pander to the obvious potential for sensationalisation that its title could so easily lend itself to.

As its author so rightly says in his introduction, "the shark is simply the sea's most perfect symbol of the never-ending search of predator for prey."

Yet in the complex web of marine society the shark is but one of many creatures whose lives are entwined with each other in that intricate ballet of life or death, kill or be killed, eat or be eaten — the hunt."

We therefore find an amazing array of predators and preying techniques in this colourful 190-page volume. These range from some of the more unlikely, but perfectly "valid", predators such as soft corals, to the more obvious ones like groupers, barracuda and (of course) sharks themselves.

The chapter headings/groupings also mark a welcome and original departure from the expected. For instance, we find that Chapter 1, which is entitled, 'Hunters who cannot move' is followed by one appropriately labelled, 'Those who move, but slowly'. Some other equally "colourful" chapter titles are, 'The swimming browsers', 'Odd couples', 'Masters of disguise', 'Ambush! — sudden death on the reef', 'Children of the night', 'The classic predators — sharks' and, quite pointedly, 'Man — the final predator?'

Such originality is more than ably sup-

ported by a very readable text and spectacular illustrations.

This is a book not to be missed.

John Dawes

### 2. Nutrition and Feeding in Fish

By: C. B. Cowey, A. M. Mackie and J. G. Bell (Editors)  
Published by: Academic Press  
ISBN: 0-12-194055-1  
Price: £30.00

Gone are the days when fish farming, either of ornamental or food fish, was considered more of an art form than a science. In fact, there must be considerable doubt that it was ever considered an art in certain quarters, e.g. trout farming. Other fish, however, notably Koi, could perhaps be regarded as having occupied the more "arty" end of a very extensive spectrum.

**Nutrition and Feeding in Fish** brings all types of fishfarming unequivocally right into the centre of the scientific forum, including as it does, such serious and essential contributions as: 'Gross nutrition and conversion efficiency of intensively and extensively reared carp (*Cyprinus carpio* L.)', 'Recent advances in vitamin nutrition and metabolism in fish', 'The application of nutritional findings to the formulation of practical diets', 'Effects of artificial diets on the digestive processes of fish larvae' and 'Feeding behaviour and fish culture'.

If you are looking for a colourful, popular book — forget it. **Nutrition** is certainly not this — neither should it be. If, on the other hand, you want a book which brings together the latest ideas and findings in this complex subject area in a competent, straightforward, scientific format — look no further. **Nutrition** may not be a "light" book, but it is certainly an absolute must for anyone involved in the scientific and serious business of aquaculture.

John Dawes

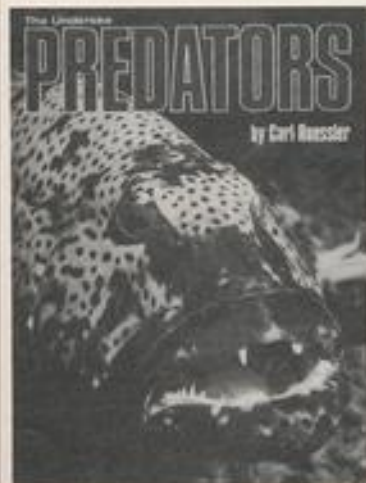


## News from T.F.H. — Latest Edition of a Popular Book

### Encyclopaedia of Tropical Fishes — New Edition

By: Dr. Herbert R. Axelrod and William Vorderwinkler  
Published by: T.F.H. Publications  
Price: £13.50

This volume represents the latest edition of one of the most popular and widely read books in aquarium literature, with its special emphasis on breeding techniques. This informative book is aimed at both the beginner and the more advanced hobbyist. Improved production techniques have resulted in a very attractive book which contains the very latest full-colour photographs with up-to-date nomenclature of fish and recommended equipment. It is superbly illustrated with over 480 plates and 100 black and white photographs.



## COMPETITION WINNERS

### £250 WATERLIFE COMPETITION

First Prize: Valued at £82  
Robert Harding, 3 Cedar Avenue, Ickleford,  
Hitchin, Herts, SG5 3XU

Second Prize: Valued at £80  
E. Rodgers, 23 Becket Walk, Sheffield, S8 7HE

Third Prize: Valued at £40  
Mr P. Wilkinson, 45 Heddfan North, Penwyn,  
Cardiff, South Wales, CF2 7EB

Fourth Prize: Valued at £20  
Miss J. Ogden, 5 Oakwell Gardens, Norton,  
Stockton, Cleveland, TS20 1HJ

Fifth to Tenth Prizes: Valued at £10 each  
Michael Adams, 11 Bank Street, Ferryhill,  
Aberdeen, Scotland, AB1 2TA, Mrs P. Foster, 4  
Royden Crescent, Billinge, Nr Wigan, Lancs, Mrs  
A. Forsyth, Ullms Cottage, Rothiemay, Huntly,  
Aberdeenshire, AB15 5NH, R. Williams, 1 Milton  
Close, Brixham, Devon, TQ5 9QY, Ian Richardson,  
5 Norman Rise, Dedridge, Livingston, West Lothian,  
Mr Harry Copley, 25 Muirfield Avenue,  
Parkfield Grange, North Featherstone, West York-  
shire, WF7 6NF

The correct answers were: 1. Algizin P, 2. Algizin A,  
3. Halcox.

### PROMIN "EXPERTS" COMPETITION

The winner of £30 worth of Promin foods is Mr  
N. Jopling, 15 Meltonfield Close, Armthorpe,  
Doncaster, DN3 3LG

The correct answers were: Ac, Bb, Cc, Dd and Ee.

### WATERGARDENING BOOKS COMPETITION

The winner of the selection of watergardening  
books donated by the Northern Horticultural Soc-  
iety is Mr R. R. Wixon, 69 Herfield Road, Coalpit  
Heath, Bristol, BS17 2TG. The correct answers  
were:

1. Aquatic plants prefer full sun.
2. Yes, decorative pond fish need plenty of light.
3. The planting season extends from early April to  
September.
4. Yes, watergardeners need fish for balance and pest  
control.





# SPINY EELS

## A GUIDE TO THEIR CARE

With a little thought and care, Spiny Eels can be kept easily and successfully by anyone willing to provide them with the room they require. Dave Curran points the way.

**T**he Mastacembeloidei, or Spiny Eels, have been known to science for over 200 years, yet remarkably little work has been done on them by ichthyologists, especially at the species level. It is not surprising then that

The Zebra Spiny Eel, *Macrogathus zebrenus*, is a beautiful but not commonly-seen species. It can attain a size of nearly 18 inches.



*Macrogathus circumcinctus*, commonly known as the Banded Spiny Eel, is one of the smallest species but, even so, can grow to around 10 inches.



there has been a shortage of reliable information about these fish in the aquarium literature, although there are some articles scattered throughout the various hobbyist magazines. (See, for example, my article on Spiny Eel classification in *A & P* June, 1986).

The Spiny Eels have been known to the aquarium hobby since about the beginning of the century. Indeed they have been kept in aquaria since about 1906, and are now receiving a boost in popularity due to the increased demand for oddball fishes.

Most Spiny Eels are found in Africa where they belong to two genera, but most of the commonly available species in the hobby are still imported from Asia, where there are four genera, of which only two are seen in the hobby.

The four most commonly available species in Britain belong to these Asian genera;

these are *Mastacembelus armatus* — the Tyre Track Eel, *M. erythrotaenia* — the Fire Eel, *Macrogathus siamensis* — the Clown Spiny Eel, and *M. circumcinctus* — the Banded Spiny Eel. Some authors also refer to *Macrogathus* (*Mastacembelus*) *pancalus* as a commonly available species, but it is evident that this fish has not been imported in quantity for a number of years.

### Aquarium care

The care of Spiny Eels in the home aquarium has been discussed in only a small number of hobbyist magazines, but even these have some inaccuracies.

The first thing to consider when setting up an aquarium for Spiny Eels is the size. This may not seem very important when you buy your specimen from the dealer at only four or five inches long and no thicker than your little finger. Appearances can be deceptive, and I have personally bought young Fire Eels at this size. But, it is the final size to which they are expected to grow which should be taken into account. The Fire Eel grows to about three feet long in the wild and its accommodation should ideally match its size, hence it would be advisable to house young Fire Eels or Tyre Track Eels in nothing smaller than a four foot tank, and be prepared to move them to more spacious quarters as they grow. Even a group of full grown Clown Spiny Eels at a mere 14in would be cramped in a three foot aquarium. The smaller species such as *Macrogathus pancalus* (8in) and *M. circumcinctus* (10in) could be housed in a two and a half or three foot tank.

### A cover is essential

Whatever the size of the aquarium, there should be no means of escape and tightly fitting lids or cover-glasses are highly recommended as Spiny Eels are excellent escapologists.

Many aquarists have either neglected these covers or have forgotten to replace them, only to find that their valued specimen had decided to "go walkies" through the night and found the next day dehydrated on



the floor, not a very nice thing to find first thing in the morning — the same goes for their close relatives, the Swamp Eels (personal experience). Even a quite narrow gap to allow heater cables and air-lines into the tank could be a means of exit for small or medium sized specimens.

#### Tank decor

It has been well documented by aquarists worldwide that Spiny Eels have a habit of burrowing into the substrate and never being seen for long periods of time. It is this that brings me to the subject of decor.

For most Spiny Eels the substrate should consist of mud or sand although mud is usually ruled out in the aquarium. I have personally found the white silica sand sold for aquariums to be most effective as the Spiny Eels can easily burrow into it if the necessity arises. Smooth medium sized gravel can be used but this may inflict damage to the fish's skin as I have found it to do on a number of occasions. I must stress that not all Spiny Eels are prone to "digging in", but almost all will do so if no other method of hiding is available.

Planting the aquarium is an option which is open to the individual aquarist, but it must be said that all plants, no matter how securely they are planted, will be uprooted in time unless they are allowed to root firmly before the Spiny Eels are introduced.

Floating plants are recommended on two counts. These are:

(i) some Spiny Eels have a tendency to get among the larger plants and can often be seen hanging from them, apparently keeping a close watch on the other occupants of the tank;

(ii) they will provide shade in brightly lit aquaria, hence encouraging the Spiny Eels to come into the open more often during daylight hours.

Rocks are an ideal form of decoration as they can be used to create caves in which the fish can hide. It may sound odd, to say the least, that I should encourage the building of caves in a tank where the occupants are unlikely to be seen anyway, but the provision of alternative hiding places usually prevents the Spiny Eels from burrowing, and I have found that it encourages them to come into the open more often.

Pieces of piping, plastic or ceramic, may not look natural but can be used to achieve the same goal as the rocks, and are very effective.

If cave systems are employed, then it must be stressed that the rocks should be arranged securely so as not to collapse when the Spiny Eels dig out the interior, which they will inevitably do. This is probably where piping would come into its own. Piping can also be an invaluable tool in catching Spiny Eels as we will see later.

Caves may occasionally lead to problems if a number of Spiny Eels are kept together in the same tank, as they will all, at one time or another, wish to take refuge in them. If too few caves are created it will obviously lead to overcrowding. This is normally of no great concern, however, as most species will happily share their caves or other

hiding places. Sometimes a piece of slate or a cave mouth with five or six heads poking out can be quite amusing.

A word of caution, though. In my experience I have found that some species from Lake Tanganyika can be aggressive towards other Spiny Eels, or indeed other fish, and can be quite territorial.

Lighting in Spiny Eel aquaria should ideally be very low because, as I mentioned earlier, these fish tend to shun bright light in favour of darker quarters. Therefore, dim lights are ideal, and a low wattage only need be used eg. 20w for a four foot tank, as lighting need be for viewing only. This rules out a heavily planted tank with a luscious growth unless plants are chosen which are suited to low lighting. All this does not mean that Spiny Eels will not survive in brightly lit aquariums, but they will be seen less frequently.

Another method of hiding is sometimes employed and has been observed by many aquarists: Spiny Eels will find their way into the undergravel filter by working their way down the uplift tubes; this can be prevented by ensuring that the end-caps that are provided with the filter are used.

If a Spiny Eel gets under the filter it can usually find it's way back out, and is, therefore, rarely a cause for stripping the tank down. Other fish which I have observed doing this are Swamp Eels, Kuhl Loaches, and Reed Fishes. All are quite adept at getting themselves back out. I have also seen young Indian Snakeheads — *Channa micropetels* — trying to get down uplift tubes.

#### The diet

To the aquarist who feeds his/her fish flakes foods, and serves livefoods only as a treat at Christmas and birthdays, Spiny Eels will prove very difficult fish to keep. The reason for this is that Spiny Eels have a very strong preference for live foods, which must be fed regularly.

Livefoods include bloodworms, glassworms, *Daphnia*, Tubifex (clean), earthworms, river shrimp, and various cultured worms.

Frozen foods are generally accepted with a certain degree of reluctance, and, then again, not all frozen foods will be accepted. It would be worthwhile to experiment with various types and ensure that a fish is really eating and not just pecking at the food, then leaving it for the other occupants of the tank, as I have found them to do. It is usually much cheaper to buy your own food (if possible) and freeze it yourself in ice cube trays or shallow dishes, thus providing a measurable amount of food. It must be noted that, in a normal sized ice cube, there is a large volume of food.

Freeze-dried foods are another option open to the aquarist with a taste for adventure. I have found that only one of my fish would entertain this type of food; this was a Tyre Track Eel which would only take Tubifex.

I have heard a number of accounts of aquarist who have successfully fed freeze dried foods as a substantial part of the Spiny Eel's diet, but I have never seen any

such fish eat the great amount which it must do to survive.

A fourth option is to try feeding fresh or prepared meats such as fish, beef heart, leftovers from your last meal etc. Although I have fed this kind of food to fish such as Snakeheads and Bichirs, I have been unable to get Spiny Eels to eat it.

The last option is to feed a good quality flaked food. It has been said that Spiny Eels can be weaned onto such food, but I have not found any proof that this has been done, and, in my opinion, it could be very dangerous for the fish if it refuses food for too long, as it has been known for Spiny Eels to stop feeding altogether.

It is worthwhile checking on the natural diet of your fish when considering how to feed it, as various species can require very different types of food, ranging from the aforesaid insect larvae and crustaceans to other fish.

#### Water conditions

Water conditions in the aquarium are not critical, but for aesthetic reasons it should be kept clear, and, most importantly, clean and free from any excessive buildup of waste products.

Normal aquarium temperatures from the upper 70's to lower 80's F would be satisfactory for all Spiny Eels, but pH should vary depending upon the species. For *Macropodus*, *Mastacembelus*, *Chasichuria*, *Rhynchobdella*, and *Cacomantacombelus* the pH can be kept at around 7.0 with a little fluctuation one way or the other, provided extremes are avoided, but for *Afromastacombelus* the pH should be much higher as the majority of species hail from the Rift Valley Lakes and the upper Zaire river where more alkaline conditions persist.

Marine salt should not be added to render the water brackish as some authors claim, as Spiny Eels are freshwater fishes. Even so, a small amount of aquarium salt would not do any harm.

#### Tankmates

Spiny Eels can safely be kept with other fishes which are too large to be considered as food, but some species, in particular some from Lake Tanganyika, can be very aggressive, and care should be taken when introducing them to other tankmates.

#### Catching a Spiny Eel

One problem which most aquarists come across is concerned with capturing a Spiny Eel once it has been introduced to the tank. Many methods have been used, including the use of two nets, chasing the fish into one of them; cornering it with a sheet of plastic or glass then netting it, and even sinking a polythene bag into the tank and trying to lure the fish into it. The method which I have found most effective is to leave a piece of piping in the tank into which the fish will try and hide; it is then a simple matter of blocking both ends and lifting the pipe from the water.

Our knowledge of the Spiny Eels is far from complete. I would therefore very much like to hear from any aquarists who have kept them, regarding their experiences.



# 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



**TROPICAL**  
Dr David Ford



**COLDWATER**  
Pauline Hodgkinson



**PLANTS**  
Barry James



**KOI**  
Roger Cleaver



**MARINE**  
Graham Cox



**DISCUS**  
Eberhard Schulze

## Discus Breeding age

*I have been keeping Discus for some time now. My aim, like most other keepers, is to breed these fish. I have been told that it takes two years before I will be able to do it, but a friend has told me that he bred his Discus when they were only 15 months old. When can I really expect to breed these fish?*

Discus will be mature enough to breed when they are about one year old. Some species or types will be ready earlier; some will take a bit longer. Also, females seem to be ready as early as seven to 12 months, whereas the males only after about one year to 15 months.

Of course, all this depends very much on the way the fish were cared for during their upbringing. With a good variety of foods and plenty of water changes, these fish will grow very quickly and will let you know when they are ready to produce young.

## Coldwater Small tank problems

*I have never kept fish before, apart from a Goldfish that I had for ten years when I was a child. I recently bought a 16in x 10in x 12in tank, a filter, gravel, plants, lights and three fish. Two died almost immediately and I replac-*

*ed one of them. Since then my fish appear lifeless, have developed white spots, and one of them "sits on its tail". Please help.*

All your problems are due to the size of the tank, which is too small for keeping coldwater fish. Attempting to keep good, healthy conditions within a tank so small is extremely difficult. In fact, selecting a tank smaller than 24in x 12in x 12in is, I am afraid, courting disaster.

There are several very good reasons why small tanks should be avoided. Small volumes of water pollute easily and therefore need to be freshened up each and every day. This is done by giving small, partial changes, making sure that the new water is at the same temperature as the old. Because your tank holds so little water, the temperature is easily affected and the fish are easily chilled. This could be the reason why your fish is 'sitting on its tail'. Not only do water changes affect the temperature, but room temperatures will also

cause rapid fluctuations. Goldfish are able to tolerate a wide range of temperatures, but not rapidly fluctuating ones.

## Gudgeons

*While visiting my local shop I was surprised to see a tank containing two 20cm Gudgeon. Would you please give me some details about this species? Can Gudgeon be kept with Orandas and baby Koi?*

The Gudgeon (*Gobio gobio*) can grow to about 20cm as have those in your dealer's tank. Gudgeon can be found in many rivers and lakes around our country; they are bottom feeders living on small insects which they find living between the stony gravel base of their waters.

The height of their spawning period is in the month of May when the females usually lay between 1000 and 3000 eggs. It takes about two to three years for the young to mature.

Often pondkeepers add these

fish to ornamental pools only to find that they are a disappointment due to the fact that they are bottom feeders and therefore are rarely seen.

I doubt that your Gudgeon will harm the Fancy Goldfish or young Koi because they are, in fact, members of the Carp family. I would, however, suggest that you furnish their tank with gravel and worn river stones to imitate their natural environment.

## Tropical A Tiger in the tank

*Would you please tell me what type of cichlid I have in my 24in x 12in x 12in tank, as it is digging up gravel and plants? It is very aggressive, is about 5in long and has a base colour of yellow with 4 to 5 black spots, starting from behind the gill flap to the start of the tail. It has red eyes with a black stripe through the middle.*

*The fins are edged in light blue with red tips on the dorsal fin.*

*Just behind the gill flap there seems to be a slight colour of red. I think he or she could be a *Tilapia mariae*.*

Yes your description certainly fits *Tilapia mariae*, or the Tiger Cichlid. These fish are renowned for uprooting everything in the aquarium. The name refers to the immature fish, when the colour is black stripes — but these



*Tilapia mariae* — Tiger or Zebra Cichlid



change to spots at maturity.

*T. mariae* is a prolific breeder, not by mouthbrooding like many "Tilapia", but by pit-spawning, hence the digging. Easy to keep and feed, with no special needs, these fish can be aggressive and, since this is genetic, there is nothing you can do about it... except swap them for Platies!

## The cichlid aquarium

I have a 36in x 15in x 12in aquarium and am interested in having a "cichlid-only" aquarium. I would like to house larger species, such as Oscars and Firemouths, but am uncertain as to the compatibility of different varieties.

I have been told that larger cichlids tend to be very expensive. Is this true?

Cichlids are not expensive if you buy young, small specimens and grow them on. If you want large fish you have to pay for the time and trouble that someone else has devoted to the fish, and this makes them expensive.

There are two major groups of cichlids — African fish, which are territorial and often aggressive, and South American fish, often peaceful and easy to keep. The African fish require hard, alkaline waters and the American species want soft, acid waters.

There are so many species, some of which are very specialised, that one letter could not cope with the subject. Borrow or buy (some are cheap paperbacks) the following books:

All about Cichlids by Braz Walker, T.F.H. No. PS-751, ISBN: 0-87666-472-9.

Introduction to the Cichlids by R. J. Goldstein, T.F.H. No. PS-662, ISBN: 0-87666-019-7.

Dwarf Cichlids by J. Vierende, T.F.H. No. KW-005, ISBN: 0-87666-509-1.

Oscars by N. Pronck, T.F.H. No. PS-687, ISBN: 0-87666-765-5.

The Cichlid Aquarium by P. V. Loisel, Tetra, ISBN: 3-923880-20-0.

Also, why not join the British Cichlid Association? Write for details to:

British Cichlid Association,  
33 Kirkmeadow,  
Bretton, Peterborough,  
Cambridgeshire, PE3 8JQ.

## Carnivorous or omnivorous Oscars?

In last September's A&P, Dr. Robert Goldstein states in his article on Oscars that they are entirely carnivorous. In two of my books they are recorded as omnivorous. Who is right? Also, how many feeds per day should an Oscar receive?

Both are right! The Oscar will eat anything, from cheese to chops, but in the wild it tends to be carnivorous because such a lot of live food is available. Feed it anything it takes to, but make it mainly carnivorous i.e. earthworms, chunky meat, fish and shellfish. Add flakes for the vitamins, of course.

Once a day feeds are enough — the Oscar will take more, much more, but just digests what it needs and excretes the rest, fouling the aquarium.

## Marine Seeing (algal) red

For the past 3-4 months, I have had a prolific growth of red algae on the sand, rocks and coral. I have green algae growing well on the back glass and in small patches on the rocks etc. The fish is Coral Beauty, Melanotus Butterfly, Sebastes Clown,

Yellow Wrasse and two Danieles do not seem to eat the red algae at all — only the green. All are in excellent health.

Are red algae harmful? If so, how can I remove them? I recently cleaned almost all of it from the tank but within days it was growing again. Would more light help?

I would be grateful for your views and advice.

In nature, red algae only grow in relatively deep water. Starting from the water's edge, you find the green algae first growing in water up to 3-4 feet in depth. Next, growing in water 4-10 feet in depth you find yellow and brown algae. Finally, in depths of more than 10 feet, red algae are found. In other words there is a pronounced zonation effect which is determined by the colour of the light able to penetrate to the different levels in question.

In the shallows, light of all the spectral colours can penetrate and so green algae, which require a great deal of red and orange light, flourish. In medium depth water, the penetration of red and orange light frequencies is greatly reduced but, since some yellow and green light does get through, together with virtually all the blue light, the yellow-brown algae thrive.

Finally, at greater depths, only the blue light component of the sunlight spectrum can penetrate and so only the red algae can flourish.

Deeper waters are different to shallows in the following ways:

(1) *Temperature*. Whereas the shallows will often record water temperatures as high as 82°-85°F, the deeper water is much cooler at 60°-70°F. **SUGGESTION**. Check your water temperature with a really accurate mercury laboratory thermometer and increase to 75°-78°F if too cool.

(2) *Lighting*. From the above you will see that green algae require light in the red/orange/yellow wavelengths for their photosynthetic activity. This is why they seem green to our eyes because they reflect back the useless green-blue light frequencies unused. You clearly already have some red/orange/yellow light since some green algae are growing at present. However, it may not be enough. **SUGGESTION**. If your present tubes are over 6 months old, change them for one "GROLUX" and two "NORTHLIGHTS".

(3) *Oxygen tension*. In the greater depths where red algae thrive, the dissolved oxygen tension is relatively low compared to that in the shallow surface waters. **SUGGESTION**. Buy a powerful air pump and use it to drive a wooden microdiffuser. This will saturate the water with oxygen.



*Echinodorus magdalenensis*

## COMING UP IN JULY

Our July issue will prove a real test for Fancy Goldfish fans. Among the features in store we have one from popular Coldwater Jottings author, **Stephen Smith** who will be introducing some of the latest varieties of Fancy Goldfish to become available within the hobby, while our other coldwater expert, **Pauline Hodgkinson** will be looking at the breeding of fancy varieties. **Dr Andrew Allen**, author of 'The olfactory world of the Goldfish' in this month's issue of *A and P*, will follow up with an equally fascinating insight in July.

If Anabantoids are your thing, we have a real first for you in **David Armitage's** account of the courtship and spawning behaviour of *Ctenopoma nobilis*. If you specialise in Catfish and are looking for a challenge, then you can't afford to miss **David Sands'** feature on the Emerald Catfish. Then there are the competitions, the latest product news, our regulars and many other goodies awaiting.

Finally, watch out for **Fred** — the Piranha with no conscience!

## Plants Elusive Sword

For sometime now I have been trying to obtain some Dwarf Amazon Swordplants (*Echinodorus magdalenensis*) for my tropical aquarium. Although some local dealers list this plant in their catalogues, none are able to obtain it. Do you know of anyone who may be able to supply me with specimens of this species?

I regret that, as far as I am aware, nobody is offering specimens of *E. magdalenensis* for sale either in the UK or Europe at the moment. Who knows, though — some *A&P* reader, somewhere, may have just what you need!



# Helping hand

By Nick Lushchan

## Use of the Wheelchair Logo is Expanding Fast

When I first started writing *Helping Hand*, very few aquatic traders ever considered using the wheelchair logo in their advertising.

I am therefore delighted to see that the number is expanding quite fast. Perhaps the constant stressing that has appeared in this column concerning the need for disabled fishkeepers to know which shops they can or cannot visit is beginning to yield results.

Although the increase in the number of traders who now show that they can provide access for the disabled is very encouraging, I still feel that many more dealers have the necessary facilities but do not use the logo for one reason or another.

As one lady who 'phoned me said: "If there was a way of letting my family know of the places they could take me and my wheelchair to, we could all go out as a family."

So, please, if for some reason you are not currently using the wheelchair logo, think again. Think of all those people who would benefit (you included) by this simple but vital bit of information.

I have recently carried out a count and have found that, at least, the following are using the logo. The more names I have, the more places the dis-

Kester and Mark demonstrate how well a simple curve in the design of a raised pond accommodates a number of wheelchairs thus allowing disabled pondkeepers to take an active part in the hobby.



abled can visit. So, if your company is not yet listed, or it intends to incorporate the wheelchair logo in its advertising, please write to me with full details.

## Project Pond — The Launch

As regular readers of *A&P* will

have seen in the March issue, a number of manufacturers, plus a trader, generously provided me with the opportunity of installing a large pond at Burton Hill House School, a Malmesbury-based special school for disabled children.

The digging, installation and filling were all completed late last autumn, and the pond was left to settle down over the winter months. The idea was for all the people concerned to get together at the end of March to introduce the fish and spend some time discussing the pond and its maintenance with the children.

The date was arranged and everyone duly arrived: Rob and Norma from **Deepools**, Sue Cave-Chinn from **Larchlap**, John (our editor), Ann (my wife) and I, and (very importantly) Phil Hayden from **Bath Aquatic Supplies**, with a car-load of large Goldfish and medium-sized Koi. Malcolm

Goodson from **Cyprio** had also donated a number of aquatic plants, including a lily (*Attraction*) and a very attractive *finis*.

Nature, of course, does not care much about arrangements. It therefore got up to its old tricks and sent down snow and hail, closely followed by heavy rain!

As soon as we got a break in the weather, we all rushed out to the pond and, as the photos show, had a most enjoyable time.

The pond is now "up and running" and, thanks to Phil, is also fully stocked.

The children's tremendous enthusiasm is being put to constructive use and the school's Principal, Philip Drake, already has a number of pond projects lined up. With a bit of luck, I'll be able to report on these in due course.

In the meantime, sincere thanks once again to all those who made the project possible.

### Traders Currently Using the Wheelchair Logo



**Airdrie Salvage**, Motherwell, Scotland.  
**Allpets**, Stanmore, Middlesex.  
**Animal Crackers**, Cleckheaton, Yorkshire.  
**Aqualand**, Headington, Oxford.  
**Aqua World**, Lasswade, Edinburgh.  
**Ascot Aquaria**, Clapham, London SW4.  
**B.C. Tropicals**, Stirling, Scotland.  
**Bath Aquatic Supplies**, Bath, Avon.  
**Beaver Water World**, Tatsfield, Westerham, Kent.  
**Guy Lyfe Pet & Aquatic**

**Centre**, Manchester.  
**Hambridge Fisheries**, Langport, Somerset.  
**Hugglescote Aquatic**, Coalville, Leicester.  
**Kynoch's of Falkirk**, Scotland.  
**Reflections Aquatic Centre**, Aldershot, Hants.  
**Shirley Aquatics**, Solihull, Birmingham.  
**Swinbrook Road Nurseries**, Carterton, Oxford.  
**Tranquillity Aquatic Centre**, Chadwell Heath, Essex.  
**WetPets**, Romford, Essex.  
**Wildwoods Water Garden Centre**, Enfield, Middlesex.



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## SPECIAL ANNOUNCEMENT

# TWO NEW ANABANTOID SPECIES

I would like to give advance notice of two new species of Anabantoid fishes.

The first is superficially like *Parosphromenus deissneri* (Bleeker, 1859) and was collected in Sarawak in July 1986 by my husband, Allan Brown, and myself.

I propose this fish be named as a new species because of its strikingly different colour pattern and geographical isolation from the type locality of *Parosphromenus deissneri*.

While having the characteristic rose-red body colour with dark horizontal bars of *P. deissneri*, the males' dorsal and anal fins each display a horizontal blue band which distinguishes them from *P. deissneri*. The proposed name for this new species is *Parosphromenus allani*.

The second species was collected on the west side of Peninsular Malaysia in July and August 1984 and 1985, again, by my husband and myself.

It has been released to members of the Anabantoid Association of Great Britain as *Parosphromenus* species "Batu Arang". This fish is most similar to *Parosphromenus nanyi* Schaller 1985 from Kuantan on the east side of the peninsula. They are, however, isolated from each other by the range of hills running down the peninsula, and may be distinguished by a slightly different range of dorsal fin spine and ray counts.

Males of the new fish also display black bars radiating from the eye to the lip, throat and belly. The body lacks the dense dark coloration of *Parosphromenus nanyi* and displays alternating light and dark horizontal bars. The proposed name for this new species is *Parosphromenus harveyi*.

When they are completed, both descriptions of these two new species will be submitted to the *Aquarist & Pondkeeper* for publication.

Barbara Brown



Above. *Parosphromenus allani* (new species) from Locality 1/86 in Sarawak. (Photograph: Allan Brown).

Below. *Parosphromenus harveyi* (new species) from Locality 33 in Peninsular Malaysia. (Photograph: Allan Brown).

NOTE: Neither of the specimens in these photographs are the holotypes for the new species.





# REGIONAL FOCUS

## FISHKEEPING IN THE SOUTH EAST

Jerzy Gawor of Aquality Ltd surveys the fishkeeping scene in the Southeastern corner of the country where, apparently all aspects of the hobby are thriving.

**T**he 'Aquatic Scene', if I can use such terminology, probably varies very little between one area of the U.K. and the other. The title of this article might suggest that there is something special about the South-East, but in fact I would not put too much emphasis on that point (even though I am South-East born and bred!). No, the purpose of this article is to show to all who read it that fishkeeping in all its splendid forms is very much alive and thriving in the South-East area of the U.K.

Much of the credit for this must go to the aquatic retailers, for without them, there would be no local centres for promoting interest in our hobby.

Having personally visited many aquatic centres, especially in the Greater London

and Home Counties areas, it is evident that the general standard in aquatic retailing is rising. The shops are bigger, better designed, more involved with providing technologically advanced life-support systems for the fish, more equipped and more informed.

Yes, I know there are exceptions to the rule, but you must give people a chance. I feel it is fair to say that not only are standards in the shops improving, but also the standards of aquaria and related equipment are much improved. The days of the cheap razor sharp 'glass-tanks', and penny-farthing filters are all but over, thank goodness, and the enthusiast can now get down to some serious fishkeeping.

Most notable is the increase in popularity of marine aquaria with the development of centralised systems (courtesy of Messrs.

TMC Ltd), and the subsequent dramatic improvement in stock holding facilities as well as stock quality and health. The enthusiast can now be sure of purchasing fish and invertebrates that will thrive in his/her aquarium (provided, of course, that (s)he has something a little more substantial than a three-foot tank powered by an air-pump and a box-filter).

The availability of sophisticated systems at the top end of the scale, efficient power-heads and power-filters, improved sea-salt and accurate test-kits means that the marine enthusiast now has all the equipment and means to set up beautiful aquaria. All this, of course costs money, but for the price of a daily pint of bitter for a year, you could have that dream invertebrate system.

While on the subject of money matters, I see many aquatic retailers offering Instant Credit facilities. This, of course, is very useful to a credit conscious consumer society, but do watch those %APR's. You could pay dearly in the long run.

It is probably true to say that many people who keep aquaria in the South-East, do so for the decorative aspect — a beautifully aquascaped system set into a chimney-breast, dividing wall, or as a central feature in a room, to act purely as a conversation piece or to impress friends and business associates.

However, we do have our 'true aquarists', and nowhere is this aspect of the hobby seen more clearly than in our Aquarist Societies. Both the A of A and FBAS are well represented in these parts.

My own retail shop is situated close to the headquarters of the South-East London Aquarist Society (the ones that take all the trophies home!), and of course I hear all the news, views, etc... first hand from members.

If you are keen on fish/plant/invertebrate species and enjoy meeting people in a friendly atmosphere then the Fish Society is the place for you. Most have regular meetings which include slide shows, talks and discussions, competitions, open days etc... with generally an expert or two on hand to discuss problems or clarify breeding behaviour in odd species. The clubs are run by members for members on an amateur basis, and hold a mine of useful information for beginners, specialist and advanced hobbyists alike. (See details at end for more information).

Of course clubs aren't the only ones to put on shows for aquarists. Our South East venue sponsored by 'Aquarian' at Sandown Park is a must for anyone with an interest in fish. I have been to two of the exhibitions, and I can thoroughly recommend them to all and sundry. Be prepared for a barrage of fish, equipment, exhibits, dealers, more fish, competitions, experts and celebrities, with plenty of refreshments on hand. Set in the countryside, it's a great day out for the whole family.

Pond keepers and Koi enthusiasts are



HEIDI ALLEN



JOHN DAVIES

Above, the range of marines available to hobbyists has shown a marked increase over the last few years. The quality of fish, as this small selection photographed at WetPets shows, is also very good these days.

The 'Aquarian' Fishkeeping Exhibition celebrates its third year this month and promises to be bigger than ever.

Above left, many garden centres in the South-East boast an aquatic section. Some of the country's leading Koi specialists are also located in this area.





## REGIONAL FOCUS

### FISHKEEPING IN THE SOUTH EAST

well catered for in the South-East. Almost every garden-centre sports a coldwater fish/plant section with related equipment. There are also several Koi specialists who can supply anything from a 4in Kohaku to a 10,000 gallon Koi pond complete with filtration, ornamental rockwork and live-stock. There are those who level the argument that some Koi command ridiculous prices. But then, like everything in life, if it's beautiful and rare and you want it, you have to pay the price. That doesn't mean to say that unless a Koi is valued and purchased at several thousand pounds then its not worth keeping Koi. Many superb fish can be purchased at prices that are 'affordable', but please make sure you have the correct size and type of pond to house these 'living jewels'. The BKKS is well represented in the South-East, with many members regularly holding meetings and generally being very helpful to anyone with an interest in Koi.

Yes, I would say that the South-East is definitely a 'fishy' community, and I am sure many people's lives are richer and more colourful because of it.

But what about fishkeeping in the South-West, the North-West and North-East? Let's have some views from those areas!

### DETAILS OF MAJOR AQUATIC ORGANISATIONS REPRESENTED IN THE SOUTH-EAST

Association of Aquarists,  
c/o Mrs Anne Ottley,  
Secretary,  
71 St Michaels Road,  
Aldershot,  
Hampshire, GU12 4JJ.

Federation of British Aquatic Societies  
c/o Mr Chris Cheswright,  
Secretary,  
1 Fairdene Road,  
Coulston,  
Surrey.

British Marine Aquarists Association,  
c/o Mr Paul Dance,  
Secretary,  
34 Seymour Road,  
Captain's Hill Estate,  
Alcester,  
Warwickshire B49 6LD.

B.M.A.A. Area Supervisor for Home Counties,  
Mr Terry Condra,  
15 Turnpike Lane,  
Uxbridge,  
Middx.

British Koi Keepers Society,  
c/o Mr Sebastian Ballan,  
Membership Secretary,  
102 Norbiton Avenue,  
Kingston-upon-Thames,  
Surrey.

Southern Livebearers Aquatic Group (UK),  
c/o Mrs Angela Moore,  
Secretary,  
43 Lamb Lane,  
Monk Bretton,  
Barnsley,  
South Yorkshire S71 2DX.

SLAG (UK) — South & West Group,  
c/o Mr Derek Lambert,  
20 Queen Mary Avenue,  
Morden,  
Surrey SM4 4JR.

SLAG (UK) — London Area Group,  
c/o Mr Gordon Forrester,  
37 Acacia Avenue,  
Dyrrington,  
Worthing,  
West Sussex BN13 2HP.

British Killifish Association,  
c/o Mrs Beryl Scates,  
Registrar,  
Heatherlands,  
Mannington,  
Wimbome,  
Dorset BH21 7JX.

British Cichlid Association,  
c/o Mr David Monk,  
Membership Secretary,  
33 Kirkmeadow,  
Bretton,  
Peterborough,  
Cambridgeshire PE3 8JQ.

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# News from the societies

## Anabantoid Association of Great Britain

The 3rd successful Members' Weekend took place in April at Ranmoor Hall, Sheffield University. A small delegation from the IGL also attended and one of them, Otto Roth, subsequently gave an excellent talk on his trip to Sri Lanka with its two endemic anabantoids: *Malpulatta kretseri* and *Belontia signata*.

Allan and Barbara Brown's talk on Sarawak contrasted the dry, deforested landscape with that of Malaysia and showed an interesting variety of captured Bettas.

At the AGM, it was decided that, in line with the IGL, AAGB will now concern themselves additionally with *Badis*, the pikehead and snakeheads, arguably related to the true anabantoids.

Best in Show was Mike Jordan's *Ctenopoma kingsleyae*. Best exhibit: Chris and Denise Brook's breeder's team of *Ctenopoma fasciolatum*. Following the prizegiving, the newly described *Betta* species, *B. turyae* and *B. persephone* were available at the auction.

Next year promises to be an interesting change as an Open Show is planned additionally.

D. Armitage

## Runcorn Aquarist Society

The Runcorn Aquarist Society held their 16th Annual Fish Show on Mothers' Day, 29 March, at the Royal Naval Association, Halton Road, Runcorn.

285 exhibits were shown this year, by 54 exhibitors, and over 120 non-showing visitors attended the show, from places as far as Halifax in Yorkshire and Wrexham in Clwyd.

The Best Fish in Show award was presented to Mr J. Corbett & son of Merseyside Aquarist Society who won with a *Poecilia butleri* from Central America, entered in the "Mollies" class.

The society wishes to thank all the companies who donated prizes for the Show.

R.A.S. meets on the second Monday of the month at

8.00 p.m. in the reception room (upstairs) of the South Bank Hotel, Lord Street, Runcorn. Any prospective members should contact Ruth Muckle on Runcorn 76099 or Gary Janion on Runcorn 61521.

## Thames Aquarist Society

The Thames Aquarist Society

is a recently formed society that holds monthly meetings at St Paul's Church, Shadwell, The Highway, London E1. St Paul's Church is situated in Docklands and overlooks the River Thames at Wapping.

The society holds its meetings in the refurbished crypt of the Church, on the third Thursday of each month.

T.A.S. is looking for new

members and the committee feel sure that there must be fishkeepers living in East London who would gain more enjoyment from their hobby by joining fellow enthusiasts at monthly meetings run by the society.

Further details can be obtained from Peter Riley, 1 Harford Street, Tower Hamlets, London E1. Tel: 01-790 1836.

## Diary dates

### Edinburgh Aquarists' Society

The E.A.S. 1987 Open Show will take place on 7 June. Please contact Robert Bird at St. Brides Community Centre, Orwell Terrace, Edinburgh, for further details.

### Staveley & District Aquarist Society

For details of this year's Open Show, which will be held on 7 June, contact Caryl Yates (Secretary), 47 North Road, Clowne, S43 4PG. Tel: 811220.

### Redcar Fishkeepers Society

The 1987 Redcar Open Show will be held at Redcar Racecourse, Redcar Lane, Redcar, on 7 June. Doors will be open from 12.00 noon. Benching: 12.00 noon to 2.00 p.m. Judging: from 2.00 p.m. Auction: 1.00 p.m. Further information from B. Lacey (Secretary), 32 Sycamore Crescent, Teesville, South Bank, Middlesbrough, Cleveland, TS6 0BW.

### Newton Aycliffe Aquarist Society

The 4th Newton Aycliffe Open Show will be held on Sunday 7 June at Elmfield Community Centre, Newton Aycliffe, Co. Durham. Further details from E. Hargreaves, 18 Church Close, Newton Aycliffe. Tel: (0325) 316755.

### Workington & District Aquarist Society

W.D.A.S. will be holding their 8th annual Open Show on Sunday 14 June at the Carnegie Arts Centre, Workington. Benching from 10.30 a.m. to 1.00 p.m. Further details from

R. Hadfield, 25 Queens Street, Workington, Cumbria, CA14 2PX. Tel: 61326.

### North Bucks Aquarist Society

North Bucks A.S. will be holding their first Open Show on 14 June at Wolverton Youth Club, Aylesbury Street West, Wolverton, Milton Keynes. For further details, contact Jon Myrtle (Advertising Secretary), 14 Nene Drive, Bletchley, Milton Keynes, MK3 7BY.

### Skelmersdale & District Aquarist Society

The S.D.A.S. 3rd Open Show will take place on 14 June at West Skelmersdale Community Centre, Beech Close, Skelmersdale. For full details, contact C. Martin, 10 The Winsters, New Church Farm, Skelmersdale, Lancs., WN8 8NG.

### Cannock & District Aquatic Society

The annual Open Show and Auction of C.D.A.S. will be held at the Community Centre, Avon Road, Cannock on 14 June. The event will include a tombola, side stalls, grand draw, refreshments and, (quote) "prizes galore". Benching will start at 10.30 a.m. and will end at 1.00 p.m. Doors open to the public from 12.00 noon. (No contact address supplied).

### Romford & Becontree Aquarist Society

The R.B.A.S. will be holding their annual Open Show on Sunday 28 June at the Parkside Community Centre, Goodmayes Lane, Goodmayes, Essex. Further details and Show schedules from the Show Secretary, Barry Brown, 12 Tiptree

Crescent, Clayhall Avenue, Ilford, Essex. IG5 0SZ.

### British Aquarists Study Society

On Saturday 13 June 1987, the B.A.S.S. are holding their meeting in the Lecture Room, at Regent's Park Zoo, at 1.30 p.m. 2.00 p.m. An Amazon Adventure. John Dawes, Aquatic Consultant & Editor of *A. & P.* 3.15 p.m. Collecting Killifishes in the Cameroons & Sierra Leone. Rod Roberts, Chairman the British Killifish Ass. 4.15 p.m. Questions. 5.00 p.m. Finish. Entrance to non-members £2.00. Tickets may be obtained from: Mrs M. Williams, 85 Dorchester Road, Leicester LE3 0UJ. Tel. (0533) 857259.

### CAGB Yorkshire Area Group

The CAGB first Open Show on Sunday 28 June will be held at Lady Margaret Hall, Holbeck, near Worksop, Nottinghamshire. Benching 11.20-2.00. 54 classes, of which there are 13 catfish classes. Any further details contact Des Penny (0302) 702917.

### Tongham Aquarists Society

Tongham Aquarists are holding their Open Show on Sunday 28 June. All enquiries to A. Pearce (Show Secretary), 4 Newlands Drive, Ash, Aldershot.

### Black Country Aquarists

Black Country Aquarists will hold their 3rd Open Show on 28 June. Judging will be to A. of A. Standards. For full details, contact the Assistant Show Secretary, K. Cook, 11 Severn Road, Halesowen, West Midlands B63 2LP.



# OUT AND *with John*



STAPELEY WATER GARDENS

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# ABOUT

in Dawes



Despite the name, Sussex Koi, the company sells Goldfish, freshwater tropicals and a range of tropical marines.



Part of the spacious sales area at World of Koi.

## Stapeley's Oasis in Cheshire

Stapeley Water Gardens have taken yet another huge step towards enhancing their already formidable reputation with the opening of their new, spectacular (and very large) tropical oasis, **The Palms**.

Step through the front doors and you are immediately transported to a tropical haven that takes your breath away — no matter what the weather may be doing outside.

The "oasis" itself consists of "glass pavilions" which constitute the largest glass structure designed for this purpose since **The Crystal Palace**. Stapeley also believe that **The Palms** is the only centre of its kind in Europe, specialising, as it does, in "the display of water."

Three-quarters of a million pounds have been spent — and it shows. Even though some finishing touches still needed to be applied when we paid our pre-opening visit in March, the signs were all there that this is

going to be a very special feature indeed that will attract visitors from every corner of the UK and, possibly, even from abroad.

There are ponds, aquaria (including a mammoth Piranha tank), formal and informal landscapes, an illuminated variable-display fountain, Koi pools, an audio-visual/education centre, gift shop, catering facilities (offering a scrumptious selection of delicacies) and much more besides, spread out over the two-acre, glass-roofed/walled site.

Here is a brief sampler of some of the new facilities:

**The Formal Pool** measures 100ft x 8ft x 2ft (deep), contains 18,000 gallons of filtered water, and is subdivided into three sections to display a range of Fancy Goldfish, Koi and decorative aquatic plants.

**The Palm Avenue**, planted with tall, elegant, 'feathery' Queen Palms (*Coccoloba palmosa*) from South America, leads to the floodlit **Centre Fountain**

which is operated by 13 pumps, generating 300 separate jets of water in 125 combinations — all electronically controlled.

**The Temperate House** consists of a series of informal features surrounding a "tunnel of underwater life" in which a range of sea and freshwater creatures, including sharks, will be displayed. There is even a beach and 'Touch Pool' for children (and adults?) to experience intertidal organisms at close quarters.

Space does not allow me to expand any further on all the other goodies on show. So why not create your own space in your diary and take a trip to **The Palms**? You pay £1.50 to get in (£1.00 for children, £1.08 for OAP's, £1.35 for pre-booked parties). In return, you get an experience that is worth every penny. Then, of course, you've got the added bonus(!) that, just across the car park, lies "Europe's largest water garden centre". Not bad for a day out, is it?

If you would like more information, ring Peter Robinson on (0270) 628628, or write to **The Palms, Stapeley Water Gardens, Stapeley, Nantwich, Cheshire CW5 7LH**.

## World of Koi

Based just six miles from Junction 4 of the M25 motorway, this brand-new company offers, quote, "A new concept in fishkeeping".

Once inside **World of Koi**, one becomes immediately aware that a great deal of effort, and not a little imagination, have gone into the layout and presentation of the premises.

The building has been split into two levels, the higher of which has three beautifully landscaped ponds surrounded by heathers and various conifers against a background of red cedar wood fencing.

The lower floor has five holding tanks on one side, and a spacious L-shaped counter next to a carpeted area on which a selection of aquaria are displayed.

Everything about the place has an air of good taste and there are a number of nice touches in the display area, such as attractive wall fittings, ornaments, etc. Even the office and store room are edged at the top with red roofing making them look almost like additional buildings.

The roof of the premises has

a number of glass panels giving extremely good natural light which is inclined to make you forget that you are, in fact, indoors.

There is, of course, a large selection of good quality Koi embracing a wide range of prices to suit all pockets, a selection of ponds and all the accessories one is likely to need.

The landscaped ponds on the higher level are intended as examples of the kind of work which **Steve Hickling** and **Rod Gilbert** can undertake for enthusiasts who want a Koi pool in their own garden.

Steve and Rod, both experienced Koi-keepers themselves, can also offer nationwide services to their clients.

**World of Koi** has clearly got off to a cracking start and seems destined to make a significant and early contribution to the hobby. For further details, contact **Steve or Rod** at **World of Koi, Bencewell Farm, Oakley Road, Bromley, Kent. Tel. 01-462 9479**.

## Koi and Much More Besides

The **Sussex Koi and Bird Centre** is located in an impressive four-acre site displaying a vast range of ornaments, several ponds, fourteen holding tanks for Goldfish, fourteen holding tanks for Koi, plus a number of other attractions — all set in among trees, shrubs and flower beds.

In addition, **Sussex Koi** have a tremendous display of Cockateils, Love Birds, parrots and the inevitable budgies, plus many other birds. Some of these are housed in the "bird shop", while many others are in outdoor aviaries.

The name, **Sussex Koi and Bird Centre**, is a bit misleading as there is also a large selection of tropical fish on sale, as well as twenty tanks of Marlines (by the time we go to press).

**Noel and Jennifer Pannell** who run the establishment are both very pleasant people who obviously know what they are doing. Noel is also a well-known Koi specialist with the result that at least half the stock sold at **Sussex Koi** is home-bred.

This is a place certainly worth travelling to see in season.

For more information, contact **Sussex Koi and Bird Centre, Locksacre Aquatic Nursery, Wophams Avenue, Birdham, Chichester. Tel. (0234) 412472**.



## FOCUS ON CICHLIDS

# GROWING PAINS

Breeding cichlids is often easy, but rearing the fry successfully can prove to be very difficult. Dr David Pool of the Tetra Information Centre explains why.

One of the more popular aspects of cichlid keeping is the relative ease with which many species will breed and tend their eggs and young fry. Unfortunately, getting a pair of cichlids to spawn is often the easy part, and many, if not all, of the fry that hatch may not survive to become adult fish.

The growth and survival of cichlid fry is

influenced by a large number of variables. For example, by providing optimum conditions it is possible to increase the growth rates and raise a greater proportion of the fry to maturity.

Obviously, different cichlid species require different conditions in which to breed. However, these will not be dealt with in this article. Instead, I will examine the basic variables which influence the growth of

cichlid fry. More precise details for individual species can be obtained through further reading, experience or discussions with other cichlid keepers. In this respect joining a specialist society such as the British Cichlid Association will prove invaluable.

### Factors influencing the growth of cichlid fry.

- Genetic material of fry
- Water temperature
- Aggressive behaviour
- Water quality
- Fry density
- Tank decoration
- Feeding
- Disease
- Air temperature

The variables in the accompanying table have been shown experimentally to influence fry growth and survival, and I will deal with these in more detail in the following paragraphs.

### Genetic variability

Even given optimal conditions, there is a limit to how fast a particular fry can grow. This limit is determined by the genetic material of the fish and can only be altered by careful selection of fast or slow-growing parents.

Within any batch of fish there will also be considerable genetic variability, resulting in each of the fry having a different maximum growth rate. Consequently, it can be seen that some fry from a particular spawning grow at above or below the average rate, even when the conditions are identical. The environmental conditions mentioned subsequently determine how close to this maximum a particular fry will grow.

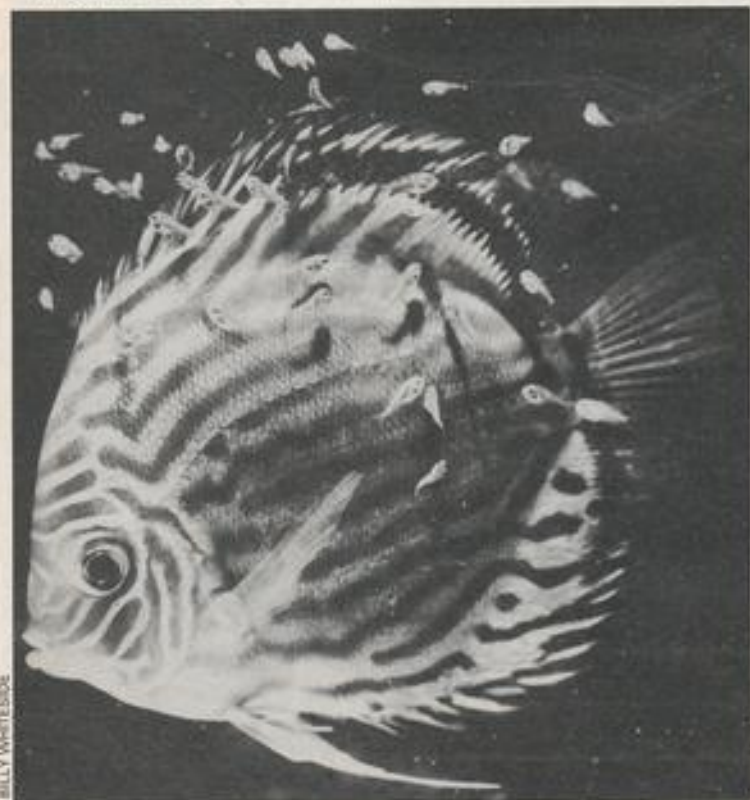
### Aggressive behaviour

Even when very young (20 days old) the fry of many cichlids are territorial to a greater or lesser extent. Fry require a certain amount of food and space in order to grow rapidly, and if this is not available, they tend to bully each other, usually smaller, fry to increase their share. Such behaviour takes the form of chasing, nudging or fin nipping and results in considerable size variation within the brood.

The aggressive fry obtain more than their share of the food and space and so grow rapidly, whereas the submissive fry are continually stressed and do not receive sufficient food. Therefore, they grow more slowly and may even die. Such aggressive behaviour is always present within any batch of fry, but is considerably increased if there is a shortage of food or space within the aquarium.

### Temperature

Water temperature is perhaps the major factor influencing the growth of fish fry, with the optimal temperatures for growth varying from species to species. However, even within the range of values at which a particular cichlid will spawn, it is usually



BILLY WHITE/ESD

These Discus (*Symphysodon aequifasciata*) fry are only a few days old, at most. Yet, they already show small size differences, even though they are receiving the same food, both in quality and quantity.



found that, the higher the temperature, the faster the rate of growth. At these raised temperatures fry tend to be more aggressive, and deteriorating water quality poses more of a problem. Therefore, the overall increase in growth is often not as great as expected.

### Stocking levels

If the fry are overcrowded there will be greater competition for the available food and space, and, consequently, the level of aggressive behaviour will increase. At high densities the smaller fry are often bullied incessantly and, so do not obtain sufficient food to survive.

If the overcrowding is not remedied this process can continue until the density is reduced to a level which is low enough for each of the remaining fry to obtain sufficient food and space. At raised fry densities, poor water quality can also present problems.

### Water quality

If the fry are overfed or overcrowded, poor water quality conditions will rapidly develop. Raised ammonia/ammonium, nitrite or nitrate levels, and reduced oxygen levels, will kill the fry if severe, and will greatly reduce growth and fin development even if slightly unsuitable.

Efficient filtration is, therefore, essential, as are regular partial water changes and regular cleaning of the tank and filter. It should be stressed that regular partial water changes are important, even if the tank has efficient filtration, as there will still be a build-up of nitrate within the aquarium which can affect growth rates. Foam filters are particularly useful in a fry tank as they provide efficient filtration without the risk of the fry being sucked into the filter.

### Food

Providing a sufficient quantity of the correct type of food is, obviously, important when raising fry. Food for fry has to be small enough for them to eat, which can be

## FOCUS ON CICHLIDS

a particular problem with newly-hatched fish. It also needs to have a high protein content to ensure that the fry get sufficient amino acids for growth.

Proteins cannot be stored, so, therefore, regular feeds are important, particularly in the early stages of the fish's life when growth is at its most rapid. Because of this, commercial breeders often feed their fry 7-8 times each day to promote rapid growth. When feeding as frequently as this, tank hygiene and regular water changes are of the utmost importance.

### Habitat structure

As already mentioned, cichlid fry tend to be aggressive towards each other as they compete for food and/or space. This behaviour can be reduced to a certain extent by introducing stones, bogwood or plants into the aquarium.



This female South African Mouthbrooder (*Pseudocrenilabrus philander*) is incubating a mouthful of eggs. Getting to this stage is the "easy bit". From now on, the fate of the fry will be influenced by numerous factors.

It is not that the fry are pacified by their surroundings, but simply that the smaller fry can escape the attentions of their larger brothers and sisters. This not only allows them time to feed, but also results in the larger fry spending less time and energy chasing. Consequently, all of the fry benefit and grow more quickly.

### Grading

In order to reduce aggressive behaviour and prevent overcrowding, it is often necessary to grade the fry. This simply involves separating the smaller and larger fry, so reducing the stocking density and allowing the fry to feed without interruption. If sufficient space is available, fry should be graded 4-5 times in order to separate the aggressive individuals. Unfortunately, this requires several aquaria and so is not practical for many aquarists.

### Other variables

The preceding paragraphs illustrate how a wide variety of variables can and do influence the growth of cichlid fry. I have mentioned several variables which I consider to be the most important, but there are numerous others, including disease, pH, hardness and air temperature.

It is important to remember that these variables do not act in isolation. So, for example, if the temperature is raised to promote growth, the aggressive behaviour of the fry is increased, the water becomes polluted more quickly and the increased growth can quickly lead to overcrowding. Therefore, the overall effect might not be quite what was expected.

Realistically, it is unlikely that anyone will successfully raise 100% of the fry that hatch. However, by being aware of the variables mentioned here, and by trying to minimise their adverse effects, it should be possible to improve the growth rate and raise a greater proportion of the fry to maturity.



A. VAN DEN NIEUWENHUIZEN



SORGEN WIMMO

Left, the eggs (laid on a partly vertical surface) which this Jewel Cichlid (*Hemichromis bimaculatus*) is guarding are genetically variable and will result in fry that will grow at different rates — even under uniform conditions. Right, newly-hatched Black Belt Cichlid (*Heros (Cichlasoma) maculicauda*) fry are almost identical in size.



# Spotlight

# DISCUS

(*Symphysodon*)

Masterpiece by:- Philip Robinson

Text by:- John Dawes

I can't draw to save my life. Consequently, I am always deeply envious (in the nicest possible way, I hasten to add) of anyone who can — and even more so of someone so obviously talented as Philip Robinson.

Just take a look at the magnificent painting on the facing page. Now, that's what I call a masterpiece.

I asked Philip to supply, if possible, a

rough guide as to how he goes about his work and he duly obliged with the accompanying step-by-step photographs. He makes it look so easy that even I am tempted to have a go. How about you?

The captions for each photograph were also provided by Philip and show the thinking that lies behind producing his works of art. Follow his tips and, who knows, you could surprise yourself and find you have hidden talents. Mine are so well hidden that I gave up looking for them years ago!

For the record, Philip lives in Durham and completed his Higher National Diploma in Visual Information and Design (with Merit) at Sunderland Polytechnic last summer. As the following quote shows, Philip is not just a fish illustrator — he is also a very keen fishkeeper.

“I started to keep fish properly in 1981 — I was always fascinated by them. From early childhood, the countryside was my place, where I would catch tadpoles and sticklebacks. These I kept in a small pool in the garden. However, in 1981, my sister, Michelle, purchased a pair of twin-

tailed Goldfish and a bowl. I followed suit shortly afterwards with a Moor and my own bowl. Several months after this, my father and I constructed a pond and later, as a birthday present, I was given a tropical fish tank complete with all the accessories.

This was when I really became hooked on fishkeeping. Since then, I have added to my equipment and now have several tanks containing a wide variety of tropical fish. I also have a large pond with Golden Orfe and Goldfish in my garden. My largest Orfe has won several trophies for me over the last few years.

My favourite fish, by far, is the Siamese Fighting Fish. In my estimation, no other fish is more beautifully designed. Next is the Angelfish with its gracefulness and cute behaviour and, I greatly admire the Red Devil which is a cheeky fish that seems to love to put on a show as it displays and bites everything in sight!

1. Pencil drawing using a soft 2B pencil (which is easy to rub out). This is the stage at which your idea develops further.
2. Painting in background colour-based objects. Care has to be taken at this stage to paint around the fish. Be aware of where you intend the light to fall.
3. I work on the minor fish first. The larger distant fish tend not to be painted as brightly as the foreground fish. You must make the smaller fish look as though they are well in the foreground.
4. The main base colours will influence the transparent colours you put over later.



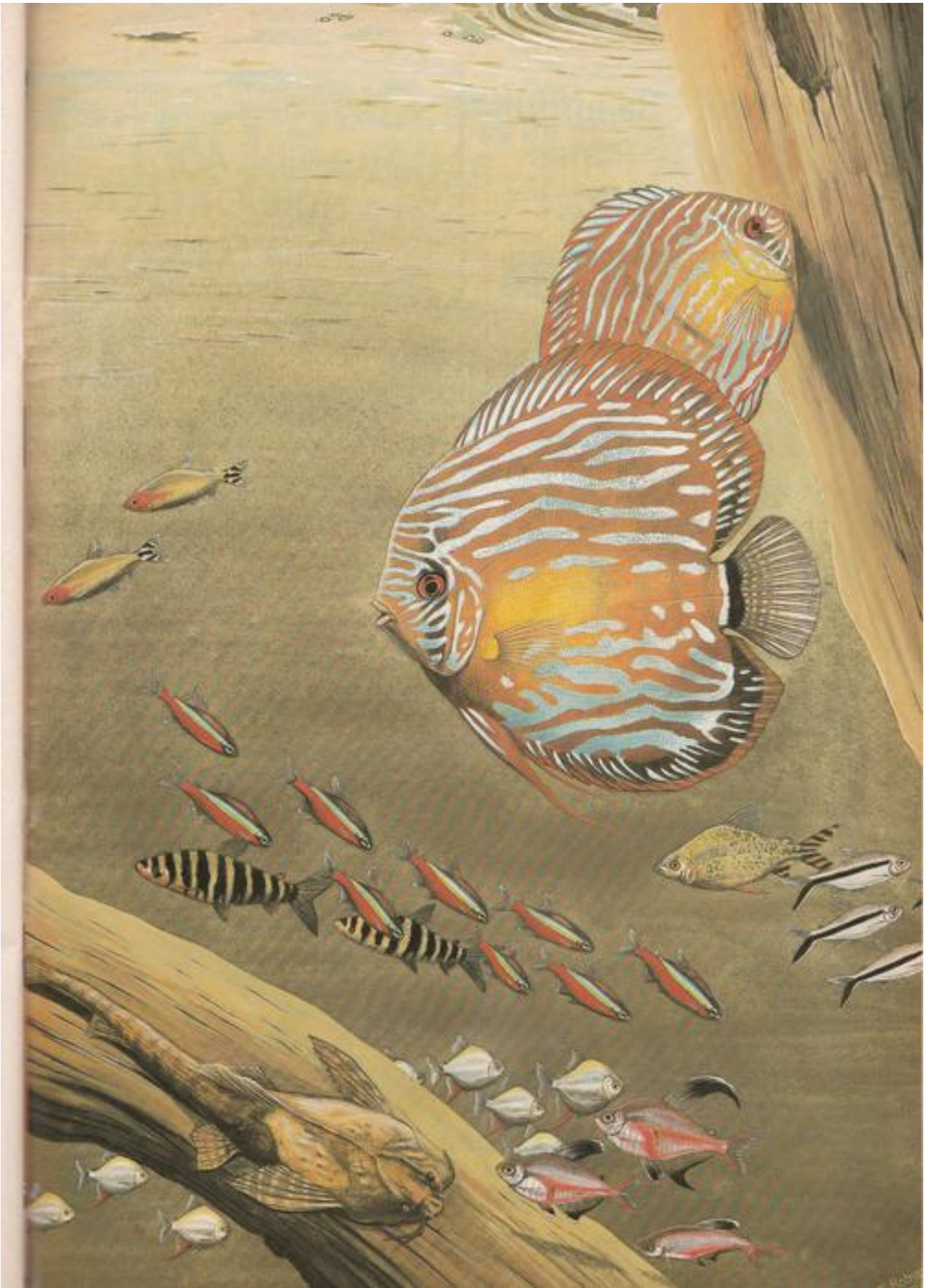
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## FOCUS ON CICHLIDS

# BREEDING



CHRIS ANDREWS



CHRIS ANDREWS

A male *Neotroplus*, left, in normal coloration.

This female, above, is in full breeding colour. Several small fry can also be seen in the photograph.

**G. LEWIS**  
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phone me on 0303-66741



## FOCUS ON CICHLIDS

# THE PIGMY PARROT CICHLID AT LONDON ZOO AQUARIUM

Many of the species of fish kept at London Zoo Aquarium regularly breed in the public display tanks. **Steven Matchett**, the keeper responsible for the Tropical Hall, describes the Aquarium's success with the delightful Pygmy Parrot Cichlid.

**T**he Pygmy Parrot Cichlid (*Neotroplus nematopus*) from Costa Rica and Nicaragua has been bred at the London Zoo Aquarium on numerous occasions.

It is a relatively small Neo-tropical cichlid, males reaching 10 cm, whereas females rarely reach over 7 cm, a usual size being 4 cm long. Coloration is an overall grey with, usually, only two or three vertical charcoal bars being present, one behind the head, a very large midbody bar, and one towards the base of the tail. Depending on the individual's mood, seven or eight other less distinct bars may also be present. The head is blunt with a small mouth. Males develop a slight nuchal hump (i.e. on the nape of the neck) and tend to have elongated tips to their fins. A white ring surrounds the eye, and whitish tips are normally present on the pelvic fins. All other finnage is basically grey, with red edging being seen occasionally.

### The breeding tank

One account of breeding and rearing this species at London Zoo Aquarium is as follows. A 75 cm x 30 cm x 30 cm tank was set up with a layer of ordinary aquarium gravel, 5-10 cm deep. Rocks were placed at angles forming plenty of caves and crevices. No filtration was present, but frequent water changes and a good supply of air was provided. Temperatures ranged between 76°F to 82°F, pH 8.2, KH 7°, GH 21° and nitrite was rarely above 0.05.

A pair of *Neotroplus* was selected and placed in the breeding tank. The diet for the chosen pair did not differ in any way from our standard diet for *Neotroplus* which is as follows: live *Daphnia*, *Tubifex* and, occasionally, earthworms, flake-food, trout pellets, finely chopped herring, grated beef-heart, lettuce and peas.

### Courtship and breeding behaviour

After three days in their new surroundings both fish were beginning to change to their breeding colour, and show interest in each other. Breeding colours in this species of cichlid are the complete opposite of the normal coloration. The overall grey colour

is transformed to a charcoal colour with only the midbody bar remaining, which changes to light-grey. The white ring around the eye changes to a bright bronze colour, being most prominent on the female.

Both fish appeared to like cramming themselves into small crevices between and under the rocks when not digging. The female seemed to do most of the pit digging under the rocks with the male occasionally helping. The female was also observed approaching the male and taking the lead in the courtship display. She quivered in front of the male, who would respond by curving his body and quivering close to the female while facing the opposite direction. The pair would then move close to one of the several pits by the base of the rocks and repeat the performance with the excited male violently "padding", causing gravel to fly out of the pit so making it (the pit under the rock) even larger.

Their colouring at this point grew more intense, with the charcoal body colour growing even darker and the midbody bar almost a white blaze on each side. The courtship display continued for the next two or three days with the pits dug deeper each time, until both could fit in together.

The ovipositor was by now in evidence on the female but no sperm tube was noticed on the male. Both fish suddenly became very shy and hid most of the time among the rock crevices, the female being slightly less wary than the male. This behaviour was probably due to zealous guarding of eggs. After two days, both appeared to be very protective of one of the gravel pits under a rock, emerging from this pit to threaten and even bite a hand if placed in or near the tank.

As this species spawns on a hard surface, i.e. rock, the fact that the pair were guarding a gravel-pit led me to believe that the eggs had hatched and had been transferred to the pit from the spawning site. Four days later a cloud of fry was seen free-swimming with both parents, who would show aggression to any movements near their tank. The parents were removed from the tank after one week to allow artificial rearing of the fry.

### Rearing the fry

The fry were fed on Liquifry No 1 to begin

with, progressing on to finely powdered flake-food, brineshrimp and *Daphnia*. They grew quickly and, at 33 days old, were 10-13 mm long and transparent. Eleven fry were removed dead (34 days old) due to a night temperature drop of 10°F. At 36 days old a black vertical bar appeared on the midbody, with the tail bar soon following. At this stage there were about 150 fry — too many to rear. Consequently, 60 of the largest and best were removed to six other tanks (the rest being culled). The rearing tanks were 60 cm x 37 cm x 30 cm with a thin layer of gravel and a few broken clay flower-pots to provide hiding places. Again no filtration was present, only good aeration and a regular siphoning of debris coupled with water changes (¼ per week). With 10 fry in each aquarium they grew rapidly and, at 30 mm (and 5-6 months old), some changed to breeding colour and attempted to spawn!

### Footnotes

1. Observing several other pairs of *Neotroplus* breeding and rearing their fry, the majority of the time (if parents are allowed to rear the fry), it is the female who tends to rear the fry to maturity, with the male only occasionally taking full responsibility for the fry's well-being. When males do rear the fry, they seem to chase the female away from the fry if she tries to help, so she is best removed, unless adequate cover is provided.

2. In some batches of fry the red edging to the fins is present.

3. If the adults are removed once the fry are free-swimming, the parents should be kept separate or serious fighting may occur as a result of a combination of various stress factors, such as the loss of fry, netting, new surroundings, etc.

4. *Neotroplus* are part of London Zoo Aquarium's Cichlid Breeding Display, representing Cave Spawning Cichlids. They can be seen breeding all year round with one or both parents rearing the fry, much to the public's delight.



## FOCUS ON CICHLIDS

# HAPLOCHROMIS VENUSTUS A LAKE MALAWI MOUTHBROODER

If you can afford the space, this colourful African mouthbrooding cichlid could be just what you are looking for, according to Jørgen Wimo, president of the Danish Aquarium Union.

There are still a lot of new and exciting cichlids being imported from Africa. Some are completely new to aquarists and scientists while others may be new to aquarists but old to scientists.

Most of the imported fishes come from Lake Tanganyika and Lake Malawi. In Lake Malawi there is a large genus called *Haplochromis* and one of the species from this genus, *Haplochromis venustus*, was described for the first time by G. A. Boulenger in 1908 in his article "Diagnoses of new fishes discovered by Captain E. L. Rhoades in Lake Nyasa", printed in *Ann. Mag. Nat. Hist.* (8) 11: p.238-243.

A synonym for *H. venustus* is *Haplochromis similans*, Regan. Regan described *Haplochromis venustus* females in 1921 and gave them the name *Haplochromis similans*. Boulenger described the genus *Cyrtocara* for *C. moorii* and Regan moved, among others, *H. venustus* to this genus. This is why another synonym — at the time of writing — for this species is *Cyrtocara venusta*, Regan.

*Haplochromis venustus* is endemic to Lake Malawi, which means that this species of

cichlid does not occur in any other place in nature. It is found in the whole of Lake Malawi from north to south. *Haplochromis venustus* males can attain a size of 25cm (c.10in) while females can grow to 17cm (6.7in). 50 fish caught in Lake Malawi — from the north and the south — measured from 11-22.5cm (4.3-8.9in).

This cichlid keeps to the sandy areas where there is mostly fine sand nearest the coast and a little coarser sand a bit further out. The areas with sandy bottoms slowly get deeper as one gets further from the coast. At 100-200 meters from the coast the water is only 4 metres deep but then (quite quickly) it gets very much deeper.

The vegetation is sparse and is mainly *Vallisneria* in patches not more than 10m<sup>2</sup>, and mostly less. At the north of Lake Malawi these *Vallisneria* growths have their largest distribution and cover 12-15% of the entire bottom area.

Besides *Vallisneria* there are two other higher plants, one of which is a *Ceratophyllum* species.

*Haplochromis venustus* has been caught at depths down to 10 meters and in periods with calm weather when the water is very

clear (when on-shore wind causes large waves to break on the beach, the water becomes cloudy). The water is rather hard with a DH value of 15-20 and a pH value of 7.2-8.5. The temperature is from approximately 23°-26°C (73.4-79°F) and it never goes below 20°C (68°F). *H. venustus* feeds on smaller fish, a little vegetable matter and lots of crustacea and other invertebrates. On sandy areas there is a more varied fauna of invertebrates and crustacea than on rocky coast areas and it is quite natural, therefore, that this fauna is the nourishment for the fish that live there.

### Description

The colours of the male are strongest when it is about spawning time. The area on the front of the head, from the snout and right up to the beginning of the dorsal fin, and as wide as the head, is coloured strong yellow. The dorsal fin, as well as the upper and lower parts of the caudal fin are yellow too, while the remaining parts of the fish are steel blue. When it is not breeding time, there are some large brown blotches on the side of the body. The first impression that this fish creates is that somebody with a bucket of yellow paint has not finished painting a blue fish yellow!

The colours of the female are much more neutral. On a light yellow/brown basic coloration there are large dark brown blotches all over the whole body, approximately 8-10 on each side. At spawning time they are even more prominent. The coloration of the female is an excellent example of how evolution has resulted in camouflage which makes the female nearly invisible in the flicker of light near the bottom as she carries the eggs, and fry in her mouth during incubation.

The male spawns, if possible with every female that passes by, so one can't talk about forming pairs. *Haplochromis venustus* is therefore a polygamous, dimorph (the sexes are different), mouthbrooding cichlid.

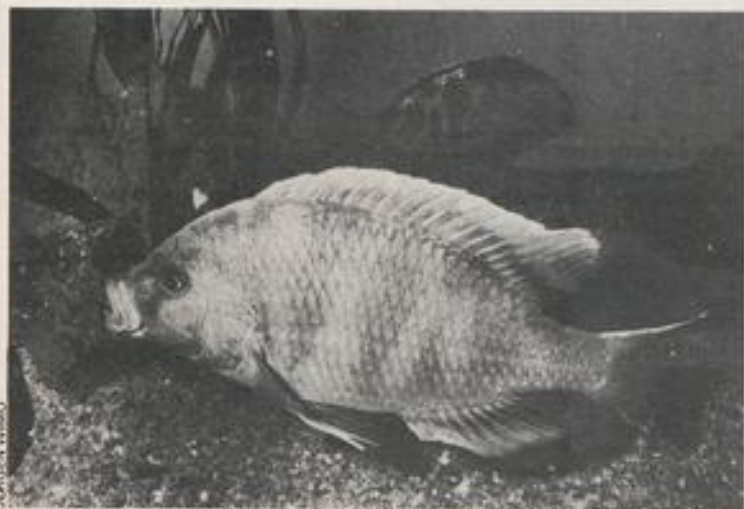
The name of the genus *Haplochromis* can be divided into *Haploos* which means "single" and *Chromis* which is a closely related genus. The name of the species, *venustus*, means "graceful" in Latin.

### Spawning behaviour

The auction in our local aquarium society is always very big and with lots of different fishes and plants. One evening there was a trio of *Haplochromis venustus* for sale — 1 male and 2 females and I got it for the very low price of two dollars.

The next problem was to find space for these fish and I put them in a large aquarium with a trio of *Cyphotilapia frontosa* after I had moved the stones around. The tank was 1 meter long and, at both ends, there were lots of stones, thus creating a lot of hiding places. The bottom layer was fine gravel and the stones were overgrown with algae. The water had a hardness of 14 DH, the pH value was 7 and the temperature was constant at 24°C (75°F).

One evening when I came home, spawning was taking place. The three *C. frontosa* were chased away and the male *H. venustus* had



A pair of *Haplochromis venustus*. The "blotched" female can be seen in the background.



# FOCUS ON CICHLIDS

## Technical data:

- 1 The snout measures 1½-1¾ times the diameter of the eye (Boulenger.)  
1½-1¾ times the diameter of the eye (Trewavas.)
- 2 The lower jaw is not pointed and 'fits' 2½-2¾ times in the length of the head.
- 3 The height of the body goes 2½-2¾ times into the total length (including the caudal fin).
- 4 The length of the head is ½ that of the total length.
- 5 The diameter of the eye is 4-4½ times smaller than the length of the head.
- 6 The diameter of the eye is 1½-1¾ times smaller than the orbital length.
- 7 The snout has a straight upper profile and the mouth does not extend behind the hindmost edge of the eye.
- 8 The outer teeth are moderately large and nearly all conical with some bicuspid teeth (two-pointed). There are 56-74 in the upper jaw followed by 3-4 series of small conical teeth.

9		Spiny rays	Soft rays
Dorsal fin		XVI	10-11
Anal fin		III	10
Lateral Line	4-5 (anterior section) 14-16 (posterior section)		

made a hollow in the gravel to which he tempted the father of the females. He swam back and forth in quick jerks in front of her and arched away from her so he could really show his bright yellow and blue colours. The female had large brown blotches in an irregular four-striped pattern and every time the male made his movements she was tempted a little nearer to the hole in the gravel.

The fish then started circling around one another and, suddenly, the female started laying eggs. She hurried, turned around and collected the yellowish oval eggs measuring 2 x 3mm in her mouth. As she continued to circle, her snout came nearer to the anal fin of the male. It was nearly impossible to see the genital papilla of the male since it only measured approximately 1mm. (The breeding tube of the female measured 4 x 2mm and looked like an upside-down truncated cone). Now and then the other fish in the tank were chased away and then the spawning continued. The eggs were not always collected in one lot but then she took any she had missed the next time she turned round. The female layed her eggs in batches of 2 to 5.

The whole spawning lasted one hour and it seemed to me as if the eggs were spawned, collected and then fertilised, but not always after each batch of eggs. This could mean that *Haplochromis venustus* belongs to the most advanced type of African mouthbrooders.

When the whole spawning was finished, the female kept near the surface in the darkest corner of the tank with her mouth full of eggs.

### Mouthbrooding behaviour

The day after the spawning, the female was moved to a 60-litre (16-gal) aquarium with aeration, temperature 25°C (77°F) and hiding places created by means of large stones. She only spat out two eggs in the process of transfer and immediately hid. The following day it was obvious that she

still had eggs in her mouth since she often made chewing movements.

20 days after the spawning she spat out the baby fish. They measured 12mm, were coloured like the mother and looked like her in miniature. As soon as the mother sensed that somebody was coming close, she started taking the fry in her mouth again. The next day she still collected the fry at the slightest disturbance. Before she took them in her mouth she circled a little as if to give the fry a signal to collect. Thereafter she backed upwards and the fry swam towards the dark areas. She did not keep the fry for very long in her mouth.

On the evening the day after the fry were spat out the female was removed and, to try the instinctive behaviour of the fry, I put my hand into the tank, made a circular movement with two fingers closely together and then moved the fingers upwards and away from the fry. The whole lot immediately swam towards the fingers and especially towards the darker area between the fingers. They really tried to force themselves in between the fingers. When I spread the fingers, the darker area disappeared and none of the baby fish swam in between the fingers.

Four hours later the fry did the same, but the next day — 9 hours later — the fry fled when I put my hand into the aquarium. From that first day the fry were fed with Cyclops and small *Daphnia* and they grew with an astonishing speed.

At an age of one month they already measured 20mm and they still had the same pattern as the mother. Altogether, there were 56 babyfish in this spawning, but a large female should be able to produce 200 eggs. It is not possible to tell the difference between males and females before the fish measure 10cm, at which time the males lose the female juvenile pattern.

If you get a chance to keep a shoal of *Haplochromis venustus*, you will need a 300-litre (80-gal) tank, but the result will be really worth the effort.

"I just can't believe what I'm seeing!" "Fabulous!" "Do you paint them every morning?" "Do they need special ponds?" "Oh, aren't they beautiful!" "I've never seen such big fish!" "This is something else!" "How on earth do you keep the water sparkling like that?" "Fantastic!" "Aren't they magnificent!" "Do you sell books about them?" "We keep seeing your advertising but why are you so modest; there just can't be anywhere else to touch this!" "I almost want to cuddle them!" "Do these babies really grow to that big?" "The prices I see displayed really blow the myth that Kent Koi are expensive. I've never seen better value!" "Do they really hand feed?" "Why don't you advertise the fact that they are indoors! We never go koi-hunting unless its fine." "Fantastic!" "Do you really sell koi to the Japanese?" "They really are so relaxing that I could stand and watch them for hours." "The kids ask to come here rather than the zoo." "What a mix of colours, there just aren't two the same!" "Far better than all your tranquillisers!" "Was it you we saw on tele?" "No wonder koi keepers get so hooked!" "Absolutely fascinating!" "Why do they come to us like this?" "Out of this world!" "I travel all over to see koi and this has to be the greatest!" "Do you build ponds for koi?" "Why don't you charge people to come in to see them?" "You just want to get in and swim with them, don't you!" "Just wait till I tell Harry!" "Are they real?" "They're really gorgeous. I can understand my koi-keeping friends getting so enthusiastic!" "Good gracious, is that the time: I must go: see you again soon."

NOT OUR WORDS BUT JUST A SELECTION OF YOURS!

Thank You!



KENT KOI KO, POLHILL CENTRE,  
BADGERS MOUNT, SEVENDOKS,  
TEL: 0959 33567

### Where?

M25, Junction 4 and spur to first roundabout, take first exit to second roundabout then second exit and Polhill Centre is 300 yards on left.



# Coldwater jottings



Stephen J. Smith

## Importance of correct feeding

This year's fine weather has been a boon to coldwater fish breeders. Spawning started fairly early and fry had a good start in which to develop without being impeded by late snow or freak frosts.

Apart from good weather conditions, though, correct feeding is essential in order to ensure healthy, strong fish.

Although the majority of coldwater species will eat virtually anything, a balanced diet is the key to achieving maximum potential.

There are several varieties of commercially-prepared foods available, most of which are perfectly adequate. My own preference is for floating pond pellets which include a carefully defined balance of ingredients to ensure healthy fish.

Because they float it should be impossible to pollute the water. Any uneaten pellets remaining when next feeding-time comes round indicates that you are providing more than the fish can take at each feed.

I supplement the diet of my own fish with natural foods such as chopped earthworm, bloodworm and *Daphnia*, for example.

Pond snails are also readily consumed by my larger fish, and as I prefer no snails in my ponds, the fish are doing me a favour as well as treating themselves!

Back to prepared foods, and

I have received some thought-provoking information from BP Nutrition, manufacturers of floating pellets for pond fish.

The company also manufactures feeds for farmed fish, and they write, "It may be sensible to advise against using feeds manufactured for the commercial trout and salmon farming industry. Because of their rapid rate of use, such pellets have limited vitamin life. Thus, vitamin deterioration could cause problems for the hobbyist who would not use feed at the same fast rate as a commercial trout farm."

They continue, "The best advice for the hobbyist is to stick with one of the brands formulated specially for pet fish and from a reputable manufacturer. After all, breeders of pet pond fish can purchase pond pellets in large breeder packs."

I know that many Koi and Goldfish keepers are keen on the use of "trout" pellets for their charges. It may be that you could be doing less good than you think — maybe even causing harm to your fish. I would be delighted to hear your opinions.

## Development of fry

Still on the subject of growing fish on, how is it that some breeders of coldwater fish attain greater growth rates than others?

This is a question often put to me at around the time of the year, when the results of the

spring spawnings are becoming clearer.

The answer can never be simple — several factors control growth rates in fish. In my opinion, plenty of space is extremely important, together with consistent water temperature and correct feeding.

Referring back to feeding, different aquarists have different preferences for fry food. In addition to "trout" pellets, mentioned above, which are said to promote growth, some of the feeds used include "natural" foods such as earthworm and *Daphnia*, and even "Bemax" — which I suppose must be fairly natural...! I have even heard that granulated sugar stimulates growth.

Water temperatures in the pond can be kept fairly consistent by taking a leaf from the gardener's book. Greenhouse polythene, stretched over a wooden frame and placed over the rearing pond, will create a "greenhouse effect" thus raising the temperature of the water.

Be careful, though, on hot summer days, when you could risk poaching your fish.

My own preference is to remove the covers in the morning — thus allowing air, and the opportunity of valuable live food, onto the pond — and replacing them before dusk. The warmth is then retained overnight when, even in the summer, temperatures can drop quite drastically.

But do remove the pond covers completely at the onset of thundery weather, when oxygen is scarce and fish will

be seen gasping at the surface during the early hours of the morning. The solution then is to spray water from a hose into the pond to introduce oxygen and avoid premature deaths.

Returning to the subject of growth, many coldwater fishkeepers have set up elaborate systems of continuous water supply — trickling slowly through their ponds or aquariums and overflowing to waste.

"Partial water changes" is a phrase often quoted as essential for successful fishkeeping and the trickle method appears to be highly effective — as well as providing additional benefits for the fish.

Waste matter is continuously removed from the water as well as any uneaten food. It has often been said that ammonia actually retards the growth of fish, and its removal is bound to speed up the normal development of healthy fish.

In addition, parasites stand a greater chance of being flushed away and, in my opinion, the chances of diseases occurring in such an environment are greatly reduced.

## Size versus quality

However successful breeders may be at producing large fish — whether Goldfish, Koi, or any other species — there can never be any substitute for quality.

Even at some shows, technically inferior fish have been favoured by some judges in view of their size.

In the breeder's quest for perfection of a particular variety, while size is obviously a consideration, this should not be at the expense of quality.

Surely, hasn't a small GOOD specimen got to be better than an enormous POOR specimen?



This fine young Moor shows signs of producing first-class finnage when it reaches maturity. Time, patience and care should eventually result in a top quality specimen. (See 'Size versus quality')

## Editor's Note

Stephen Smith will be manning a special stand set up to promote the hobby of Goldfish keeping at the 'Aquarian' Fishkeeping Exhibition at Sandown Park on 20-21 June. Come along and enjoy an informal chat... you will be made most welcome.

John Dawes



# Tomorrow's aquarist

## TAKE A WALK ON THE WILD SIDE!

Fancy a Summer Safari? Just for the afternoon, mind you, and probably in your own town...

This year, if you hadn't already noticed, is the Year of the Environment. We got the ball rolling back in February with our T.A. feature on the Kodak Conservation Awards, then in March, on our 'Letters' page, we gave prominence to John Drewett's letter drawing attention to the International Wetlands Campaign. In the same issue, Julian Sims gave us a fascinating insight into the lives of frogs and toads.

Conservation is very much to the fore at the moment and maybe you are sick of it. Which is a pity because, by being an aquarist/pondkeeper, you are a conservationist.

Congratulate yourself — you can, in your own way, be counted among the more prominent fighters for our environment — Sir Peter Scott, David Bellamy, Richard Mabey and Chris Baines. It is Chris Baines' latest project that could give you a great afternoon out, and you don't have to enter a competition or do much more than make a local phone call to take part.

You might already be watching his new series 'The Wild Side of Town', which started on 19 May on BBC 1 at 11pm (repeated in the afternoons, beginning 29 May at 3.25pm. Check *Radio Times* for details). His 'safari's are out of Africa, if you'll forgive the pun. They are set in our own concrete jungles and explore the wealth of wildlife our cities enjoy. The idea isn't new, as those of you who enjoyed watching 'City Safari' and 'Bellamy's Backyard' will remember, but the innovation is in what comes after...

Chris wants you to discover for yourself your local wildlife and sought the support of Urban Wildlife Groups. So

far, over 150 groups have responded. They have agreed to organise 'safari's in June and July. The walks will last between two and three hours, under the guidance of local experts, and your safari could take you along canal towpaths, abandoned railway cuttings, woods, wasteland or even cemeteries.

It is a unique chance to get to know the habitats in your area: not just for the afternoon, but to return again and again, to watch the progress of local wildlife. If you are really committed, you could also pinpoint areas that could be improved and enter for the Kodak Conservation Awards, (the details we published in February.)

If you want to join in, you're advised to contact your local Urban Wildlife group or



Chris Baines can be heard talking about 'The Wild Side of Town' on all 32 BBC Local Radio stations during June. He will also embark on a nationwide lecture tour connected with the series in the autumn. In addition, the British Museum (Natural History) currently has an exhibition on urban wildlife, again, associated with the programmes. (Photograph reproduced by courtesy of the B.B.C.)

Naturalists' Trust — their address should be available from your library; check the *Radio Times* for details of walks and watch the series — details of safari's will be given at the end of programmes.

If you fancy a wildlife weekend in Amsterdam, or a week on a narrow boat in the Midlands, with Chris Baines as your guide (or win one of a number of other exciting prizes), why

not enter the Shell UK competition that goes with the series? Details can be found in the June and July issues of the *BBC Wildlife* magazine. Entrants are required to make a map of their urban wildlife network and will be helped by information given in the programmes. The competition closes on 31 July.

Have a good afternoon — we intend to!

## Beginners' Corner

### Starting at the bottom

Continuing our occasional series on setting up a community tank, this month we come to the fun! Now you've sorted out the 'technical' side of the aquarium, you can begin your landscaping.

Working from the bottom up, gravel is your first priority. Don't just tip it straight from the bag into the tank. Gravel must be rinsed thoroughly under running water until the sand and impurities are flushed away. If you're really thorough, boil it. Tipping unwashed gravel into a new tank will result in cloudy, pea-soup water and the hard work of siphoning off a large quantity of sand particles that will have settled on all your furnishings.

Always allow plenty of gravel — better to have too much than too little. You can always use the spare for other tanks, but a thin layer of gravel will not give your plants much rooting space — if they even stay

in the gravel! A lot of aquatic literature will recommend that you slope the gravel from back to front in the aquarium. If you like this idea, fine, but experience will often prove that the digging of fish will soon even out this slope.

Once the gravel is in place, you can add the water. Bear in mind that, if your tank is deep, you will be up to your armpits in water when it comes to siting the plants. You might prefer to half-fill the aquarium to make this process easier — it is a matter of personal choice.

When pouring in the water, place a bowl or wide container on the gravel and direct the water into this — it will result in a gradual overflow, which will gently fill the tank. Sloshing water straight onto gravel, haphazardly, will dig large holes in your carefully levelled base.

If it is your intention to plant the tank immediately, you must fill the tank with water that is already warmed to about 75°F; a plunge into cold water will not help your plants, which will need a lot of nursing to

begin with to get them established.

One final word of advice: **Measure** the amount of water you are adding. A lot of aquarists use a watering-can for water changes — and, in the way of all tank equipment, this is used solely for the fish and not for gardening. It only takes a few minutes to establish how much this watering-can holds. Use either a measuring jug or a clean milk bottle to fill the first can. You will then know exactly how much it holds. On filling the tank, count the number of cans used. Make a note of the tank capacity and **keep it somewhere safe**. If this seems rather painstaking to you — or you think you can work out the capacity of your tank later, think on this. At some point in the future, you will be adding medicines to your aquarium — even if it is only for White Spot. An overdose can kill your fish. Not knowing how much water you have is a very widespread mistake and can have disastrous results. **Be safe, not sorry!**