

APRIL 1987 95p

AQUARIST

AND PONDKEEPER

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Longnosed Filefish**

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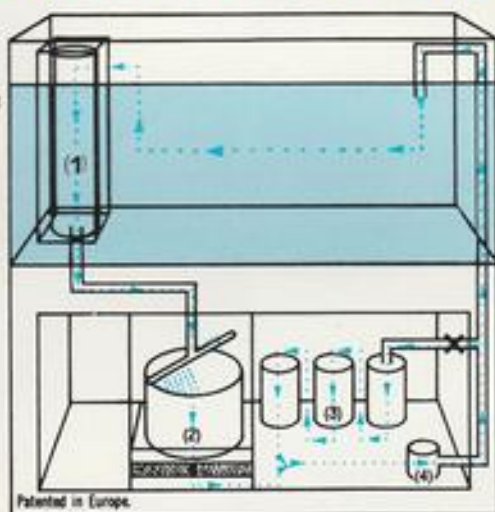
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Cover Story

Photograph:
Arend van den Nieuwenhuizen
Corydoras ambiacus is a very attractive, hardy, though shy and (reportedly) difficult-to-breed species from Peru which hardly ever exceeds 3 in. (7.5 cm) in length. Its pattern of spots can easily lead to confusion between it and other spotted species, such as *C. leucomelas*, the False Spotted Catfish. The common name for *C. ambiacus*, Black Spot Catfish, does not really help matters either, bearing in mind the widespread nature of this characteristic in the genus *Corydoras*, as well as the variable pattern between individuals of the same species. Nevertheless, *C. ambiacus*, is a most impressive fish for the tropical aquarium.



AQUARIST

AND PONDKEEPER

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APRIL 1987 Vol. 52 No. 1

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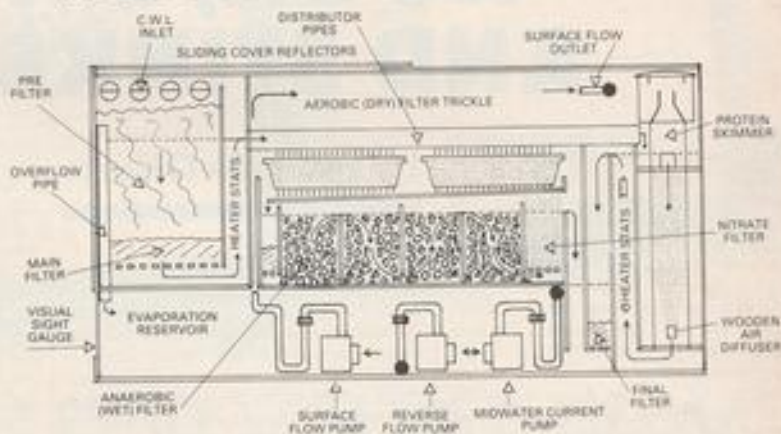
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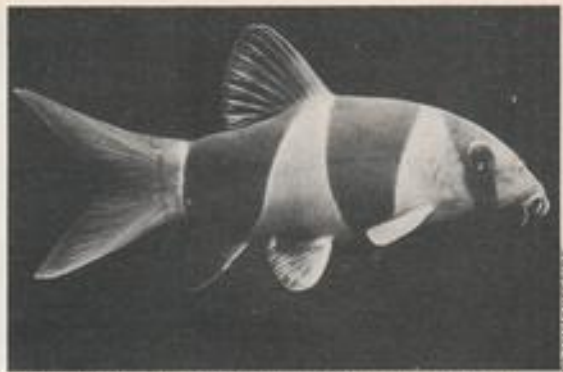
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DAVID GARDNER



BILLY WHITEHEAD

Left, Corydoras (this is *C. orphnopterus*) are easy to catch — when you don't want to! Right, Botias, like *B. macracantha*, are best caught by unfair dismissal.

HOOK, LINE AND STINKER!

Fish do not think; they act purely on instinct. This is the scientific view. I disagree — or maybe I lean more towards the opinion that instinct is very underrated. If I'm hungry, I eat. Given a choice, I think about what to eat. If, like fish, I have no choice, I eat what I can get. And if someone came racing after me with a huge net, I wouldn't wait to rationalise the situation. I'd run. Which is exactly what my fish do — and they do it very well . . .

Netting fish is an art form. It requires speed, guile, patience and a criminal mind. Take a shop's tanks, for instance. Notice the lack of plants and hiding-places? Here you're dealing with the Flying Squad. These people know their business. One quick raid and it's all over.

In the same way, quarantine, hospital and raising tanks for young fish should present no problem, as they are usually kept almost bare.

My breeding and community tanks are a nightmare, though. They're heavily planted and stacked with bogwood, flowerpots, coconut shells and rock. This is where the first crime comes into its own . . .

Loitering with intent: This is the old 'the last thing I want to do is fish you out' trick. Battle drill: Cut back plant — tall-growing *Wisteria* (*Hygrophila difformis*), *Elodea* etc., and put cuttings in water for later use. You've now cleared room for the net. After a few minutes of this, the fish are comfortable with your hands. Put the net in and lean it **casually** against the glass. Leave it there for about an hour. This lulls the fish into a false sense of security — but don't let it lull you. They'll soon catch on when you've caught a few.

Snatch squad tactics: If you're after a shoal of fish, try this one first. Taking the net, sneak up on them quietly and slowly and scoop up what you can. I'm talking

By Amanda Grimes

basics here. There's no subtlety in a snatch squad . . .

Confidence trick: As the above will have netted you two fish, one Tubifex feeder, a thermometer and some more plant (my best netful to date is five Neons and a chunk of bogwood), it is now time to switch tactics. Word will have passed through the shoal that you're onto them and by now they'll be disguised as Duckweed, thermostats, gravel — you name it. So now you must feign indifference. Sniggering fish are very hard on human dignity. Go for the bottom fish. *Corydoras* are incredibly easy to catch, if you don't want them. While you're stalking your new prey, the shoal will reassemble and a quick turn of the net should get them . . .

Amnesty: In the event it doesn't work, try this one. Leave the net in the tank, make a great show of walking away — and go and make a cup of tea/have a stiff drink/scream. Fish lose interest, opening the way for . . .

Bribery: Fact — fish like eating. Attach teaspoon to long cane, fill said spoon with food and empty into tank from great distance. Approach on hands and knees with reserve net. Fish by this time will be boss-eyed; one eye on net in tank, other on food. Game, set and match. You might have an arm covered in flake food but you also have your shoal.

Conspiracy: If you have four-foot community tanks, as I do, you will have noticed the glass support strip across the centre. So have the fish. If you compound this problem by planting a very large Amazon Sword plant just past this obstacle, as I have,

you're in trouble. You need help. This is conspiracy. Your partner, son, postman, milkman, anyone will do. They herd the fish towards you with one net, you catch them with another. Remember, this is the theory you explain to your co-conspirator. In reality, the fish will swim round and round the plant, hide up under the glass bar and dodge both nets at the last minute. You might not catch many but it's a great test of true friendship.

Citizen's arrest: This is really sneaky and can only be used if you have a territorial Cichlid in your tank. Steer the fish you want in his direction and he'll chase them straight back into your net.

Unfair dismissal: Upside-down catfish, Botias and *Ancistrus* are very fond of bogwood. So don't waste time flushing them out of their haven. Just put a towel on the floor, lift out the bogwood, put it gently on the towel and wait. Within seconds the inhabitants will be sitting on the towel quite calmly. We found this out by accident when stripping down a tank and the fish are never distressed by this method.

'Ello, 'ello, 'ello: A tongue-in-cheek version of the bogwood. Herd the fish you want into every flowerpot, coconut and cave you have in the tank. Close off the entrance with the net, lift up the container and tip gently into net on surface. Peer into net in mock surprise and say in deep, friendly voice, 'What have we here, then?'

All these methods I have employed for netting a few selected fish. If, on the other hand, you are moving house or stripping down an aquarium for repair, your best bet is the . . .

Dragnet: Remove all plant, rocks, pots and bogwood. Turn off and remove heaters and thermostat, lower water level to reduce escape opportunities and then — quite simply — trawl!



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Letters

Spawning Glass Cats

In the January issue of *A. & P.*, Frank Garside mentions in his letter about spawning *Myriat armatus*, that the Glass Catfish (*Kryptopterus bicirrhus*) responded to the same conditions.

At the London Zoo Aquarium our Glass Catfish were observed spawning in a mixed display tank, and fry 10-15 mm long were observed. Our shoal of 20 Glass Catfish share their display tank with Glassfish (*Chanda ranga*), X-Ray fish (*Pristella riddlei*), Butterfly fish (*Pantodon buchholzi*), and Elephant fish (*Gnathomemus peterti*).

I was very interested to see that Frank Garside's Glass Catfish were being kept at 3°DH and a pH of 6.8. In contrast, the Glass Catfish here at the London Zoo Aquarium spawned at pH 8.2, GH 21°, KH 7° and a temperature range of 76°-82°F, with nothing being done deliberately to stimulate spawning. However, live *Tubifex* is provided daily for the Elephant fish and live *Daphnia* is provided to all our fish in generous amounts when available, both of which probably helped condition the Glass Catfish.

Mr Garside says his Glass Catfish "responds". I would appreciate more detailed information on how they responded, either through *A. & P.* or directly to me at the Zoo.

I would also be keen to hear from anyone who has successfully bred Glass Catfish (or attempted to).

Steven J. Matchett
London Zoo Aquarium

Whirling Tigers

Some time ago, while I was working in a newly-opened pet-shop, I came across a very puzzling sequence of events which I had never encountered before — and haven't since.

The matter involved a shipment of Tiger Barbs (*Barbus tetrazona*) which I routinely picked up at the airport, along with several other fishes.

After a few days, I was willing to consider the barbs fit for sale, and so out walked the first customer with about six of the creatures. The next day,



We make the rules — but fish can't read, as Michael Moore found out (see 'Bubble-Less Honeys').

she was back, saying that all of the fish had died by the time she got home.

I found this disconcerting and, of course, replaced her fish with more Tiger Barbs

from the same tank, which I examined closely. Despite a perfectly healthy appearance, the fish were returned five minutes later in the original bag; all were dead.

PROMIN 'EXPERTS' COMPETITION

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Tropical fish food manufacturers Promin this month launched the latest in their range: a high-protein food for Cichlids.

To mark the launch, we are giving away assorted Promin foods to the value of around £30 in this month's competition.



Regular readers of *Aquarist & Pondkeeper* should find this a doddle!

All you have to do is to match up the list of *A & P's* "experts" (below) to their appropriate subject. For example, if you think John Cuvelier's specialist subject is *Koi*, write *Ae*; and so on.

- | | |
|-------------------|--------------|
| A John Cuvelier | a Coldwater |
| B Graham Cox | b Naturalist |
| C Eberhard Schulz | c <i>Koi</i> |
| D Stephen Smith | d Marine |
| E Eric Hardy | e Discus |

Write your answers, preferably on a postcard, together with your name and address (in block capitals), and send to:

Promin "Experts" Competition,
Aquarist & Pondkeeper (April)
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Closing date: 30 April.

The first correct entry drawn on 1 May will win the prize.

Could it be a rapid pH change, or temperature change, or oxygen depletion, or ammonia build-up? All of these possibilities I ruled out as being very unlikely.

When the next customer who came in wanted to buy some Tiger Barbs, I explained that he should watch them very closely on the way home, and not to hesitate to call back if there was any trouble.

A mere sixty seconds after walking out the door, he came back and laid the bag of whirling Tiger Barbs of the counter. They were not dead yet, so I returned them to their tank, whereupon they recovered immediately.

Now I was really puzzled! I worried, as the midsummer sun blazed brightly on the white countertop.

In desperation, I put the next outgoing bag of barbs in an opaque cardboard box. The customer reported that they got home OK, and were doing fine. Problem solved. Moral: always consider every possibility and do not dismiss anything out of hand. Was the reflective white countertop to blame?

D. Martin Moore,
Athens, Georgia, U.S.A.

Bubble-less Honeys

I had only been keeping freshwater tropicals for two or three months when I decided to try my hand at breeding an easy species, namely, the Honey Gourami, *Colisa sota* (*channa*).

The pH was 6 and the hardness around 10°DH. The tank contained gravel and plenty of plants, both floating and rooted.

I had read in all the books that Honey Gouramis would build a bubble-nest and care for the eggs and fry until they became free-swimming.

My Gouramis had, obviously, not read the books and spawned without a nest, leaving the eggs to drift off without paying them any notice at all. Despite this, I raised a few of the fry (but lost many with Velvet).

I wonder if any other readers have experienced this type of behaviour in their own Gouramis. I'd love to know.

Michael Moore,
Poole, Dorset.

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Fig. 1



Fig. 2



Fig. 3

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'Plant Treats' come in packs of 25 tablets at £1.43, or in 100-tablet dealer packs.

For further details, contact: Amphill Aquatics Ltd., Albridge Road, Theydon Bois, Essex, CM16 7NR. Tel: (037 881) 4545/6 (24 hours).

Expert information from Interpet

Interpet's new Product Information Guide marks a welcome departure from the norm in that it reads almost like a book on aquarium principles, products and techniques.

For instance, there is a section on 'Choosing your Aquarium' which deals, not just with the Interpet products which will satisfy your needs, but also gives sound advice on siting the aquarium, lighting, heating, aeration, filtration, chemicals, safety and aquarium sealants. In addition, there is a very useful chart from which one can work out the capacity in Imperial Gallons, U.S. Gallons and Litres for a wide range of tank sizes (dimensions given both in inches and centimetres).

The same thoughtful approach is taken towards all individual aspects of aquarium keeping, making the Product Information Guide an interesting and useful publication in

Latest power filter from Atlantis

X500 External Power Filter
This unit replaces the X550 and represents a major improvement in power filter design after joint development by Thomas's and the manufacturer. The research was carried out in Thomas's 'Aquarian' Laboratories. There are several features which 'Atlantis' claim make the X500 unique.

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their filter fibre in the top basket, carbon (packed in a nylon bag) in the central section, and 'Atlantis' Ceramic Filter pieces for use in the bottom basket.

There is a one-year guarantee and all spares and accessories are available from Thomas's, the Yorkshire-based parent company.

For fuller details contact: Thomas's, Oakwell Way, Birstall, Batley, West Yorkshire WF17 9LU. Tel: (0924) 474373.

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Further information concerning these and other Waterlife products are available from Waterlife Research Industries Ltd., Bath Road, Longford, West Drayton, Middx., UB7 0ED. Tel: (0753) 682487 or 685696.

Norfine Nets change hands

On 1 February 1987, Norfine Nets changed hands. The new owners, Al and Liz Ewing, reassure clients that the high standards of the current product range will be maintained (using only British-made materials). Prices will also remain at their 1986 levels throughout the cur-

Computer protection for aquaria

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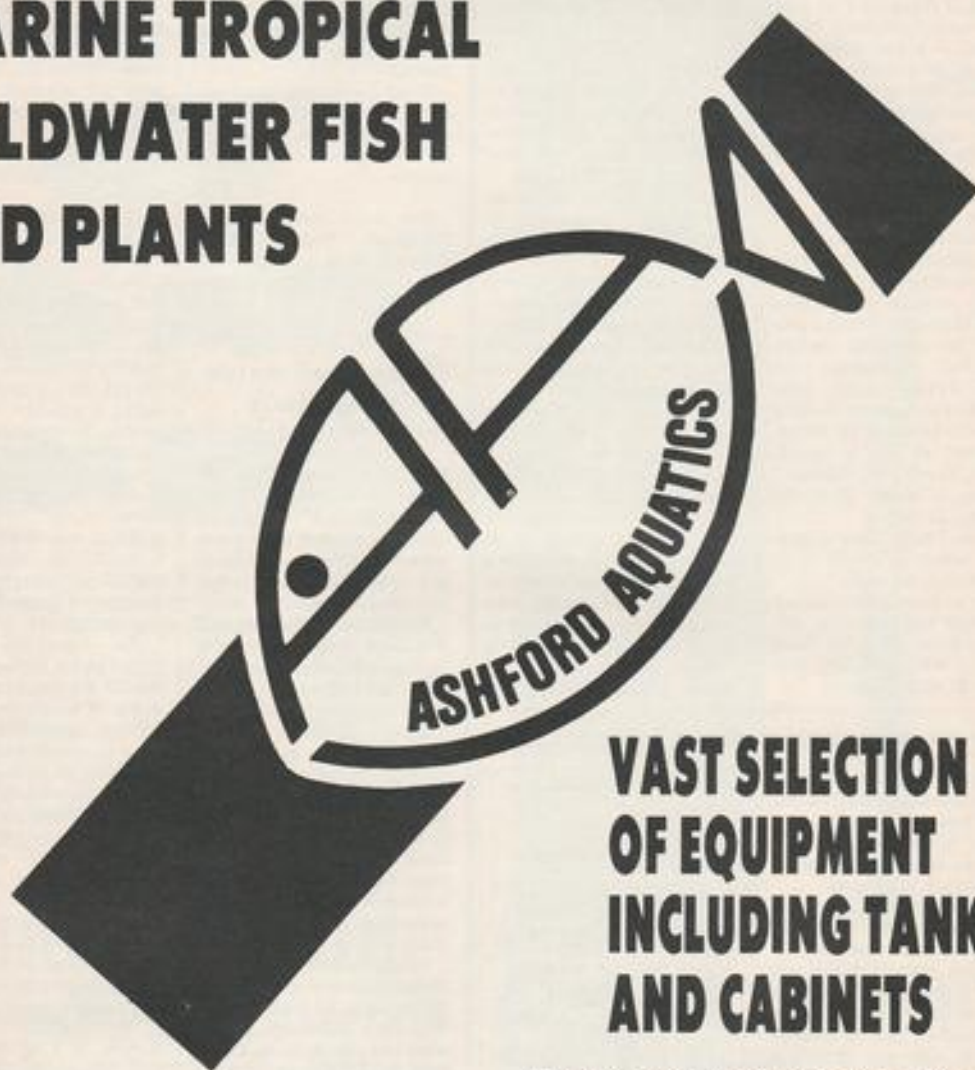
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News from the societies

Obituary



Alec Fraser-Brunner FZS Remembered by FBAS

The Federation of British Aquatic Societies announces with deep regret the passing of their Vice-President Alec Fraser-Brunner. The following tribute is based upon information provided by FBAS Vice-President Cecil Creed, a contemporary aquarist.

The designer of the FBAS logo, Alec began taking an interest in fish from an artist's viewpoint — working at the Natural History Museum fish

room while a professional advertisement artist. Much of his early work was preparing fish illustrations for 'fish standards' — even in the early 1930's there was talk of the need to improve rather than allowing strains to spoil, particularly in breeding circles.

Of course, the spread of information was not without early differences of opinion and many arguments arose, especially when taxonomic re-classifications were proposed (nothing changes, does it?).

Alec's involvement with fish flourished professionally and, aside from helping to form the FBAS in 1938, he worked on the United Nations Fishkeeping for Food programmes in the Far East. He was always very keen on accuracy in his illustrations and, in order to get the anatomical details just right, he was often to be found sitting on the seabed itself sketching

directly from living models. Prior to his final engagement at Edinburgh Zoo Aquarium, Alec was in Singapore at the King George V Aquarium, during which time he also produced designs for stamps for the postal authorities.

A member of the 'Fish Culturist Circle' before the war, Alec moved on to become increasingly associated with the *Aquarist & Pondkeeper*. With his professional ichthyological talents and from his eminent position at the Natural History Museum, he was well qualified to fill the post of Advisory Editor. Following the commencement of post-war publication of the magazine he took over full Editorship from 1946 until 1948 when overseas duties and pressure of work demanded more of his time. However, he remained with the magazine reverting to his former post as Advisory Editor under Antony

Evans' editorship for many years. In recent years, Alec made guest appearances at Hendon A.S. Annual Congresses and became a Vice-President of the FBAS in 1974.

Alec was enthusiastic in everything he did, was a man of many stories and had a sharp intellect. Whether it was 'Plate Tectonics' or proudly showing Edinburgh Zoo's Penguins to visitors, he always gave full value. While mourning his loss at a personal level, fishkeepers everywhere are indebted to him for the legacy of fish-knowledge that he leaves behind for the benefit of us all.

Federation of British Aquatic Societies

Thank you FBAS for your kind words about our former editor. We, at *Aquarist & Pondkeeper* share your feelings for this great man.

John Dawes (Editor)

Diary dates

Preston & District Aquarist Society

The P.D.A.S. Auction will be held on **Sunday 5 April** at Preston Polytechnic, Students Union Hall, Fyde Road, Preston. Booking in: 11.00 a.m. Auction starts: 12.15 p.m. For further details, contact: A. McFarlane (Secretary), 70 Princess Way, Euxton, Chorley, Lancs., PR7 6PJ.

Wrexham Tropical Fish Society

The 3rd. Open Show of the above society will be held on **Sunday 12 April** at the Rhosddu Community Centre, Prices Lane, Wrexham. Booking: 11.30 a.m.-1.00 p.m. Judging: 1.15 p.m. prompt. Further information may be obtained from Mrs B. Jones, 1 Hope Street, Caergwile, Nr. Wrexham, Clwyd, LL12 9AA. Tel. Wrexham 761829.

Kirkcaldy Aquarist Society
The K.A.S. Open Show and Auction (which will include rare species) will take place on

Sunday, 19 April at Balwearie High School, Balwearie Gardens, Kirkcaldy. There will also be a Tombola and canteen facilities. Schedules from: Peter Symington (Show Manager), 60 Colonsay Street, Perth, PH1 3TU.

Ashby Fishkeepers Society
The A.F.S. 1987 Mini Open Show is on **Easter Monday 20 April** at the Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe, South Humberside. Booking in: 12.00 noon. Show starts: 2.00 p.m. sharp. Further details are available from the Show Secretary, Terry Nelson, on Scunthorpe 850525.

Catfish Association of Great Britain
The annual C.A.G.B. Open Show will take place at Amersham Community Centre, Amersham-on-the-Hill, Bucks, on **Saturday 25 April**. Schedules and further information are available from Chris Ralph, (Show Secretary), 610 Abbey Road, Basingstoke, Hants., RG24 9ET. Tel. (0256) 63220.

Merseyside Aquarist Society

The M.A.S. annual Open Show will be held at Rainhill Village Hall, Dane Court, Rainhill, Prescot, Merseyside, on **Sunday 26 April**. For further information, contact J. Bailey (Secretary), 11 Auburn Road, Liverpool, L13 8BJ. Tel. (051) 2288199.

North Avon Aquarist Society

North Avon A.S. will be holding their Open Show at Hanham Folk Centre, High Street, Hanham, Bristol on **Saturday 9 May**. Booking in: 9.30-11.45 a.m. All enquiries to: Bob Cummins, 1 St Annes Close, Cadbury Heath, Warmley, Bristol. Tel: (0272) 677898.

Bournemouth A.S.

The B.A.S. annual Open Show will take place on **Sunday 17 May** at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show schedules are available after 1 April from

Jack Jeffery (Show Secretary), 8 Hatfield Gardens, Castledean Park, Bournemouth, BH7 7HE.

Stafford Aquatic Society

The first Open Show of the S.A.S. will be held on **Sunday 17 May** at the Northend Community Centre, Holmcroft Road, Stafford. Further details from L. F. Lainton (Secretary), 280 Sandon Road, Stafford, ST16 3HP. Tel. Stafford 44406.

The Warrington Aquarist Society

W.A.S. are holding their 1987 Open Show on **Sunday 24 May**. Venue: The Masonic Hall, Wimmerleigh Street, Warrington. For further details, ring the Show Secretary, Frank Cobb, on Warrington 413938.

Swindon Aquarist Society

The 5th S.A.S. Open Show will be held on **31 May**. For full details and schedules, contact: K. Curtis, (Show Secretary), 78 Downton Road, Penhill, Swindon. Tel: Swindon 32920, or ring the Chairman on Swindon 643402.

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FLUVAL 403 #A-875	UP TO 100 GAL.	1200	21

Coldwater jottings



Stephen J. Smith

There is much more to the coldwater scene than keeping fish, as several items from my recent mailbag demonstrate.

It would appear that not only is interest in coldwater fish on the increase, but water gardening itself is receiving more and more recognition as part of the broader world of garden and leisure interests.

Lilies for leisure

I was pleased to hear from Philip Swindells, superintendent of Harlow Car Gardens near Harrogate, about a Water Gardening Seminar to be held on 23rd April.

Organised in conjunction with The Northern Horticultural Society and The Lily Society, speakers at the seminar are Philip himself and water-garden specialist Bill Heritage.

The event, titled "The Garden Pool", includes information of interest to the gardener in general as well as to the cold-water fishkeeper, and runs from 10am-4pm at Harlow Car Gardens.

Fee is £6.00 for the day for members of the Lily Society (£7.50 for non-members). Further information is available by contacting Philip Swindells, Superintendent, Harlow Car Gardens, Crag Lane, Beckwithshaw, Harrogate HG3 1QB. Telephone: 0423 64518 or 508237.

Water Lily Society

The Water Lily Society was formed in 1984 in Maryland,

USA, by Charles B. Thomas — a member of a family of aquatic nurserymen who established the extensive nursery of Lilypons.

Aquatic plant enthusiasts from all over North America, as well as some from Britain and Europe, were brought together to found a society "to promote interest and investigation into Nymphaeas and other related aquatic plants, and to provide information concerning aquatic horticulture in general".

"A series of international symposiums has been held annually in the USA, with this year's taking place in Denver," explained Philip Swindells, UK secretary of the society.

"However, next year the event will be hosted by ... Harlow Car Gardens!"

A quarterly journal is published by the society, and sub-



The Water Lily Society caters admirably for the needs of anyone interested in these magnificent plants.

scription is only £12.50 per annum. For further information contact Philip Swindells at the address above (see "Lilies for Leisure").

Gardening with water

By sheer coincidence, and to continue this month's "Jottings" on an outdoor aquatic theme, I have recently received the revised second edition of Bill Heritage's book "Ponds and Water Gardens".

Whenever I pick up a book for the first time, almost instinctively I turn first to the index. Why? Well, within only three or four pages you can tell immediately just what the contents of the book has in store.

And with some poetic-sound-

ing references to the likes of Charles de Meurville, Mary Patricia, and Zebra Rush, who would resist the temptation to find out more ...?

This is a true PONDkeeper's book — it is even a GARDENER'S book. And it is certainly a book for the coldwater enthusiast who may want to find out more about the scene without repetitive references to "types of pond fish".

However, for the serious keeper of Koi, this is unlikely to meet your needs; as Bill himself explains in his introduction: "... it should be made clear that in the general-purpose plant-oriented water garden ... there is no place for the Koi ..."

"It is a magnificent fish ... but in ponds depending on natural balance it is frequently a failure ... It is a fish apart, with specialised needs (and a specialist literature) ..."

So, for the aspiring water gardener who wants more from a pond than just a "hole for fish", this book provides 170 well-written pages on just about every aspect of aquatic gardening. Plants take pride of place — and over 60 full-colour illustrations serve to demonstrate their status.

A sprinkling of crisp line illustrations and black-and-white photographs also accompany the text, which itself covers: pond design and construction; fountains and waterfalls; plants and livestock; as well as planting outside the pond and general pond maintenance.

As if you haven't guessed, I can thoroughly recommend this book. Perhaps even all but the most dedicated Koi-keeper will also find it, at least, of passing interest!

Ponds and Water Gardens, by Bill Heritage, is published by Blandford Colour Series, £2.95.

Reputation — Your guarantee

Fish and birds are, apparently, two of the worst kinds of livestock to keep. So, what do you do when your newly-acquired Goldfish, Koi or Orfe joins its brethren in that "great pond in

the sky" only a few days after being introduced to your garden pond?

The last thing you should do is rant and rave at the retailer: that is almost guaranteed to get you nowhere.

It is virtually impossible for any retailer of coldwater fish to offer any kind of guarantee.

Dave Tibbury, whose company in Romford, Essex, is long-established as a supplier of quality Fancy Goldfish, explained that all his fish are kept outside in natural still ponds.

"These are the best conditions for pond fish," said Dave, "So the fish are sold in excellent condition. We inevitably have the occasional 'problem', but if it occurs up to 24-hours after the sale we would normally replace immediately."

Shirley Aquatics, in the West Midlands, imports high-quality Koi among its comprehensive range of aquatic activities.

Some customers have been known to select their charges from a shipment of Koi as soon as it has arrived, and proprietor John Cooke is quite willing to reserve the fish in quarantine for a few weeks, before it is collected by the customer.

"We like to look after our customers, so if they have a genuine problem we can normally come to an amicable agreement," explained John.

"It all depends on the circumstances. Although we will always do our best to advise the customer, this advice is not always heeded. — which obviously causes problems."

Co-incidentally, both Dave and John related the same "classic" tale: people read that fish should be floated in their polythene bag before introducing into the pond.

So even in the height of summer, the newly-acquired fish are treated to three or four hours under baking sunshine. Little wonder they end up poached!

To conclude, the rule is simple — you are likely to have less problems if you obtain your fish from a reputable retailer. But, for the retailer to look after you properly, you must look after the fish properly, yourself.

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- Free scuba diving lesson/escorted dive along the coral reef
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OUT AND ABOUT

with John Dawes

The Lewis Touch

Anyone going round the shops looking for new types of Fancy Goldfish to buy will not have failed to notice that the range of varieties available has been slowly expanding for some years now.

This welcome development has become even more pronounced during the last 18 months or so. Tosakins, for instance, are no longer the extreme rarities they once were (though they are still not common). The same goes for Black Orandas and several other new varieties. 1986 also saw the first introductions of Hamanishiki from Japan, subsequently bred in their hundreds over here.

Looking to the immediate future, we are soon going to become familiar with such "exotics" as Telescopic Redcaps, Redcap Moors, Butterfly Moors, Pompon Moors, Black Lionheads, Copper Orandas and other varieties.

In the majority of cases, the man behind this expansion is Gary Lewis, proprietor of G. Lewis — Coldwater Fish Specialist who, as the name of the company indicates, specialises in this field (although he also deals in plants and livefoods as well).

In 1981, growing demand for his fish led to Gary moving from London to larger premises in Kent. The present site includes over fifty ponds (each 6ft x 6ft, at least), a large fish house for Chinese fish imported during the winter months, and a hatchery where Gary carries

out his intensive and carefully-monitored breeding programme.

Major awards at the Bristol Aquarist Society, Goldfish Society of Great Britain and other shows, won with his own-bred stock, are living proof of Gary's abilities as a breeder of quality fish. It is the fish from these spawnings which ultimately find their way into shops.

Gary looks on his fish farm, 'Rancho Lodge', as a half-way house between the country of origin of the fish he imports

and the retailers' tanks. He, therefore, carefully simulates conditions in his shippers' ponds as closely as possible, slowly introducing arrivals to UK conditions and thus keeping stress (and losses) down to an absolute minimum.

Business is, not surprisingly, booming, as demand from hobbyists continues to grow in line with the wider availability of the fish. The result is that Gary now does weekly deliveries throughout London,

Kent, Surrey and East Sussex, rails fish all over Britain, and even exports to U.S.A., Switzerland and Belgium.

So keep your eyes open for some exciting Fancy Goldfish this season. When you find them, ask your dealer — there's a pretty good chance that those fish will have received the "Lewis Touch".

For details of your nearest stockist (G. Lewis deals only in wholesale), ring Gary on (0303) 66741.



NO COMMENT!

A & P reader, Gordon Booth from Plymouth obviously has a sharp eye for the unusual — also a wicked sense of humour!

If you know of other "interesting/weird/funny/warped/ridiculous" examples, I'd love to hear from you. Just send me your contribution to: Out & About, Aquarist & Pondkeeper, 58 Fleet Street, London EC4Y 1JU. I look forward to receiving your gems.



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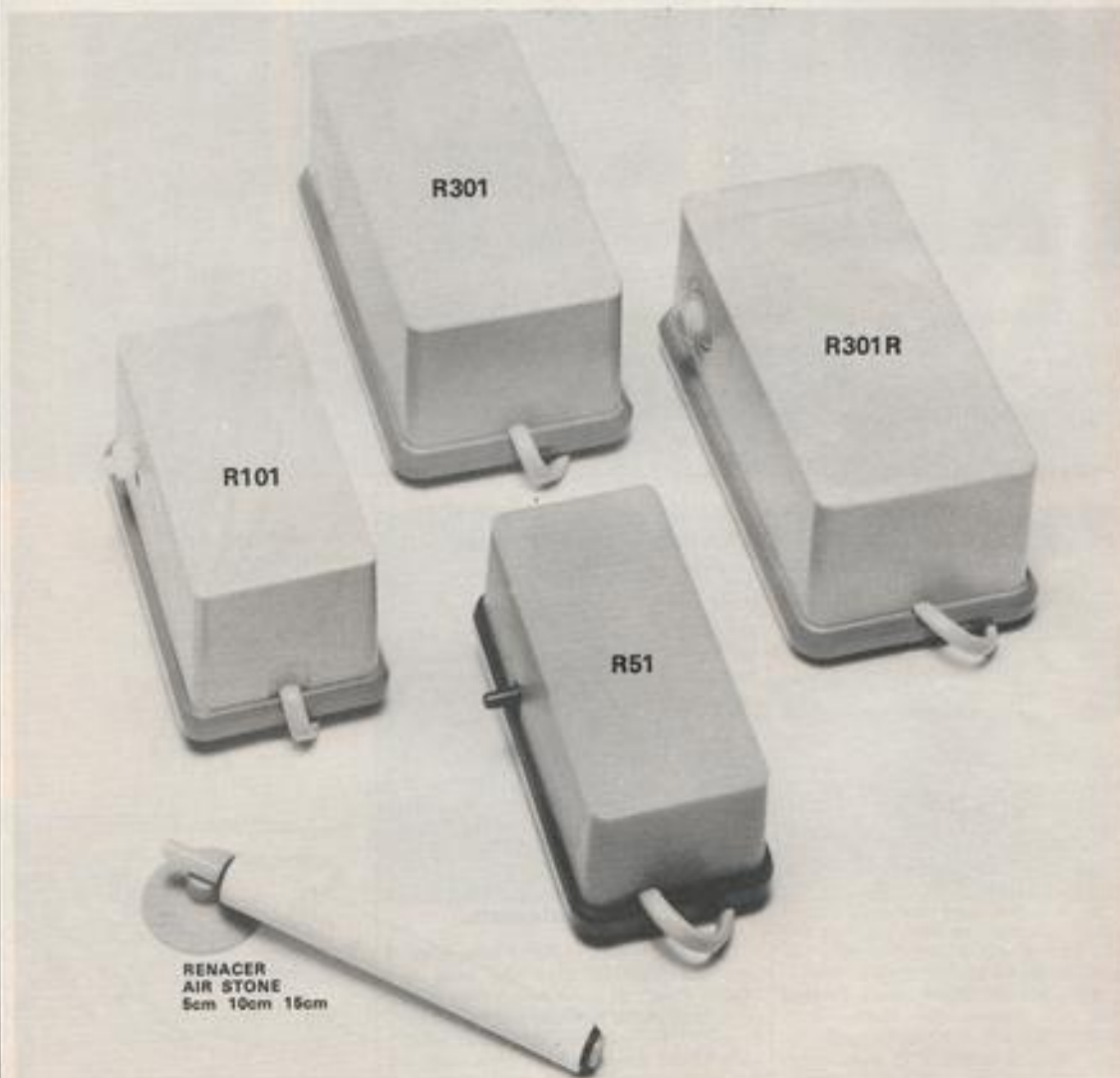
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THE FABULOUS CRINUMS

Onion Plants (Crinum) have been available for several years, yet they have not really received the attention they deserve. Barry James of Everglades Aquatic Nurseries, redresses the balance.

Crinums belong to that famous family of bulbous plants, the Amaryllidaceae (which contains other well-known plants such as the terrestrial lilies). They are cosmopolitan plants, being found in the Americas, Africa and Asia. Over 110 species are known to exist, most of which favour damp soil in close proximity to water. Several species actually grow in water and are true aquatic plants. Many others have been found to tolerate prolonged submersion without ill effects.

I am sure that many new truly aquatic Crinum species will turn up over the next few years, but, at the moment, relatively few species are known to occur in water, including: *C. giganteum* Andre, from Tropical Africa; *C. campanulatum* Herb, South Africa; *C. capense* Herb, South Africa; *C. natans* Baker, West Africa; *C. purpurascens* Herb, West Africa; *C. thasianum* Schulze, Indo-Malaysia; and (most recently) *C. aquaticum*. Of these, only the last four are generally found as aquarium specimens.

Being mostly large plants, Crinum are grown in large aquaria where their ribbon-like leaves can reach their full potential. The bulbs are also often large and so require a deep substrate in order to anchor themselves firmly. They appreciate a layer of Laterite soil beneath the gravel and feeding with liquid, or preferably tablet, fertilisers must be carried out at regular intervals in order that the bulb can build up starch for continuous growth.

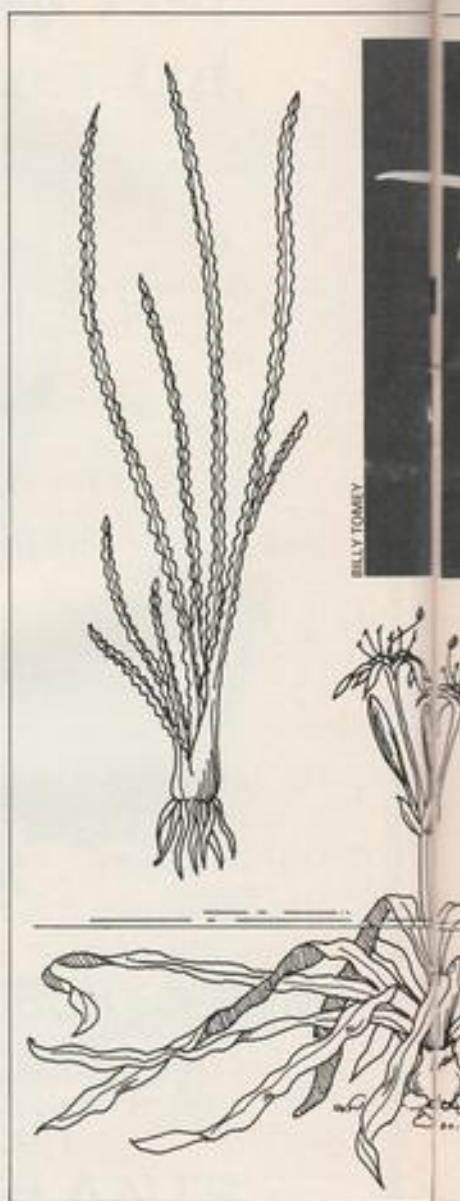
Temperature for most species should lie

between 60-86°F (20-30°C). Crinum seem indifferent to water chemistry and electrical potential and grow well even in London tapwater. In nature, they generally flower when the water levels fall in the dry season, and it might be possible to induce them to flower in aquaria with overhead Halogen Quartz or Mercury Vapour lighting in open-topped tanks. The flowers are very beautiful. My photograph taken in a Singapore nursery shows them flowering in damp soil.

Crinum thasianum

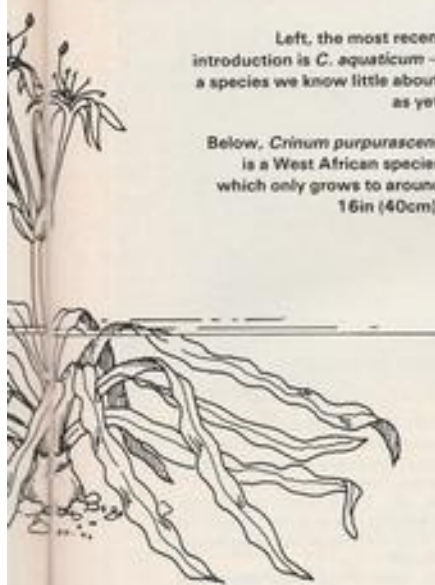
This is the species imported from Singapore and Thailand under the name of "Onion Plant". It grows from a large bulb up to three inches in length and two inches in width. The roots are fleshy and break easily so care should be taken when planting this species. The leaves are pale green, strap-like and reach a length of between 6-7ft (c. 2 metres) and up to 3/4in (c. 1.8cm) width. The flowers are normally borne only when the water level drops in the dry season. The petals are white and somewhat resemble those of the water lilies but the petals are much narrower. This species requires temperatures of between 68-86°F (20-30°C). The bottom soil need not be too rich, especially if one is trying to accommodate the plant in smaller aquaria. Propagation is slow by bulb offsets. *Crinum thasianum* is a hardy plant without vices.

An African species, this one is far less frequently available than the aforementioned



Crinum natans

species. It is found in tropical west Africa in sluggish streams, often with a brackish nature. This plant is characterised by its broad strap-like leaves which are dark-green in colour with undulate margins and a pronounced midrib. The surface of the leaf is bullate (i.e. blister-like, as in Savoy cabbages). This is a shorter plant growing up to 3ft (c. 1 metre) in length but up to 1in (2.5cm) or so in width. Again the flowers are white but rarely produced in aquaria. It makes a good accent plant in large tanks.



Left, the most recent introduction is *C. aquaticum* — a species we know little about, as yet.

Below, *Crinum purpurascens* is a West African species which only grows to around 16in (40cm).

Above left, close-up of the delicate lily-like bloom of *C. natans*.

Above centre, *Crinum thaianum*, showing the bulb which gives rise to the common name of Onion Plant.

Above right, *Crinum natans* — the bullate ("crinkled/Savoy cabbage") nature of the leaves is clearly visible.

Below, *Crinum thaianum* in flower in a plant nursery in Singapore.

Demands a higher temperature than *C. natans* and should not be exposed to temperatures less than 72°F (22°C).

Crinum aquaticum

This is a new species to the hobby. Supplies on a limited basis have been trickling into the UK via Holland. It is a West African species and so, presumably, requires much the same growing conditions as *C. natans*. This species does not appear to grow as large as the other two. The distinctive features are the highly bullate and

undulating leaves. Only ½in (c. 0.4cm) across, they are dark-green and reach a height of around 2ft (60cm). No other information on this species is available at present.

Crinum purpurascens

This species has not been re-introduced for some time to my knowledge. It hails from West Africa. It grows up to 16in (40cm) in height and the mid-green to blue-green leaves have a width of just over ½in (2cm). The flowers are white or reddish. An

attractive plant, it needs a steady supply of nutrients to give of its best.

Closing Remarks

Crinums may well be a poorly studied group in terms of species for the aquarium, but the lack of information available should, in no way, detract from their undoubted beauty and the challenge they present anyone having a sufficiently roomy tank to do them justice. If you are looking for an aquatic plant with a difference, you may well find it among the Crinums — why not give them a try?

PRODUCT ROUNDUP

GROWING HEALTHY PLANTS

At one time, it seemed that all you needed to grow plants was a mucky tank, a nearly clogged-up airstone, a lot of neglect and, to quote a few hobbyists, "If that's good enough for nature that's good enough for me." Nowadays, we have come a long way from that theory (even if it did grow good plants for reasons we never quite understood) and there are now other ways to promote healthy plant growth and keep the aquarium looking better into the bargain.

Plants need two things for growth (in addition to water): light and nourishment. Light is necessary for the process of photosynthesis under which the plant manufactures its own sugars to be quickly converted further into starches. The aquatic plant draws its nourishment both through roots and leaves, although in some species the root system is merely to anchor the plant.

Growth aids for plants can be divided into two main groups — Lighting and Aquarium Additives.

LIGHTING

We must make some broad assumptions when discussing lighting for plants in order to assess their needs. Tropical plants are used to "12 hours on, 12 hours off" periods of illumination, while plants from more temperate areas have differing day-lengths according to the time of year. Again, the equatorial sun is brighter compared to its intensity in other areas. The plants themselves require differing amounts of light, although this can be arranged quite naturally by planting shade-tolerant species under taller, stronger-light needing plants. Plants have their 'photosynthesis peak' at a different part of the light spectrum to that of sunlight, so a lamp that produces ideal light for plant photosynthesis looks dimmer to our eyes.

While it is quite possible to grow plants under normal tungsten lamps, the lamps are inefficient and give off a great deal of heat; fluorescent tubes are much cooler-running and come in many "colours", some more suited to the plant's requirements. Best results come from combining colours to give acceptable viewing light/colour together with the desired plant growth. More sophisticated "spot-lamp" types, such as metal-halide, mercury-vapour and blended-lamps (a mixture of tungsten and mercury-vapour), are of particular value in deep aquariums or hanging above open-topped aquariums where their intensive beams can be used to satisfy individual lighting requirements by specimen plants. Strong lighting is particu-



NEW TECHNOLOGY

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INTERPET

larly needed in marine systems where a growth of algae is required.

Manufacturers provide their own directions for use and these should, obviously, be followed closely in order to get the best out of any type of lighting chosen.

In the following list, sources include lamps and/or fittings which, while designed for aquarium use, may not necessarily have plant growth-encouraging features.

Manufacturer:

Arcadia — wide range of fluorescent lamps and starter units.

Osman — Fluora.

Philips — Nos. 32, 33, actinic — fluorescent lamps and starter units.

Sunlight — metal halide (especially suitable for tropical marines); mercury vapour (switchable 80-125 watts).

Sylvania — Gro-lux.

Wotan — Floraset Mercury discharge lamps.

Thorn — Northlight and Supergrow.

Dura-lite — Trulite.

Top, left, safe and effective, aquatic liquid fertilisers such as these from N.T. Laboratories, are eminently preferable to any home-made preparations.

Above, left, 'Plant Treats' are among the latest easy-to-use and well-researched growth enhancing products to appear on the market.

Above, right, 'Plant Plugs' provide an enriched rooting medium for all forms of aquarium plants.

AQUARIUM ADDITIVES

Aquarium additives can be divided into three groups — (i) water additives, (ii) substrate/rooting additives and (iii) mechanical devices. The first two are self-explanatory and consist of enriching nutrients lacking in the normal aquarium environment. Mechanical aids include a supplementary carbon dioxide dosing system and an iron supplement dosator.

D-UP

BY DICK MILLS

(1) Liquid Fertilisers

It is tempting providence to try to make up your own plant fertiliser by diluting garden-produce fertilisers as there is a danger of over-fertilising the aquarium and flooding the tank with too many nutrients, some of which may increase nitrates to a level toxic to fish. Aquarium fertilisers are the result of years of research and are much safer to use.

Manufacturers:

- Aquadel** — Fluid 68 (Plant Fertiliser, prevents yellow leaves); Iron-Fer (Trace Elements, maintains plant growth).
Aquarian — Plant Food (general fertiliser).
Ferrogan — (Iron supplement).
New Technology — Aquagreen (fresh water plant food); Marine Green (marine algal growth food).
Seatest — SeaGarden Algae Nutrient (marine).
Sera — Florena plant developer with iron and trace elements for all aquarium plants; Marinovit — nutrient supplement for marine algae and invertebrates.
T.A.P. — Bioflor (general plant food).
Tetra — Floraspiride (general plant food).
Waterlife Products — Humaquat (black-water tonic and plant fertiliser); Taxoflora (freshwater plant food); Seagreen (marine algal fertiliser).
Wimex — Ferroplant (iron fertiliser).

(2) Non-liquid Additives

Manufacturers:

- Alderswade Aquatic Research Centre** — Thrive — Selection of minerals, peat, wood and leaf mould packed in perforated polythene sachet, which may be floated in the aquarium (or included within a power filter body) to release nutrients slowly.

(3) Substrate/Rooting additives

Nutrients used in the substrate are obviously of benefit to those plants with functional root systems. A favourite used to be a peat-filled stocking buried in the gravel but modern-day growth aids include tablet foods, pre-formed rooting "plugs", utilise nutrient-impregnated rock-wool growing medium or are based on a baked iron-clay formula, the latter to be mixed in with the substrate when first aquascaping the aquarium. It may not be quite a good idea to use substrate additives with "down-flow" biological filtration systems as the additive could be drawn through the system and redistributed on top of the gravel! Enclosing the additive in small cloth packets next to clumps of plants might be a practical solution but it then seems to defeat the purpose of being a general overall substrate additive.

Manufacturers:

- Aquadel** — Root Iron Fertiliser (powdered

plant starter).

Hagen — Peat Plates: plates of compressed peat (4in x 12in) to be placed beneath the substrate to provide nutrients and rooting medium for plants. Handy size means easy fitting to standard tanks for complete base coverage. Do not colour the water.

Hobby — Nutrient Earth Tablets — simple to use, just push a tablet (or part of tablet, depending on plant size) into the substrate near each plant; Sanoplant — a tablet food but has CO₂ enrichment; Aqualit; Natalit — clay-based gravel; Calcium Free, trace-element enriched planting medium; Peat Fibre; Turf Granula Peat.

Interpet — Plant Plugs (mineral fibre block enriched with natural vitamins and minerals in which plant roots are wrapped before burying in substrate; "Poly Grid" — plastic mesh holds several "plant-plugged" species together until roots develop. Florenette "A" — for aquarium use, particularly for *Cryptocoryne*, *Echinodorus*, *Sagittaria* and *Vallisneria*; Florenette "T" for ponds, especially for Water Lilies when used with Pond Water Peat (tablet foods).

Sera — Florisan "A" for aquarium use; Florisan "T" for ponds (tablet foods).

Tetra — Hilea Initial D Gravel additive.
Amphill — Plant Treats (growth-promoting tablets); Potting Kits (include pot, rooting block and fertiliser tablets).

(4) Chemical/mechanical systems

(i) Supplementary carbon dioxide

Along with light, plants require carbon dioxide to photosynthesise and the various systems available work on the principle of introducing measured amounts of CO₂ into the aquarium to maintain it at its optimum level. It is important to monitor the introduced levels regularly; any excess will cause fluctuations in pH and carbonate hardness of the water.

Systems vary from the very basic (you measure the CO₂ amount yourself using the appropriate Test Kit — see *A & P Product Round-up* January 1987) to the very sophisticated (where the CO₂ dosage is coupled with automatic lighting controls and pH regulation).

Manufacturers:

- Dennerle**
Dupla

(ii) Iron supplement dosator

Using a slightly-pressurised "diving bell", a solution of iron-rich nutrients is allowed to permeate into the aquarium over a period of weeks (depending on water temperature). Placing the dosator near a gentle water flow will ensure that the nutrients are spread throughout the aquarium.

Manufacturers:

- Sochting** (also make the more well-known Oxydator system).

According to the KENT KOI KALENDER

(just a few of which are still available at £4.95). April is soon to be followed by Spring when our Koi ponds should start to warm up and the inhabitants resume manure production.

Unfortunately the micro-organisms that claim to deal with this are not so keen on the British climate and prefer to keep their heads down for just a little longer.

Whilst we have every sympathy, the trouble is that algae is not so choosy and there's now't better than a good Spring dressing of ammonia to produce a vigorous green flush, as any farmer will tell you.

Don't wait till you have to fit fog lights to your koi. Get down to Kent Koi now to get your POLYBAC, the best way for you to take control before the algae gives you a very persistent headache.

We have to admit that we would not be surprised if you found other things to interest you as well.

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GROWING TROPICAL AQUATIC PLANTS: THE PHYSIOLOGICAL APPROACH

Research scientist Dr Geoffrey Kite couldn't grow healthy aquarium plants, until he adopted a scientific approach to the problem — with remarkable results.

Aquatic plants make an important contribution to the initial visual impact of the tropical freshwater aquarium. A well laid-out tank containing a thriving community of plants is an attractive addition to any home but, unfortunately, if things go wrong, even the most colourful fish will not compensate for the unsightliness of straggling, senescent plants. Despite this, many people often set up their aquarium with only the wellbeing of the fish in mind.

In truth, plants need more care than this would indicate: few will survive for long if shoved into clean gravel and tap water. However, with a little knowledge and experimentation, anyone can grow a flourishing 'underwater garden' in their basic community aquarium which will provide as much pleasure as the more active inhabitants.

General chemical requirements

To be a successful aquaculturist it is necessary to know a little about the physiology of submerged plants (ie. the way they work) so that one can understand their growth requirements.

All plants synthesise (build up) simple sugars from carbon dioxide and water using light energy trapped by the green pigment, chlorophyll. These sugars are then converted into all the compounds that are necessary to build more plant tissue; these include proteins, lipids (fats/oils), cellulose and, of course, chlorophyll itself.

The energy for this process comes from the oxidation of some of the sugars produced by photosynthesis back into carbon dioxide and water. However, other substances are also needed. For example, proteins contain nitrogen and some sulphur, while magnesium is an essential component of chlorophyll, and elements such as potassium and phosphorus are necessary for the activation or maintenance of many metabolic processes. Therefore, in addition to carbon dioxide, oxygen and water, plants require about thirteen of these essential mineral nutrients

in order to grow healthy. The aquaculturist must ensure that all of these requirements are satisfied.

Carbon dioxide

Carbon dioxide is very soluble in water while oxygen is only slightly so. Nevertheless, lakes and rivers usually contain less dissolved carbon dioxide than oxygen because of its lower partial pressure in the atmosphere (a reflection of its lower concentration), and the activities of aquatic plants.

In fact, since carbon dioxide diffuses relatively slowly through water, submerged plants can generate locally depleted conditions. This can be rectified by employing a carbon diffuser, but it should be remembered that increasing the availability of carbon dioxide will only improve plant growth rates if the light intensity is not already limiting photosynthesis. Aeration with air which simply aids diffusion is also a good way of ensuring that plants receive an adequate supply of carbon dioxide for photosynthesis under normal circumstances.

One additional point to note regarding carbon dioxide availability is that the dissolved gas (ie. carbonic acid) exists entirely as the bicarbonate ion (HCO_3^-) above pH8-9, and not all aquatic plants can utilise carbon dioxide in this form. However, the pH of aquaria is generally neutral to slightly acidic so this fact should have little consequence.

Oxygen

Oxygen is a by-product of photosynthesis and plants generate far more oxygen than they use through respiration. Consequently, it is only the roots of aquatic plants that are likely to experience oxygen deficiencies in a correctly stocked tank.

This can be alleviated by employing an undergravel filter to draw fresh water through the planting medium and not allowing excessive amounts of rotting material to accumulate and create anoxic (oxygen-less) conditions around the roots. Nevertheless, it is not necessary to have

strong undergravel filtration as most aquatic plants are anatomically and/or physiologically adapted to growing in oxygen depleted muds.

Lighting needs & combinations

The most important factors affecting plant growth in the aquarium are undoubtedly light and nutrient availability, and it is probably the latter which is most neglected. Light must be provided at an adequate intensity and at the correct wavelengths.

On average the Earth's surface receives about 0.025 watts/cm² of solar radiation per day. If some very crude assumptions are made, then a typical three-foot aquarium would need to be illuminated continuously by a 75 watt light to equal this. Little wonder, therefore, that most aquarium lighting appears dull during the day. So, basically, the more light that can be provided the better, within reason, but certainly a single fluorescent tube is not going to be sufficient in most cases.

The amount of radiation reaching the plants can be increased by using a light-coloured substratum which will reflect up to 20% of the incident illumination. Conversely, over-vigorous aeration will cause a loss of light due to reflection off the rough water surface. Floating plants such as *Lemna* (Duckweed) should, of course, be removed.

Artificial lighting must produce the wavelengths that can be usefully absorbed by the plants. Figure 1 shows the action spectrum of a typical plant. This gives a relative indication of how well a plant will photosynthesise when illuminated with light of different wavelengths at subsaturation intensity. It can be seen that plants will grow better under blue light than green and best of all under red light.

Does this mean that a red light should be fitted into one's aquarium? Surprisingly, no, because, if light is provided simultaneously at two different wavelengths, the resulting rate of photosynthesis is greater than the sum of the rates expected for each wavelength given individually. Far red light (further along the spectrum than red) in particular, can significantly enhance the effect of shorter wavelengths. The idea is to fit a light source whose emission spectrum matches the plant's action spectrum.

Specially designed fluorescent lights are available which do this. A similar result can also be achieved by combining normal cool white fluorescent lighting with tungsten (incandescent) filament lighting (Figure 2). The former lacks any significant emission in the red region of the spectrum but this is supplemented by the tungsten bulb(s). Personally, I like this set-up as incandescent light is rich in the beneficial far red wavelengths.

Nutrients & rooting media

Rooted submerged aquatic plants have access to two potential sources of nutrients:



Left, *Cryptocoryne affinis* (background), *C. cordata*, and other related species all require a nutrient-rich medium.

Above, the roots of plants such as *Vallisneria* (left) and *Cryptocoryne affinis* show how important these structures are for species which derive substantial portions of their nourishment from the substratum.

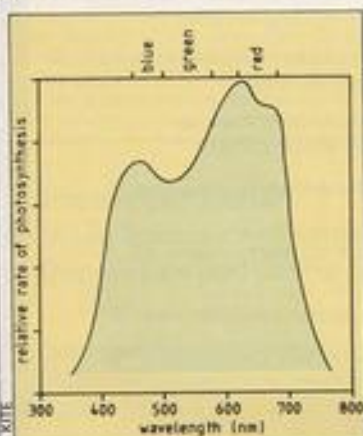


Fig. 1: Action spectrum of a typical plant showing maximum photosynthesis at the red end.

they can either absorb solutes (substances in solution) from the substratum through their roots, or from the water through their shoots. There are no firm 'rules' about which source is the most important; different plants behave differently.

Strongly rooted forms (e.g. *Cryptocoryne*) grow considerably better when planted into mud than when in clean sand or gravel, regardless of whether or not nutrient-rich water is supplied to the leaves. This infers that these plants absorb the bulk of their nutrients through the roots. However, foliar absorption (i.e. through the leaves) becomes more important in less strongly rooted genera, like *Vallisneria*. In *Myriophyllum*, it is the absorption through the shoots that supplies most of the nutrients to the growing

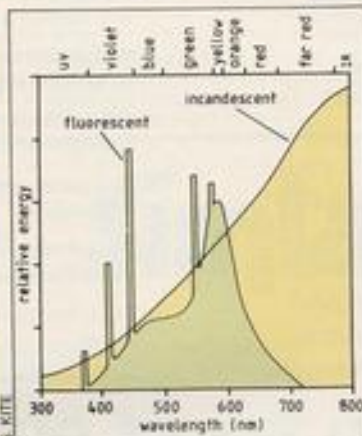


Fig. 2: A combination of fluorescent and incandescent lighting provides a good "mix" of energy for plant growth.

points. Nevertheless, research has shown that the roots of aquatic plants are not merely anchorage devices; they enable plants to take advantage of the higher concentration of nutrients that occur in substrata containing organic matter and, consequently, to grow more successfully.

Failure to provide a suitable fertile rooting medium is one of the major mistakes made by aquarists who experience problems in growing tropical aquarium plants.

It is not enough to rely on the excreta of fish to supply essential nutrients, especially in a newly-established tank. Just consider a natural river ecosystem where there is a continual nutrient input from fallen leaves, rainwater wash, etc.

The hardened 'fish enthusiast' might shudder at the suggestion of employing a soil-based potting compost (e.g. John Innes No. 2) in the freshwater aquarium to provide an artificial source of nutrients, but it may be necessary to do so if one is serious about growing certain plants. Potting compost should not have any adverse effects on the more hardy species of tropical fish. In fact, it will create a strong buffering capacity (which will minimise water quality fluctuations).

At least 2-3cm of compost should be sandwiched between layers of gravel in the areas of the tank to be planted and, if the compost can be steam sterilised (autoclaved) beforehand, then so much the better. Do not use garden soil! There are too many "unknowns" in it.

To enhance the growth of those plants that absorb nutrients through their shoots (i.e. genera such as *Myriophyllum* and *Ceratophyllum*) and to replenish exhausted compost, then a fertiliser can be added to the water. Special liquid and solid aquarium plant fertilisers are widely available, but other high-nitrogen liquid plant foods will also do. Aquarium fertilisers are, of course, the more convenient and easy to use. If, however, other fertilisers are used, they must be administered at a very low concentration — about one fiftieth of that recommended for foliar feeding of indoor house plants and at about monthly intervals if the

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FOCUS ON PLANTS

plants are growing rapidly, less frequently if they are not. Again, this practice does not seem to affect the fish, although some fertilisers may cloud the water temporarily.

Experimentation may be necessary

Having ensured that the plants receive an adequate supply of light and mineral nutrients, it is then a matter of experimentation to determine which particular species will flourish in any given set-up.

Factors such as temperature, pH and local water chemistry will influence which plants can be grown successfully. However, it is possible to make a few recommendations.

Firstly, only those species which naturally occur fully or partly submerged in tropical lakes and rivers will grow in aquaria over a long period of time. Cuttings of *Hypostelma* and other terrestrial plants will, therefore, not flourish underwater. Similarly, marginals such as *Acorus gramineus* are unlikely to do well in the long term when grown completely submerged. However, many emergent species and bog plants which, in the wild, tolerate long periods of submergence during the tropical wet season, can be kept successfully in aquaria.

The majority of true submerged plants rely extensively on buoyancy for support, so any "aquarium plant" which stands rigidly when out of water may not be a true aquatic



Fine-leaved plants such as *Cabomba* absorb a large proportion (if not most) of their requirements through their leaves.

species.

Secondly, rooted genera like *Cryptocoryne*, *Echinodorus* and *Vallisneria* are better than cuttings of 'bunch plants' at utilising the nutrients in the compost and are more likely to be shade adapted than, for example, *Lad-*

wigia or *Cabomba*. This is important because most artificial lighting essentially creates shade conditions. *Cryptocoryne* species, in particular, are very useful plants for the dimly lit aquarium.

Unfortunately, if rooted species have to be purchased with their roots clipped or otherwise damaged, they may take a little while to get established. Finally, different species should not be planted in the same area. This invariably leads to detrimental interspecific competition for resources, usually light. It is as well to remember that, given ideal conditions, aquatic plant growth can be quite prolific and so, even a large tank will not support more than two or three species, unless it is expertly managed.

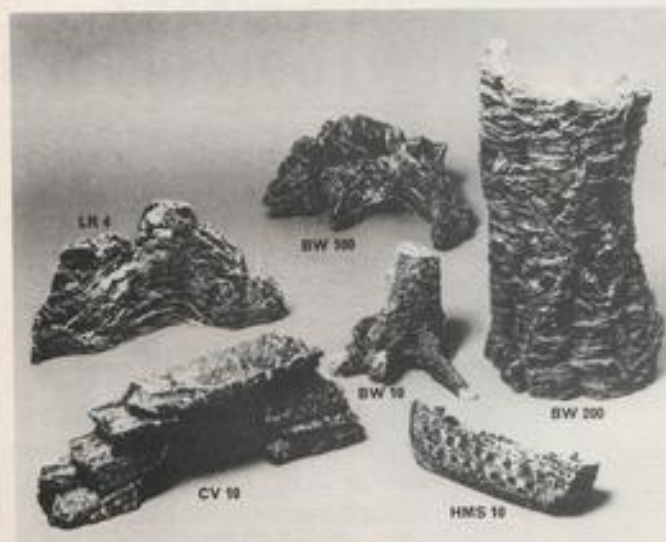
Closing remarks

Hopefully this "physiological approach" to growing tropical aquatic plants will enable the unsuccessful aquaculturist to identify the reason for his or her failure and apply a solution. Those that I have suggested are based largely on personal experience and are, consequently, open to criticism, but they seem logical ones and appear to work. However, there is no room for complacency — all the factors discussed in this article can be investigated further and, of course, there still remains the more challenging problem of inducing aquarium plants to flower.

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PHANTOM TETRA

South American Tetras are among the most popular of aquarium fish, but do we take their characteristics into consideration when calculating their living space requirements?

Arend van den

Nieuwenhuizen discusses these highly desirable fish.

Photographs by the author.

For quite a number of years now Phantom Tetras have been kept in our aquaria. The most well-known are the Black Phantom Tetra and the Red Phantom Tetra.

The first of these (*Megalimphodus megalopterus*) was described by Eigenmann in 1915 and first introduced into the hobby in 1956. One or two years earlier Harald Schultz caught the fish in central Brazil among the numerous lakes of the middle of the river basin of the Rio Itenes. From there he sent hundreds of specimens to Sao Paulo where they were lost through the carelessness of his assistants. In the cold winter of the 800 metre high Sao Paulo plateau the fish were left outdoors subjected to a temperature of just above freezing point.

Natural conditions

In 1957 Schultz visited the region once more and managed to send off a large number of these, to him at least, new fish. In the DATZ magazine of 1959 he described where he had located them. "The climate of the region in which our fish has its home is tropical, with hot and dry summers and very rainy winters. Average water temperatures, measured at the hottest time of the year, were between 23 and 25C at about seven in the morning close to the bank in slow-flowing water. Of course, the temperature rose considerably during the day under the scorching sun.

"The water of the upper Itenes is brownish, soft and crystal clear. It had an acidity reading of exactly six degrees at the time the temperature was measured. The bed of the river was sandy with areas here and there which had a muddy covering about ten centimetres deep consisting of humus. That is to say, made up of decayed water

Right above, The Black Phantom Tetra, *Megalimphodus megalopterus*, is one of the most popular Characins for the aquarium.

Right, the Pink Phantom Tetra, *M. roseus* is an ideal species for the smaller aquarium.



PHANTOM TETRA

Continued

plants and animal waste products.

"A peculiarity of this region is the occurrence of sudden cold spells (friagem as they are called by the Brazilians) which are most frequent during the first half of the hot and dry period of the year. They are accomplished by cloudy skies and fine drizzle and the rapid fall in the temperature, which may result in changes of up to 25°C, which often brings about great damage to the natural environment, which was previously subject to the summery heat. There are credible reports of sudden fish mortalities which are on such a scale that the surface of the water is covered with a white sprinkling of floating dead fish. The temperature sinks much more slowly under water, of course, but the fall is nevertheless significant during these sudden cold periods, which may last up to three days.

Needs of the Black Phantom

"Since our new black-finned Tetra prefers the protection of the deep, shadowy places beneath the extensive canopy of vegetation, as is indicated by its coloration, it is quite possible that it is hardly affected by these natural catastrophes which recur several times a year.

"This preferred location may also lead one to conclude that the fish may tolerate lower temperatures without permanent damage, provided they are not inordinately low and the right kind of environment and care is offered by the aquarist. Most often the species is to be found beneath a metre deep covering of floating vegetation among a dark tangle of roots and grouped in small shoals over a sandy substrate covered with dark humus. Here the water is stagnant or flows only very slowly. In this dark environment bright rays of sunlight must constitute a rare occurrence. It is possible, however, to catch sight of individual specimens swimming around in shallow water among *Cabomba* and other plants, in the company of all kinds of other fish.

"When the heavy rains fall in November at the onset of winter, streams, ponds, swamps, lakes and the main river swell very quickly and in the area of the upper course there are extensive wetland areas in which the buriti-palms flourish in their millions. The ground is covered with their red-brown fruit and fallen leaf-stems. As soon as the rising water fills up these marshy areas the main river becomes almost red-brown for a period of time. According to modern sources the fruit of the buriti-palms has an enormous vitamin A content. There is no doubt too, however, that the soaking of the palm stems and the fallen leaves introduce a heavy tannin content into the water.

Spawning in the wild

"At this time the water rises high above the river bank, with a difference of six to

eight metres between this winter level and the summer level. There is general flooding, the areas of floating vegetation are carried downstream or pushed far into the areas beyond the river banks and, in the latter case, millions of water plants which disappear into the ground during the extended dry season spring up in a few short weeks. Other kinds of plants, which have adapted to dry conditions by developing shorter and sturdier leaves, also grow significantly in the submerged conditions. During this time the small, black-finned fish make use of the watery jungle for the purpose of spawning.

"The floating vegetation extends for up to several hundred metres in length and a hundred metres across and myriads of water creatures develop and thus provide food for the young fish at every stage of their development."

This is the time, then, during which the fish reproduce. Although one might well expect otherwise, having heard a description of their natural habitat, they adapt well to the very different conditions in captivity. They are most at home in an aquarium containing water which is not too hard, has quite a lot of marginal plants and in the middle — depending on the size of the tank — an attractive piece of moor oak which is partially overgrown. For the marginal vegetation one or two plant species can be used, of the type which will grow with long garlands spreading across the surface of the water and so provide a certain amount of shade. The fish certainly do not appreciate too much light. Although they have a preference for hard water, this is no advantage in the breeding tank. One will have most success with a water hardness reading of 5°DH or less. In order to make the water more acid a peat filter can be used, but the same result will be obtained if a piece of hard peat is left to lie in the water for a few days. The water should have a pH reading of 6.6.

Spawning in aquaria

Courtship behaviour is very attractive; it is similar to that of *Hyphessobrycon bentosi rosaceus*. Afterwards the fish release their eggs in open water or against and among fine-leaved plants. A clump of greenery in the breeding tank serves the main purpose of reducing the amount of direct light. Preferably, diffused lighting should be used. After the eggs have been extruded, which may take place after a few hours or days, the breeding pair is fished out and the tank covered with a newspaper. At a water temperature of 24°C the young hatch but do not hang from the plants or sides of the tank, as is the case with the 'Minor', for example. They are not free-swimming until the fifth or sixth day. Since it is difficult to employ a control in the tank, a few of the very adhesive eggs are removed after spawning by means of a pipette. They are put in a

dish containing water from the tank and the dish placed on top of the tank. It is then possible to observe what happens and when the right time has arrived to introduce food.

At this stage it is important that the breeding tank should be subject to subdued lighting for the young are disturbed by light and are very nervous. As small as they are, they dart here and there through the water keeping close to the tank bottom. Consequently, part of the tank bottom is covered with separated pieces of peat or Java moss. The water level is lowered to about ten centimetres, so that a suitable concentration of the food is created. The young are given pond Infusoria and, after a few days, a diet of finest, newly hatched brine-shrimp nauplii. Pond food should nevertheless then be fed again and the water level raised a little by the addition of fresh water. If one wants to siphon away dead food remnants great care must be taken, for the young are difficult to see and a certain amount of risk is involved. This is the case for about two weeks and then the young are easily seen as they grow very quickly. After three weeks they have already begun to develop their coloration. After eight weeks they may be as long as two centimetres. The parent fish need about fourteen days before they are capable of breeding again.

The young develop into splendid fish which are plainly larger than their counterparts in the wild. Schultz put a few pairs of the fish he had caught himself into a breeding pond and obtained a large number of young Phantom Tetras. He wrote about what he subsequently observed in the DATZ magazine in 1959: "At this stage I had a large surprise. When the parent fish were caught and removed I discovered that they had developed in a few months to a size which surpassed any I had seen in the natural state. The males were at least as big as fully-grown *Scorpaen* males and had grown long dorsal fins, which they waved about proudly. The anal fin, too, was quite elongated. The red of the male's body had given way to a dark grey, against which the striking black fleck set in its shimmering mother-of-pearl band contrasted to great effect. The dorsal, anal and caudal fins were still jet black as before. A splendid fish — particularly when swimming in courtship around the brightly coloured female, which increased my surprise by having retained the original bright red of the body in the pectoral and anal fins and the now flesh-coloured or pinkish body which was now more colourful than the male's."

The coloration of young fish may cause some confusion if Red and Black Phantom Tetras are swimming about together in the bare tank of the aquarist dealer. The young are difficult to distinguish, because the females of the Black Phantom Tetras resemble very much the Red Phantom Tetras, which differ in having a transparent reddish hue and a darker dorsal fin with a small white spot.

Red and Pink Phantoms

The breeding of *Megalalopodus roosei* can be compared with that of *M. megalopterus*. Once again soft water is needed, as I have heard of reports of the eggs being beset by fungus in hard water. The brownish eggs of both species can be clearly seen in the breeding tank. The young Red Phantom Tetras, too, grow very quickly if they are reared properly. The same is true to a third available species, which, remarkably, is much less well-known amongst hobbyists, although it is a striking fish. This is *Megalalopodus roseus*, the Pink Phantom Tetra, an ideal species for smaller aquaria. It resembles somewhat Griem's Tetra, *Hyphessobrycon griemi*, which is rarely seen these days. I consider the Pink Phantom Tetra to be more attractive, with its golden underside, striking black fleck behind the gill cover and the intensive red of the rear of the body.

This small fish inhabits the basin of the Rio Maroni in French Guyana and resembles in its behaviour the Flame Tetra (*Hyphessobrycon flammeus*). It is a lively swimmer and is best cared for in a small shoal in an aquarium with marginal vegetation containing open areas in which the fish like to take the occasional rest from the continuous movement to and fro. Otherwise the fish

have no particular needs with regard to the organisation of the aquarium. They are equally at home in both hard and soft water, but they take on their best coloration in water which is not too hard, with diffused lighting and a dark tank bottom covered with some vegetation. They can be kept in a community tank together with the smaller *Pyrrhulina* and *Copella* species, for example *Copella nattereri*, the slim bodies and attractive spotted markings of which form a beautiful contrast to the Phantom Tetras. Also suitable companions are *Nannostoma* species, Hatchetfishes, Neon Tetras and *Crenichthys* and *Thayeria* species such as the only recently imported *Thayeria ifati*, which is a little more colourful than the well-known *Thayeria boehlkei*. Also highly suitable for smaller aquaria is the once again available Dwarf Tetra, *Hyphessobrycon georgiae*, from the Sipaliwini savanna in southern Surinam. In short, there is sufficiently wide choice of species available to enable one to establish an attractive South American community for the Tetra *Megalalopodus roosei*.

For all these fish a water temperature of about 24°C should be chosen. Small Phantoms will indeed accept dried food, but I prefer to give them live food such as cyclops or mosquito larvae. They are extremely partial to black mosquito larvae and fruit flies, too, should be included on the menu, which is equally true for other members of this group of species. If one spoils the fish with such a diet the females soon put on spawn and are then easy to distinguish from

the somewhat smaller and slimmer males. For breeding, a tank measuring 40 x 25 x 25cm is suitable, filled with water which is not too hard. I used tap-water at 5°DH and increased the acidity with Torumin. I placed a piece of moor oak, over-grown with Java moss, in the moderately illuminated tank. The temperature was 25°C. Two days after I had placed the fish in the tank in evening darkness they spawned in open water and also on the vegetation. Spawning in open water often took place in the darker part of the tank beneath the moor oak. The eggs numbered about 300 and were not very adhesive. It is a fact that one can feed the young immediately with small brine shrimp nauplii, but if Infusoria from a pond or one's own production are available, it is correct to feed them in the first few days.

In order to raise the young in the best possible way the fry are placed in a small breeding tank. As soon as they are free-swimming, they are placed in a larger tank with great care, in such a way that they can find their own way out of the breeding tank into their new home. The breeding tank should not be tilted in any way.

If we start off with about ten centimetres of water in the tank and raise the level daily by about three centimetres using fresh water, everything will go fine. It is true that the young of *Megalalopodus roosei* do not grow as quickly as other members of the genus. All in all, it is a species which deserves more attention, all the more so as it is seldom imported and we need to keep it in the hobby through our own breeding.



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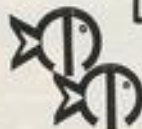
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Male Dusky Damselfish guarding a large batch of eggs.

SPAWNING THE DUSKY DAMSEL

Breeding their fish regularly is the dream of every marine hobbyist. For a few, like experienced marine aquarist and B.M.A.A. member, **Derek Bunn**, the dream has become reality.

In May 1985 I purchased two 1 in long Dusky Damselfish (*Dascyllus carneus*). They were pretty little things, one with the rear half of its body whitish, contrasting well with a dark vertical band on the forepart, and the other with the rear part rather darker and, so, less contrasting. Both had — and still have — a very white tail.

By the following October both had matured and I found I had a breeding pair. The female had become much duller and the male had turned darker still, but with a conspicuous large creamy-white spot halfway along its body, just below the dorsal fin. He had outgrown his mate by about a third and was about 3 in long. They are not the most beautiful of marines, but do have a purple sheen over their bodies when the light catches them in a certain way.

My tank is in a cabinet and measures 3 ft 5 in x 14 in x 11 in (top of gravel to surface of water). I estimate that it only holds about 20 gallons, taking account of rocks and gravel. For "decoration" I have some rather nice rocks brought back from the shore at Llandudno, North Wales (the tank was originally designed for coldwater marines). I have a traditional undergravel filter, consisting of just a mixed up layer of coral sand, some gravel from Llandudno and a little calcareous material. I also have a charcoal filter operated by a side branch from the airline, but I rarely service it and I suspect that it contributes minimally to the wellbeing of the tank. Instead, I prefer to rely on a 5% water change each weekend and this coincides nicely with the weekly

clean-up. In this relatively small tank I achieve excellent water movement and filtration with an uplift at each end operated by a powerful Schego or Schwarzer air pump (one on standby).

In order to promote the growth of macroalgae, rather than just the simple filamentous types, I have three fluorescent tubes — two Northlights and a "power-twist" Truline — on for twelve hours. The growth of *Gaulteria* species is maintained by doses of Sea-green, Sea-trace, Sea-vita and Invertfood. Though many aquarists detest the presence of filamentous algae, I consider that a small amount is advantageous, as it is always colonised by tiny crustaceans which the fish eagerly search for — the skill lies in adding just the right amounts of nutrients and in not permitting rampant *Gaulteria* to take over completely.

In addition to the Damselfish, I have a pair of Common Clowns *Amphiprion ocellaris* with a large *Radianthus* anemone, a Boxer Shrimp *Stenopus hispidus* and two "Feather Duster" worms of different species. I use frozen foods entirely: clam, squid, brine shrimp and lobster eggs. I have assumed that, with livefood thriving in the tank, including various algae, it should not be necessary to give them additional food types.

The temperature is usually about 78°F (c. 26°C), but varies a few degrees in hot or cold weather. I try to keep the SG (Specific Gravity) at 1.021 as this density seems to be favoured by aquarist shops and facilitates the transfer of specimens, including macroalgae, in and out of my tank. I cannot

remember when the water showed the slightest sign of nitrite, nor when the pH was not correct, so I seldom trouble to do the tests these days.

Since October 1985 the Dusky Damselfish have spawned every week, usually at six-day intervals. Laying commences as soon as I switch on the lights in the morning and hatching occurs in the evening of the third day, ie after about 60 hours. That is when the pair of Clownfish emerge from their anemone to have some sport, snapping up the minute fry as they float about in the water making it appear slightly cloudy.

I do not believe the Damselfish are really a pair, in the sense of being mated like the Clowns. They have terrible squabbles in which the (smaller) female usually comes off worst! The male has a nest area at one end of the tank, where he plucks algae from the rocks or back glass and, perhaps for effect, has scooped a deep hollow in the gravel. He displays a lot to the female, performing a vigorous "switchback" movement which emphasises the cream spot as his body moves up and down. He also circles this way and that and sometimes vibrates his body against suitable substrates for laying. Most remarkable is the loud noise he is capable of making, but I think this is used more in aggression. I have not quite decided how this "rattling chirrup" is produced.

A day or two prior to laying, the female will sometimes respond to the male's invitatory displays by following him as he circles and dives about and shivers his way across the spawning site. On the day of spawning, as soon as the lights are switched on and the female has got used to them, she follows him to the spawning site and moves across it, vibrating her body and leaving a trail of eggs. At this time she exposes a short ovipositor. The two then move to and fro across the site for a full hour, losing their usual nervousness and being not easily disturbed. The female keeps her vent pressed to the rock or glass all the time and the male fertilises the eggs every few seconds, vibrating his body as he does so. After an hour the female will break off but then, in response to encouragement by the male, will commence to lay again for short periods over a further ten minutes.

The male does not pay continual attention to the eggs as some fish do, but he makes periodic visits to the "nest" and I have the impression that the amount of time spent there, fanning and plucking at the eggs with his mouth, increases as hatching nears. When they hatch, I believe that even the female, who has taken no interest in them, does not attempt to eat the young. The fry are extremely tiny, but could possibly be reared by someone with the time and patience, especially now that Rotifer Kits are available. However, I have never made the attempt and by the following morning all have invariably disappeared.

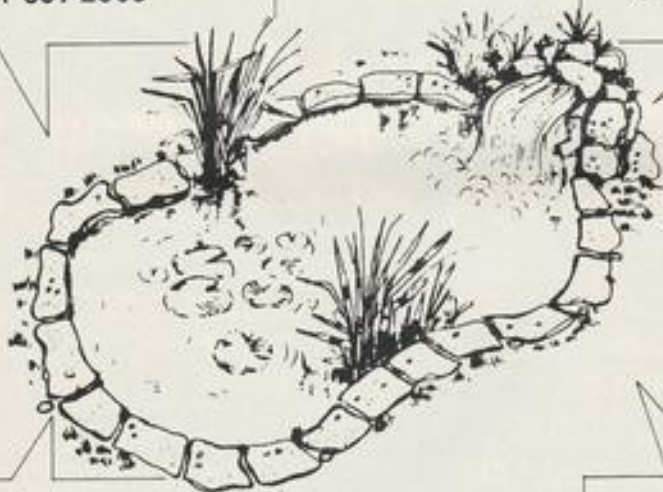
When the eggs are all laid, the individual lines of eggs deposited by the female form a large whitish mass consisting, presumably, of many thousands. Produced every six days, this must make the Dusky Damselfish a very prolific fish indeed.

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LIVE FOODS

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livefoods (and more) — all in one
information-packed article by
Dr. Robert Goldstein.

All of us admire the spawning successes of famous European aquarists like H. J. Richter, experts who always report that their fish were fed live foods. In fact, certain species can only be maintained on live food, while others can be readily bred using this simple approach to good husbandry.

Some foods, such as tubificid worms, must be purchased, but many other foods are readily cultured. You can order starter cultures for many of these foods from companies which advertise regularly in *A & P*. Alternatively, many members of aquarium societies also list live foods in the organisations' trading posts.

PROTOZOA

Older textbooks refer to Infusoria, a term dating to Antony von Leewenhoek's descriptions of "infusions" of tiny "animalcules" in pond water, but this term has no real biological meaning. Methods used to grow "infusoria" cultures usually produce ciliated protozoans (single-celled organisms) such as *Paramecium*. Another first food is "green water", which often contains flagellated protozoa like *Euglena*.

Paramecium

When we set up dried grass or banana peel "infusoria" cultures from old aquarium water, we are really attempting to grow ciliated protozoans like *Paramecium*. Today, pure cultures of ciliates are also available. The pure culture should be added to a jar containing diatomaceous earth-filtered water from an established aquarium. Add a single dry half split pea per quart. The peas will slowly decay and, in time, clouds of fine white specks will appear near the surface, cascading slowly to the bottom. These specks are ciliates that can be removed with a food baster or eyedropper. A single culture is all you need, but duplicate cultures insure against loss. If the water smells foul or becomes grey without specks, the culture is contaminated with bacteria and should be discarded.

Euglena

Green water cultures often consist of a flagellated, chlorophyll-containing, one-

celled organism called *Euglena*. *Euglena* is an excellent first food and more easily cultured than *Paramecium*. Find some stagnant green water outdoors, and then filter it to remove detritus and larger organisms and add it to dechlorinated tap water. Place the culture jar directly under a fluorescent lamp or on a window sill, and add dried yeast or liquid plant fertilizer. The water will gradually turn deep green. *Euglena* are siphoned out with a food baster or eyedropper and squirted directly into the fry tank. Do not add tap water to replace what you've removed, as the change may shock and kill the culture. Begin additional cultures (sub-cultures) when your main culture is at its peak.

ROTIFERS

The rotifers are protozoan-sized, multi-cellular animals closely related to the roundworms (see below), but which look nothing like worms. There are pictures of several kinds in Sterba's *Encyclopaedia*. I have written previously about *Brachionus plicatulus*, cultured as live food for marine fish fry. We have others available for freshwater fry, including *Philodina* and *Aplanchia*. The rotifer *Daphnia* is used to feed both brine shrimp and marine fish fry. Cultures of all these species, with instructions for growing them, are usually available from members of specialty societies. In addition, commercially produced cultures and culture kits have recently become available in the UK, the States and some European countries.

NEMATODES

Nematodes (roundworms) are the most abundant animals on earth, in water and even in Arctic ice. Two types are used as food for very small fry when they pass the "infusoria" stage: these are microworms and vinegar eels.

Microworms

A microworm (*Paragriffus silvaticus*) starter culture (inoculum) can be purchased by post. When it arrives, prepare the cultures in containers with slit or loosened lids to allow carbon dioxide to escape.

Mix two cups of dry baby food and an eighth teaspoon of yeast with enough tap water to make a paste. Spoon the paste into the plastic containers to a depth of half an inch. Add the inoculum of microworms to the surface and cover the containers. The worms eat the yeast which grow on the baby food. Any cultures that begin to grow fungi should be discarded. A good culture will become tan and glistening as the microworms swarm on the surface.

As the culture matures, the worms climb up the sides. Wipe your index finger along the container wall to collect the pus-like pure worms. To feed, simply swirl your finger in the fry tank.

As the culture ages, it gets very wet, the colour deepens, and the worms stop climbing. Throw it away, and be sure you have other cultures going. Give cultures to all your friends to ensure a continuous local supply.

Vinegar eels

Vinegar Eels (*Turbatrix aceti*) are tiny nematodes that live in acidic liquids. You can purchase starter cultures by post. Dilute some cheap, cloudy, brown cider vinegar with an equal amount of tap water. Add your inoculum to the dilute vinegar in an uncovered glass jar, throw in a pea-sized piece of fruit, and you're in business.

Within a week, a fuzzy white line of rapidly growing worms will form around the meniscus of the liquid. Siphon the line out with a food baster or eyedropper and filter the liquid through a brine shrimp net to separate the worms. Vinegar eel cultures probably never die, but new cultures with fresh vinegar and fruit smell better than old ones.

ANNELIDS

The annelid (segmented) worms are divided into the polychaetes, leeches and oligochaetes. Of the more than 3,000 species of oligochaetes, I will discuss earthworms, red and black tubificid worms, white worms and grindal worms.

Earthworms

Earthworms will bring many meat-eating catfishes into breeding condition fast. *Lumbricus terrestris* and its relatives can be dug



Left, Daphniae are easily raised in gallon jars containing either green water or a constant supply of yeast sufficient to barely cloud the water. Far left, a pair of adult shrimp mating and producing eggs. Above, Streptocephalus seal fairy shrimp raised outdoors by the author.

from the garden or purchased at a bait store. They can also be cultured.

Rake a pile of dried leaves onto a concrete sidewalk or driveway, mix a few buckets of garden dirt with the leaves, wet it all down, and wait a month or more. As the leaves decompose, the worms multiply and concentrate at the damp base. If you're fussy, you can transfer the worms to a box of damp, 50:50 potting soil and peat moss and feed them corn meal mixed with liquid vitamins for a few days. This cleans out their intestines and makes them carriers of nutritious additives.

The Plesiopora, one of three suborders of Oligochaetes, contains the tubificid (red and black) and enchytraeid (white and grindal) worms.

Tubifex

The family Tubificidae contains numerous species of *Tubifex*, *Nais*, *Aeolosoma*, *Phallodrilus* and other genera of aquatic worms, which occur worldwide.

Traditional red "tubifex" worms are a mixture of species collected from the effluents of sewage treatment plants, where they thrive in the organically rich mud. Tubificids carry some parasitic tapeworms of primitive fishes, but the evidence for transmitting any disease to aquarium fishes is, I feel, circumstantial at best.

Keeping tubifex is not difficult, but many people do it wrong and then blame the worms for dying. The best way to keep tubificids is in cold, slow running tap water. The small amount of chlorine in a dripping tap will not hurt them, and keeps them clean. The worms form a richly coloured, active clump at the bottom which should be broken once a day to allow dead worms to

wash free. A less desirable approach is storage in a refrigerator in half an inch of water, a method used mostly by current or incipient batchers!

Black Worms

For twenty years, another kind of tubificid has been available to American aquarists living in California. Called "black worms", they are a mixture of co-occurring species. A few collectors sell to local distributors, and the occasional oversupply is shipped to the rest of the U.S.

Black worms are dark purple, larger and thicker than red worms, and more vigorous. A clump of red tubifex worms forms a flaccid ball in your hands. A clump of black worms will disperse and escape between your fingers. Because of their greater activity, clumps stored under a running tap need not be broken up.

Black worms don't come from sewage treatment plants. They live in the mulm at the bottom of sedimentation ponds of trout hatcheries and food processing plants. (Many municipalities require that waste water effluents be diverted to settling ponds prior to release into streams.) The worms thrive in a few of these ponds. One collector gathered 1,100 pounds of black worms a week from a trout hatchery that had three settling basins and produced 750,000 to 800,000 pounds of trout a year. But before you do any calculations, be aware that worm production depends on water flow and quality, food supply, space, weather and other factors.

Having access to a hatchery is no guarantee of a constant supply. When trout get sick, trout managers add chemicals to the water which often kill the worms in the

settling pond.

Opportunities to grow or harvest black worms exist at trout hatcheries in England, and should be explored.

White Worms

The family Encyrtidae contains the white and dwarf white or grindal worms. These worms, measuring from half- to three-quarter inch, are said to cause fatty degeneration of the gonads, but I have yet to see proof. They are probably as nutritious as earthworms.

White worms (*Encyrtus albidus*) are heat-sensitive and easily lost during the summer. To cultivate them, use styrofoam boxes and cut holes in the lid and bottom for air circulation and drainage. Fill the box two-thirds with potting soil and mix in a quart of sand. The medium should be damp, light and loose. Spread the starter culture of worms all over the surface, make a slight furrow or depression in the middle and press a small piece of fresh white bread soaked in milk in the hole. Use very small pieces that will be consumed in a few days before they can grow fungus. Place a pane of glass directly on the soil to retain moisture. The worms congregate in moist areas under the glass where they are readily removed with a toothpick and fed to small mouthed fish. Periodically, completely stir up the soil in order to aerate and to loosen it. Do not let it pack down or get warm or wet.

Eventually, mites or small black flies will infest your culture. Save as many worms as you can, wash them, and use the cleaned worms to inoculate a new culture. The mite- or fly-infested culture should be discarded.

Grindal Worms

Grindal worms (*Enchytraeus buchholzi*) are smaller than white worms and should be kept wetter and warmer than their cousins. They are fed either bread or flaked baby food and milk. Their soil should be very damp and the box can be kept at room temperature. Otherwise, they are cultured like white worms.

ARTHROPODS

The Arthropods include many kinds of animals with hard outer shells. Perhaps, no foods are more important to freshwater fishes in nature than small aquatic insects and crustaceans.

Fruit Flies

You can get a culture of wingless fruit flies, *Drosophila melanogaster*, from a commercial supplier or a local school or college. This is the best food for small, surface feeding insectivorous fishes, clean and easily cultured in small jars using a wet mix of corn meal, water, yeast and syrup. A rolled up paper towel or segment of cardboard provides the larvae with a place to pupate. Fruit fly cultures must be constantly made anew with bits of pupa-laden paper on fresh food. The flies are shaken from the jars directly into the aquariums.

Mosquito Larvae

Mosquito larvae are excellent live foods for surface feeders. You can grow them outdoors in all but the coldest months by throwing beef or pork bones and tree leaves in a shaded wading pool to stagnate the water. Although you can culture mosquito larvae indoors, I won't tell you how out of consideration for your relationship with your family!

Live Adult Brine Shrimp

To culture live adult *Artemia salina*, forget everything you've read in all the textbooks. If you keep marine fishes, then save the used water outdoors in wading pools, plastic barrels or styrofoam boxes where it can evaporate and concentrate. Throw in some newly hatched brine shrimp nauplii (not eggs) and wait a few weeks. That's all



Artemia nauplii are hatched by every aquarist. But the used water should not be discarded. It can be stored outdoors where it will evaporate, concentrate and grow adult brine shrimp.

there is to it. Don't feed them anything. They also grow in the winter, but more slowly, and the increasingly saline water protects them from freezing. You can also grow adult brine shrimp in used rock salt hatching water. I've had shrimp at salinities of more than 1.055, which was the top of my hydrometer scale. If you don't keep marine fishes, add a few pounds of sea salts to your rock salt solution. It seems to give better growth.

Fairy Shrimp

Fairy shrimp are giant cousins of brine shrimp. In fact, brine shrimp are simply fairy shrimp that live in salt ponds, whereas all the other fairy shrimp live in fresh waters. *Daphnia* collectors occasionally stumble upon them, but few aquarists realize that they can be cultured.

Although pool culture during warm weather is the most productive way to grow them, you can also grow a few in gallon jars

of green water on a window sill. The sediment from the jar or pool contains the eggs, which look like pockmarked brine shrimp eggs. These eggs hatch when placed in aerated, clean water. The presence of adult fairy shrimp in the same pool inhibits the eggs from hatching.

Today, one supplier in the U.S. is distributing eggs of the fairy shrimp, *Streptocephalus sealii*, for starter cultures. They are hatched in brine shrimp hatching, using old aquarium water and aeration. The nauplii are then placed in outdoor pools or jars on a window sill for growth. Food can be green water or very light feedings of dissolved yeast. If you cannot get them in England, write to me on your club's letterhead stationery and I will send a starter culture of eggs to your aquarium society.

Daphniae

Today's *Daphnia* species are hardy beasts. I grow them in gallon jars under fluorescent lights or on window sills in my fish room. Each jar is filled with aged tap or outdoor pool water. I swirl in a netful of starter culture daphniae, add a squirt of green water and a few grains of yeast and then wait. *Daphniae* reproduce rapidly. Every few days I add a few more grains of yeast to keep the water just slightly cloudy. (If you overdo it, the yeast will kill the daphniae.) I also grow them in green water without any food added. The adults are harvested with an ordinary fish net which allows the babies to slip through and mature. A culture lasts almost indefinitely, but requires continual feeding and harvesting.

FINALLY . . .

Using live food to excess in my breeding tanks, I've had no difficulty spawning fishes normally considered difficult. I also add *Daphnia* to many of my fry tanks where they multiply and provide tiny live food round the clock. I also find tubificid worms keep the gravel sweet and provide constant food, and are a favourite of small fishes. Live adult brine and freshwater fairy shrimp are relished by all fish, and cost nothing to grow.

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Naturalist's notebook by Eric Hardy

Additions to Wildlife and Countryside Act

In the first 5-year review of the 1981 Wildlife and Countryside Act, the Nature Conservancy has asked the Department of the Environment to add 4 more species of freshwater Coregonid or white-fish to the protected list: Gwyniad (Lake Bala), Schelly (Haweswater, Ullswater, Red Tarn), Powan (Lochs Lomond and Eisk) and Vendace (Lochmaben). Also the estuarine Allis Shad (not the Twait Shad), and the harmless Basking Shark. These may not then be caught or kept in aquaria without licence.

The intentional killing and injuring of all species of terrestrial reptiles, as well as controls on their sale, is also requested. 31 more plants to be added include the Holly-leaved Naiad (*Najas marina*) in a few brackish Norfolk Broads like Upton, Barton and Hickling.

Clever Flatworms

Lilliputians among animals, the tiny planarians, minute, leaf-shaped flatworms living in water or damp soil, waving their triangular heads from side to side as they "taste" their way, are bright enough to remember their way through a maze. Since Ball and Reynolds published their 1981 *British Planarians*, four more have been added. One, a grey-brown North American called *Dugesia tigrina*, is subject to a national survey because it is spreading through Britain after introduction presumably by aquarists. It has been found in ponds in Anglesey, Scarlett Quarry, Isle of Man, and Hoyleake (Gilroy Road), Cheshire, etc.

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One of the world's most outstanding books on fishes, the new 6th edition of *Smith's Sea Fishes*, originated by the late Prof J. L. B. Smith of Coelacanth fame, now edited by his widow, Prof Margaret Smith with a team of 72 leading fish scientists is published, in English, by Springer-Verlag,



Outstanding book on fishes

the leading German scientific publishers, at 198 DM or £70.70. Not only does it describe 2,150 South African Atlantic-Pacific species, many known to aquarists, such as Snappers, Groupers, Wreckfish, Sea-bass, etc., illustrating 1,500 in 144 colour plates, but it gives special attention to sea-anglers.

As well as the usual identification keys with a special one for identifying all fish except eels by fin ray-numbers, its 1,047 pages include a thorough introduction to general fish anatomy, all aspects of their biology and behaviour and dangers of sea-fishing including poisonous and harmful species.

Such has been the advance in fish knowledge since the original 1949 edition, that the present one describes almost twice as many species, illustrating them with line drawings as well as plates.

Not only does the Indian Ocean represent the waters of the world's most sought-after fish, the Coelacanth (nearly 100 specimens of which have been caught), but also of the world's rarest fish, the white-spotted *Lepidaplois albomaculatus*, another "living fossil". It is an area where new species are

discovered every year, as its fish aren't yet completely known. Indeed, in 1936, a Durban sea-angler told me that most fishermen then were catching fish of unknown identity.

South Africa has some 15% of the world's marine fish (in 1984 Nelson estimated 21,723 known fish species), due to its varied habitats from coral-reefs and kelp-beds to ocean depths over 5,000 metres and the meeting of 3 great oceans. More than half are Indo-Pacific, but many deep sea species are world-wide. It has more variety than any other country except Japan.

The book's special fin-formula key is valuable as a positive identification of numerous Wrasses, Sharks, Lantern-fish, Grenadiers, Anglers, Seabreams, Snappers, Parrot-fish and Gobies. There are Flashlight-fish with luminous organs beneath each eye, Sea-horses, Soapfish with thick mucus covering their skin, several Cardinals (which make good aquarium fishes), Grunters, two Mudskippers which come out of their aquarium water, Box-fishes and Sea Catfish, some of which have hard fin spines covered by venomous mucus.

There are indexes to English and African names and a glossary of technical terms.

Useful Catfish Book

In contrast, a compact little 125 page hardback just published by T.F.H. Publications at £3.95 (soft cover £2.95), Dr Warren Burgess's *Corydorass* with 151 colour plates, doesn't even waste the inside covers for they have further colour plates. It's a bargain for anyone keeping Corys, with ample advice on keeping and breeding these catfishes. Their bottom-feeding habits made them popular as scavengers in many tanks. But they are mostly night feeders which don't like the bright lights of daytime watchers. Burgess plans to deal with more African cats in his bigger book *Catfish of the World*. Meanwhile, this is good value and a pleasure to look at.

New Collins Guide

All pond-hunters will welcome Collins' fully-illustrated, most comprehensive new *Field Guide to British and North European Freshwater Life* by Richard Fitter and Richard Manual at £12.95, with over 350 colour photos and as many drawings. Ranging from microscopic life to insects and aquatic plants, with practical notes on collecting, and a little bit of waterside birds and mammals, it's a "must" for every nature-teacher and cold water aquarist. Unfortunately, it refers to *Typha* as "Bulrush" instead of Reedmace and Stoneflies as "flies", which they aren't, thus perpetuating two widespread fallacies. It has more information for identifying every form of water life crammed into its pocket-sized pages, without wasting words, than any other guide to our ponds and streams. We have come a long way from Furneaux's famous popular guide to our freshwater fauna with which I started stocking my aquarium over 70 years ago. The book is also up-to-date, not a rehash of existing literature.

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1. Send your answers to reach us by 30 April 1987 at the very latest.
2. Make sure that you write your full name and address in BLOCK CAPITALS.
3. Post your entry to: Aquarist & Pondkeeper (Waterlife Competition), 58 Fleet Street, London EC4Y 1JU.
4. Only one entry per household will be accepted.
5. Look out for the names of the lucky winners in the June issue of the *Aquarist & Pondkeeper*.
6. This competition is open to UK residents, except employees of Buckley Press, Waterlife and their immediate relatives.





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Coldwater Winter care of fry

Would you please offer a few tips on the winter rearing of fry produced from an autumn spawning? Would the following conditions be suitable?

(i) Tank size: 48in x 18in x 12in (deep), located in a greenhouse.

(ii) Heater (stat set for 62°F);

(iii) Small sponge filter;

(iv) Partial water change once a week;

(v) Food: Freeze-dried Tubifex and Daphnia, plus Promin.

The first suggestion I would like to make is that you should provide rather more swimming space for the youngsters. Far fewer problems arise in uncrowded living conditions, the fish grow faster, outbreaks of disease are less likely, and the quality of the water is better maintained, irrespective of the type of filtration you use.

The water temperature is about right and should see them through the long cold winter months well. Natural temperatures can be allowed to take over from about April onwards.

I would like to see more frequent partial water changes in order to maintain good water quality. I personally would change about 1/3 of the tank volume every other day at this water temperature and under the reasonably heavily feeding regime required.

As livefoods are not so easily available at this time of year your choice is good but you could also offer a good flake which has been well-soaked before being given to the fish.

When is a fry not a fry?

When does a young fish lose the title of "fry"?

I suppose that a fry ceases to be regarded as a fry once it has grown to a size at which it is clearly recognisable as a young fish (ie, when its body shape is apparent and the finnage is clearly visible).

These two-day-old Goldfish are clearly recognisable as fry but when do they become "young fish"?



'Cracked' Shubunkin

I recently noticed that one of my Shubunkin had developed a drooping tail. On checking closely I could see a crack in the base of the tail, just before it joins the body. The crack is only about 1/8 in long. Will it heal itself or, if not, can anything be done? I, obviously, do not want to have to dispose of a beautiful and, otherwise, healthy fish.

I see no reason why the crack in your Shubunkin's tail should not heal, providing that the water in your aquarium is in good, clean condition. There is always the possibility of fungus infection in damaged body and finnage tissue and poor quality water will help infect the damaged area, thus making it necessary to attempt to arrest

and cure the infection.

It is, therefore, important to carry out daily partial water changes. There is no need to change large amounts of water, but the change even of small amounts will be very beneficial in helping to maintain good water quality, and giving the fish a chance to heal its wound. There is no need to even consider destroying your fish.

Tropical Breeding Neons

I have been trying to breed Neons for a long time now. I have managed to get them to lay eggs in water with the following chemical characteristics: pH6.3; GH.0; KH.0, Nitrites 0.1. I also add a fungal remedy. Although the eggs hatch, the fry all die off very quickly. Can you help?

Neons have always been considered difficult fish to breed, although many Far East fish farms now produce vast numbers. You are doing all the right things; perhaps one added factor is sunlight.

If you can arrange a beam of sunlight to strike the tank, especially in the morning, this triggers breeding. The eggs, however, are susceptible to light damage and should be shaded when maturing. Full lighting should only be used a week after hatching. Feed Infusoria for a few days, then the usual fry foods.

'Frontosa' poser

I have a two-inch 'Frontosa' but know nothing about the species. Can you help?

The 'Frontosa' is *Cyphotilapia frontosa*, a Rift Valley Cichlid. It originates from rocky beds quite deep in Lake Tanganyika — 20 metres or more. It can grow to 12 inches, but usually less in the aquarium, and is best-known for the bulging forehead in the adult fish.

There are no obvious sex differences, but males usually have the larger bump on the head. A pair will spawn readily in a big tank with a sandy base and rocks. The fertilised eggs are scooped up by the female and mouth-brooded. The male is attentive and can be left with the family. Incubation can be quite long — 20 days or more.

Special water chemistry is not essential and these fish eat anything offered.

Vicious Giants?

Ten months ago I bought two Giant Gouramis, (Ophronemus goramy) after reading an article in A&P which inspired me. Since then, they have grown to seven inches and have killed a ten-inch Tinfoil Barb. Are Giants known to be vicious? Can you give me any information on breeding these fish?

Ophronemus goramy, or the Giant Gourami, is actually a food fish found in many tropical area fish farms where it grows rapidly to 2 feet on a vegetable diet. Some public aquaria house the fish for its size and easy maintenance.

It is not considered a suitable fish for the home aquarium — especially a community tank. Although quite peaceful and not a predator, the fish rapidly grow to over 12 inches. This reduces the available oxygen for the other species and it is quite likely to eat the smaller fish, almost by accident. Are you sure the Tinfoil was actually killed by the Gouramis?

I doubt if the fish will breed in your aquarium — this would require a pond size tank (the male is a bubble-nester).

Hunch-backed livebearers

I cannot seem to be able to

keep livebearers. I have lost count of the number of fish that have died over the past 14 months. They last three or four weeks and then just seem to go a funny

hunch-backed shape, go thin, and die. Yet, my egg-layers are all healthy!

The signs you describe are characteristic of fish Tuberculo-

sis. Of course, this cannot be confirmed without a proper post-mortem examination, but if the disease is present there is nothing you can really use to treat the tank of fish. It is better to let the disease run its course so that naturally resistant fish remain and the tank becomes free of the disease.

Make sure you remove any dead or dying fish — if the carcass is eaten, this will spread the disease.

When the deaths stop, leave the tank for a few weeks and then get replacement fish. Just in case the disease is present in the original livebearers, seek another source or shipment for a time. Look for any thin or hunch-back fish in the shoal and only buy if they all look vigorous and colourful.

Marine How much is enough

I am starting up a marine aquarium in a tank measuring 40 in x 12 in x 18 in. I will have an undergravel filter driven by two powerheads, plus one Eheim powerfilter.

Do I also need a diatom filter and ultra-violet steriliser?

In view of all the filtration equipment which you've already bought, you certainly don't need a diatomaceous earth filter and an ultra-violet steriliser as well.

Whereas a diatomaceous earth filter will, towards the end of the cycle, remove even some of the larger bacteria, it will not remove all bacteria, nor will it remove any viruses. The ultra-violet steriliser, on the other hand, will, as the name suggests, sterilise the seawater. Almost everything which passes through, including viruses, bacteria, fungi and protozoa will be irradiated and destroyed. About the only parasites which can survive passage through a U/V steriliser are the amazingly durable trematodes, ie flukes of all species, including *Dactylogyrus* and *Gyrodactylus*.

If you do buy a U/V steriliser, please keep a careful log of how long the U/V tube has run for. The tubes only have a relatively short useful life. Please refer to the particular manufacturer's data for this information.

February Competition Winners

'Atlantis' Anagram Competition

Thank you for the overwhelming response. The correct answers:

1. 'Atlantis', 2. Ceramic Medium, 3. Crystal Clear.

Out of the hundreds of correct answers received, the winning one belongs to **Adrian Ibbertson, Stubbley House, Littleborough, Rochdale, Lancs OL16 8NZ.**

Adrian wins a comprehensive aquarium maintenance kit donated by 'Atlantis'.

Underworld Word Game competition

We asked you to make as many individual words of three letters or more, as possible from UNDERWORLD PRODUCTS.

Again you showed us under with your entries. The lucky winner of a NUOVA TURBINETTE 250S worth over £53 is: **Mr Alan Balfe, 110 Rothley Road, Mountsorrel, Loughborough, Leices.,** who managed to make no less than 1,523 words which were acceptable in the opinions of the judges out of 'Underworld Products'.

NEXT MONTH

● Win the holiday of a lifetime in our not to be missed competition jointly sponsored by Thomson Holidays, Isrotel Hotels, The Coral World (Eilat) and Aquarist and Pondkeeper.

Also in the May Issue . . .

● Comprehensive Beginners' Guides to Ponds and Water-gardening

● The complete guide to Fighting Fish

● Spotlight on the Eastern Water Dragon

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Water Gardens Book Competition

The Northern Horticultural Society, based at the Harlow Car Gardens, Harrogate (featured in this month's "Coldwater Jottings") has donated the magnificent prize of three books about water gardening, worth over £25, for this easy-to-enter competition.

The books, written by Philip Swindells, superintendent of Harlow Car Gardens, are: **Water Lilies, The Water Gardener's Handbook, and The Ward Lock Book of the Water Garden.**

To enter, simply write the answers to the following questions on a postcard and send to: **Lilies Competition, Aquarist and Pondkeeper (April), 58 Fleet Street, London EC4Y 1JU, to reach us not later than April 30.** Don't forget to include your name and address on your entry!

QUESTIONS

1. Do aquatic plants prefer (a) full sun or (b) shade?
2. Do decorative pond fish need plenty of sunlight? Yes/No
3. Does the planting season extend (a) from early April to September or (b) from November to March?
4. Do water gardens really need fish for balance and pest control? Yes/No

The first correct entry drawn will win the prize.



Books



Three new books on Reptiles and Amphibians from T.F.H.

1. **A COMPLETE INTRODUCTION TO TURTLES AND TERRAPINS** by Jo Cobb is available both in hardback and softback, retailing at £3.95 and £2.95 respectively. It provides a very useful identification guide to the majority of the species likely to be encountered in the pet shop, and others besides, including an interesting, brief section on sea turtles. The text is fully supported by over one hundred full colour photographs and drawings, most of which portray the species themselves.

The author has included much useful information on the biology of these creatures, and there is a fairly extensive chapter dealing with reproductive matters. In this context, it would have been helpful, especially for the novice, if the statement that correct humidity is essential to ensure successful hatching of the eggs had been quantified by a figure.

An interesting range of accommodation options can be found within the pages of this book. Surprisingly, however, in the chapter dealing with health matters, there is regrettably no mention of the condition known as Hypovitaminosis A, which remains one of the major causes of death in young hatchling Red-eared Turtles (*Trachemys scripta elegans*). Nevertheless, in spite of these comments, Jo Cobb's book is certainly well-worth a place on the shelves of all who are interested in chelonians.

2. Snake enthusiasts will be keen to acquire a copy of **PYTHONS AND BOAS** by

Peter J. Stafford. There are 110 colour photographs and 26 black and white photographs included in this book, which extends to 192 pages. It is a welcome addition to the literature, after the number of general snake titles which have appeared during recent years, but the specialist nature of the text is reflected in its price. At £17.50, it cannot be described as cheap, but all genera within the family Boidae are featured, with these chapters being divided on the basis of sub-families. There is also a checklist included at the end of the book, plus an informal identification key to the various genera.

Python and Boas are, of course, very popular with snake-keepers, and two chapters in this book are devoted to the breeding and care of these snakes in captivity.

However, I did think that this book was somewhat disjointed overall. Certainly, the text could have been made more comprehensive if further specific details concerning care and captive-breeding were included under the individual species headings in the first part of the book. The accounts given here are predominantly of taxonomic interest. In the case of the endangered Madagascar Boas (*Acrantophis* species), for example, I was disappointed to read just a straightforward description of the species themselves, and nothing about their current status. I was left with the distinct feeling that, although the text is well-researched and interesting, it does fall short of being a definitive study of this family of snakes, whether in the wild or captivity.

3. One title certain to be of interest to all reptile and amphibian enthusiasts will be **BREEDING TERRARIUM ANIMALS** by Elke Zimmermann. Translated, revised and expanded from the original German edition, this book extends to 384 pages and features 185 colour photographs, as well as many excellent drawings. If you have more than a passing interest in herptiles, you should obtain a copy. It is divided into two parts, with the first section exploring accommodation options, nutrition and diseases. As throughout the book, the text here is highly practical, exploring in depth such topics as the successful culturing of livefoods. The chapter on diseases is also clearly laid out, comprehensive and easy to follow.

As the title suggests, the bulk of this book is concerned with breeding and rearing of herptiles, and after a sound introduction to the reproductive strategies of the two classes, nearly 300 pages are devoted to the care, reproductive biology and needs of nearly 350 species, with 100 being considered in great detail. Indeed, the coverage here is unparalleled, as shown by the section dealing with frogs and toads.

An extensive bibliography will enable the enthusiast to follow up particular areas of interest, and the species themselves are fully indexed, in terms of both common and scientific names. This book is likely to

become a standard text on its subject, although for the English language market, the title "Breeding Reptiles & Amphibians" would surely have ensured wider sales. It does cost £24.95, but you will certainly not be disappointed having bought a copy.

David Alderton

Latest book on Anabantoids Labyrinthfish

By: Helmut Pinter.

Published by: **Barron's Educational, 113 Crossways Park Drive, Woodbury, New York.** Distributed in the UK by **W. H. Smith.**

ISBN: 0-8120-5635-3

Price £11.95

At last an English language book on Anabantoids, a group of fish including the Gouramis, Paradise and Fighting Fish and Climbing Perch. There are 6 major works on this subject in German and this fluent translation is one of them. The author is Curator of the Stockholm Zoo Aquarium and his thoughtful book strikes a balance between the scientist and the aquarist.

He deals, in separate chapters, with the labyrinth organ, appearance, history, classification, behaviour, care, nutrition, diseases and, finally, with the species themselves. For each of the 70-odd species discussed he lists Latin and common names, synonyms, fin ray and scale counts, length and distribution, and deals at length with maintenance and breeding. As well as Anabantoids he briefly discusses arguably unrelated fish with similar accessory breathing organs, such as the Pikehead, *Laciscephalus*, and 8 Asian and 2 African species of Snakeheads, *Channa* spp.

There are lots of thought-provoking ideas in this book. For instance, on the evolution of mouthbrooding in Chocolate Gouramis (they do sometimes build bubble-nests). Photographic surprises include *Sphaerichthys acrostoma* and *Paraespharichthys ocellatus*, both species unknown to most readers, I would imagine. However, this is not an identification guide; the quality and coverage of the photos is too uneven for that.

Unfortunately, this book perpetuates the mistake of describing the Blue Gourami as a sub-species rather than a variety of the Three-spot Gourami.

I also notice that the translator has forgotten to translate Schaumnestbauer (bubble-nester) and Maulbrüter (mouth-brooder) in the species list on p.72. The Moonlight Gourami is also directly translated as "moonbeam".

Overall, highly recommended. This is a book worth reading, not just for taking off the shelf occasionally for reference. The only serious omissions from the German edition are the useful list of references and the photorecords.

David Armitage

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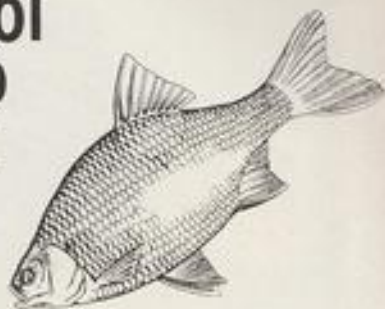
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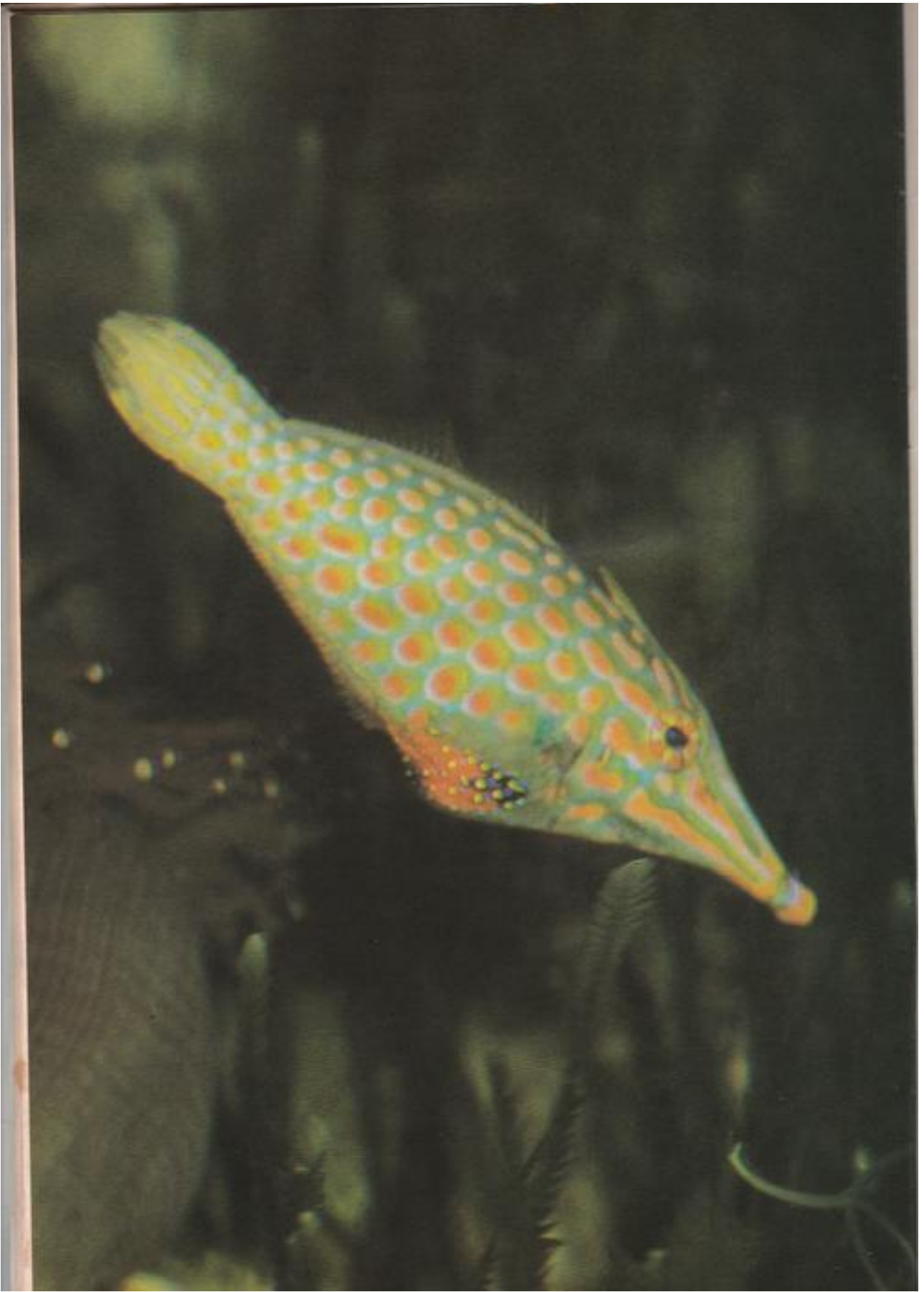
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Spotlight

LONGNOSED FILEFISH

(*Oxymonacanthus longirostris*)

Photograph: Bill Tomey

Beautiful, shy and challenging, the Longnosed Filefish is a fish for the connoisseur, as **Gordon Kay** reveals.

The Triggerfishes are among the most popular of marine aquarium fishes — and justifiably so, for they are handsome, usually cheap, and easy to keep. However, they do have one big drawback and that is their aggressive nature. On the other hand, their close relatives, the Filefishes, have no leanings in this direction and the Longnosed Filefish is every bit as good looking as its cousins.

Body facts

Sometimes called the Beaked Leatherjacket, this species is mainly blue but can be seen with a greenish cast. Its colour is darkest around the head, becoming progressively paler toward the tail. Six or seven rows of orange spots adorn the flanks, with stripes on the head which converge at the snout. The snout is unusually long for a Filefish (so called because of their rough skin), and has a white tip. Maximum size appears to be around 4in (10cm), although they are more usually found at around 2-3in (5-7.5cm).

Distribution and feeding in nature

The Longnosed Filefish comes from the Indo-Australian Archipelago, as far as Micronesia and Melonesia, but not as far as Hawaii. It can be found in shallow reef waters around areas of Staghorn Coral whose polyps it eats by using its long snout to suck out the contents of the animal. The coral also provides shelter and Filefish will dart into the cover of the Staghorn at the merest hint of danger. Fish with this habit are very difficult for divers to catch and become prime targets for cyanide use — so be warned.

Behaviour in aquaria

Unfortunately, while Filefishes don't share the aggressiveness of the Triggers, neither do they share their hardness generally. In fact, *O. longirostris* can be quite

difficult. Single specimens have a tendency to be weak and most people find that they can only keep this species for a few months. Because of this, it is advisable to keep small groups of four or five in an aquarium with plenty of hiding places into which they can dart if they feel threatened. This is a shy species and, because of this, should only be kept with quiet tankmates. Aggressive and ebullient fishes in the same tank will result in a hunger strike — and feeding the Leatherjacket is difficult enough as it is!

Feeding in aquaria

The problem with feeding *O. longirostris* is akin to that experienced with some Butterflies. Since it is a polyp feeder, it is impossible to duplicate this natural food in captivity. I have found that nothing tempts fish to feed quite like live brine shrimp and so this would seem to be the best starter food, followed by frozen items. Once the fishes are taking this confidently one can go on to try things like mussel and crab meat. Algae would also seem to be important, so a good growth in the aquarium should be aimed for. This initial period of acclimatisation can be critical, but with a little patience and care on the part of the aquarist, all

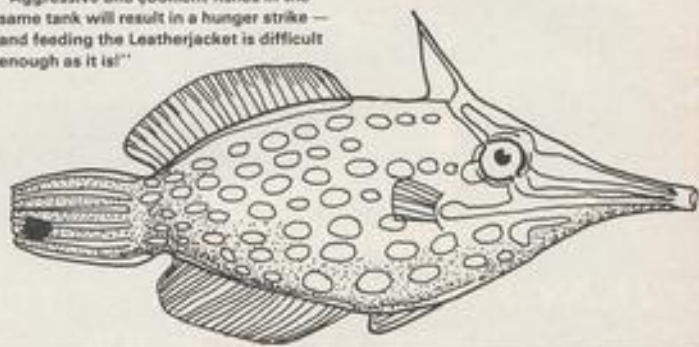
should be well within a few weeks. Trial and error is the key to success with as many different foods as possible. It should go without saying that overfeeding is a definite No-No.

Breeding challenge

I'm afraid that anyone interested in breeding corallifishes would not gain much encouragement from this species, as next to nothing is known about its reproductive habits. In the wild, adults live in pairs, with juveniles living in small groups so, if the advice regarding their being kept in groups earlier in this article is followed, the aquarist may find that (s)he ends up with a mated pair which will spawn. With so little being known, and the chances of success so remote, I would urge anyone who meets with this enviable problem to let us all know what happens.

I can't pretend that the Beaked Leatherjacket would be anything but trying, difficult to keep and even downright exasperating. It is definitely not a fish for the beginner but, with care and attention, the advanced aquarist would, by drawing on all his/her knowledge and skill, truly enjoy the challenge presented by this little beauty.

"Aggressive and ebullient fishes in the same tank will result in a hunger strike — and feeding the Leatherjacket is difficult enough as it is!"



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Tomorrow's aquarist

The Self Help Club

Welcome to our new T.A. club. After our appeal in the January issue, we have received a long letter from Peter Crawshaw in Barton-upon-Humber, which, we feel, makes very good reading for beginners and experts alike. Peter writes:

“After reading January's *A & P*, I thought I'd write and let you know how I got started as an aquarist.

“Back in September '85, I was told about a fish tank that was on our local tip. I found it had a broken end pane, which I was able to replace for £5. In October, on a mad impulse, I took my wife and two kids in search of a pet shop. We found one in a nearby town; it was only a small shop but it was a start. We bought two Platies, a pair of Kribensis, two Black Angels and four Guppies — and a fish advertised as a High-fin Molly which turned out to be a male Siamese Fighter! We also invested in some gravel and a few Amazon Sword plants. I had already set up the tank with a box filter, a Uno heater-stat and a small Petcraft air pump, supplied by a friend.

“On returning home with the fish, I set my wife to boiling the gravel (*Made a change from boiling potatoes, Peter, but we aquarists go more for D.I.Y.!*). Having sited my tank — a large 48in x 18in x 12in — on my wife's pride and joy — her sideboard (*You really were pushing your luck!*) I added the gravel, water and plants and introduced the fish. Well, that was my humble first tank. It looked smashing! A few days later I decided to put some lights over it. I made a hood out of plywood and used the light fittings from my wife's standard lamp in the hood. My tank now looked as good as the ones in books and magazines.

“In mid-November we got a colour T.V., which I ignored; all I could see was my fish tank — I was glued to it. Towards Christmas, I realised something was going on in the tank. I called to my wife in such a state of excitement, she must

have thought we'd won the pools. We had fry in the tank — 10? 20? No, more! Masses of baby Kribis! I was over the moon.

“This is when I made my mistakes. The tank was now filtered by an Atlantis twin Super Stream — and the fry were quickly disappearing into it. So I tried to net them! It was hopeless; they went every which way. I hastily purchased and set up a small tank and tried again. The few I managed to save, I transferred to this tank but they all died a week later. By now, *A & P* was starting to help me; articles on cichlid behaviour and fry rearing were just what the doctor ordered!

“Remember I had my tank on the sideboard? Well, it gave way. Luckily no harm came to the fish or tank. (*Did any harm come to you, bearing in mind this was your wife's pride and joy?*). To this day the tank now stands on a frame made of Dexion — that would hold Giant Haystacks if need be. Funny how we learn by our mistakes, isn't it?

“The next disaster happened while I was out. Investigating an ominous silence in the living-room, my wife found our two-year-old son feeding the fish. He must have thought they were a bit on the thin side and had emptied a full tub of food into the tank. When I got home my wife had removed most of the food from the tank and I

emptied it and took out the fish.

“We used everything; buckets, washing-up bowls — you name it, the fish were in it! After taking out the gravel, I saw, to my horror, a crack in one of the corners, which I quickly repaired with sealant. I couldn't wait too long as the water the fish were in was getting colder, so after an hour I replaced the rinsed gravel and the fish. I was lucky — the sealant held and I only lost three fish.

“The following March, we moved house. I was getting better — no dead fish. By September '86 I had a three-foot tank in the house and eight tanks in the outhouse, all of them occupied by breeding fish, mostly cichlids. For me it was a dream come true; to breed fish on a big scale instead of a dozen Guppies.

“I could never have gained the knowledge of how to do any of this if I didn't get *A & P* every month — but I still have a lot to learn. Only this month I did a silly thing; I gave a Jack Dempsey the meal of his life. I put him in my cichlid community tank, forgetting the half dozen Neons in there. I don't have them any more . . .

“In the outhouse I have bred the following: *Corydoras paleatus*, *Tilapia mariae*, Firemouths, Egyptian Mouthbrooders, Kribensis, Swordtails, *Ameca splendens*, Rosy Barbs,

Tiger Barbs, Zebra Danios, Convict Cichlids and Blue Acaras. In the not too distant future I hope to start up a Discus tank.

“Please keep on printing your magazine for a long time to come. . .”

Our thoughts

Thank you, Peter, for launching our **Self Help Club**. Your observation that you learn by your mistakes is only too true and it is by reading accounts such as yours that beginners will be able to avoid their own mistakes by taking note of yours. It would be nice to think that our experts are also honest enough to read your story and groan at the familiarity of it!

It takes guts to admit you've made mistakes — and in so doing help others. And you have shown that, although you might still make them — i.e. one well-fed Jack Dempsey — you have obviously learnt a lot, judging by the impressive list of your breeding successes. In return for your encouragement to other T.A. readers, we would like to offer you some further encouragement by sending you a **Whisper 200 air pump**, kindly donated by **Interpet**. We hope you didn't mind our tongue-in-cheek comments on the trials and tribulations of your wife!

Over to you . . .

To all our other T.A. readers, we would like to say: Come on in, the water's fine. If Peter can share his experiences with us, so can you.

We don't need great literature — just great aquarists who are doing interesting things and would like us to know about them. What fish have you bred and how? Which are your most popular fish and why? We're a friendly bunch and would like to laugh with you, commiserate with you on your failures and congratulate you on your successes. Write to us at “**The Self Help Club**”, **Tomorrow's Aquarist, Aquarist and Pondkeeper**, 58 Fleet Street, London, EC4Y 1JU. For every letter published, we will be offering a small but, we're sure, welcome prize.

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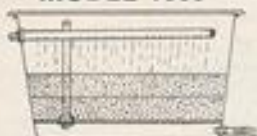
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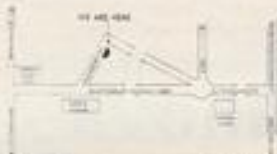
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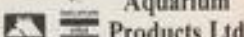
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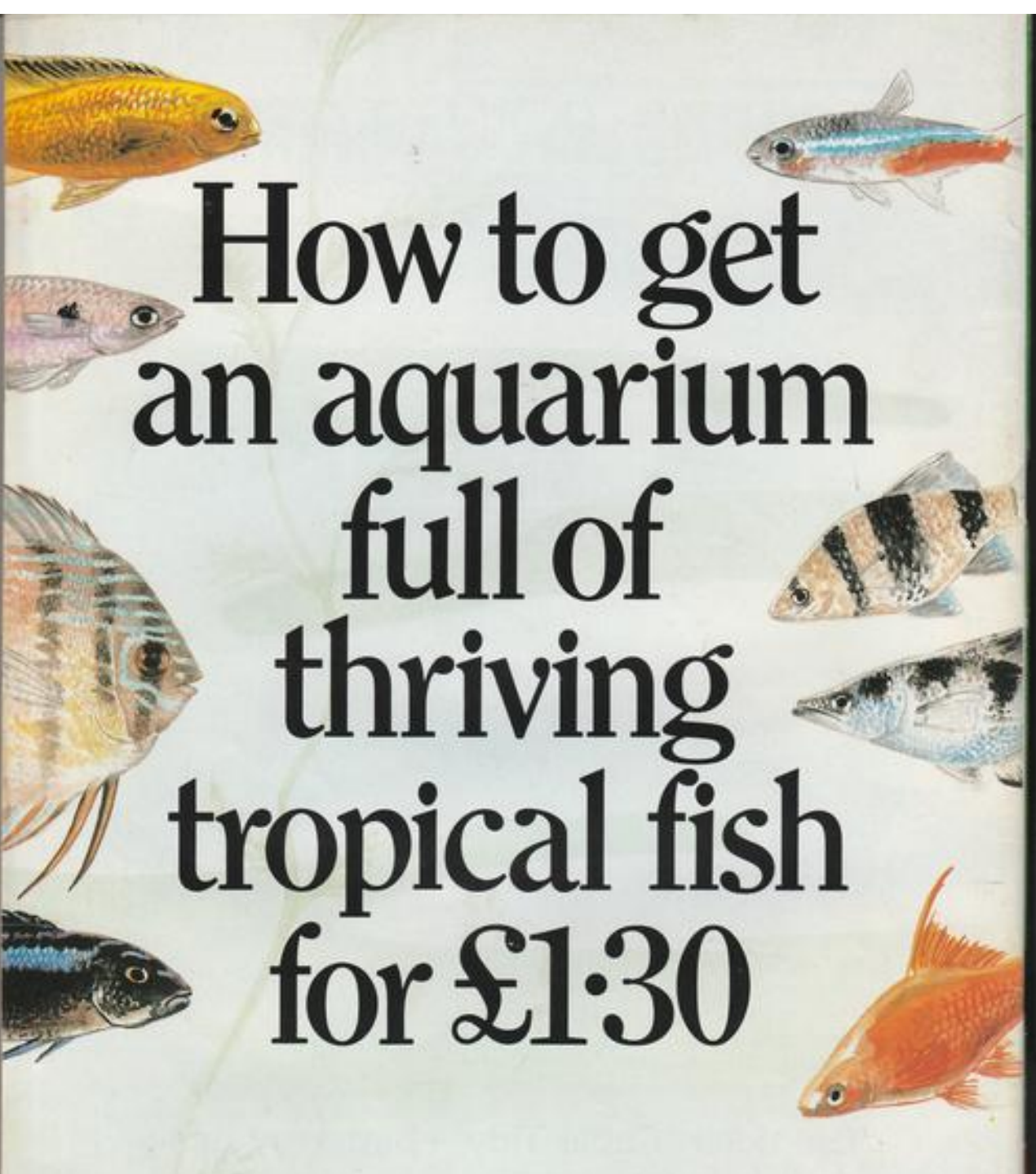
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