SEPTEMBER 1991

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AQUARIST AND PONDKEEPER

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EDITORIAL

THINGS LIKE THIS DON'T HAPPEN . . . DO THEY?

I need help. (Yes, I know — people have been telling me that for years!). On a more serious note, however, something that just doesn't happen has just happened to me.

Let me explain . . . At the time of writing, I've just returned home from Singapore where I've been judging some unbelievably good Fancy Goldfish at **Aquarama** (see my report in next month's issue of *A & P*), chairing an international conference (well, part of it), and filming a TV documentary/video which *A & P* has co-sponsored (along with other similarly 'enlightened' companies like King British, Schott Glaswerke — manufacturers of SIPORAX Finnair, Academic Associates Pte Ltd — organisers of Aquarama, and Singapore's South Island Aquarium).

As I do whenever I visit Singapore, I carried out my usual tour of all the booksellers to check on the availability of my books. (I'm big in Singapore; at 5ft 4in — on a good day — it's about the only place I know where I can look most people straight in the eye!). It also happens to be about the only place I know where I can find adequate supplies of shoes small enough to fit me!

Anyway, back to the story . . . On our very first morning, we (Vivian, my wife, and I) visited our first bookshop — Times at Centrepoint — one of Singapore's countless, super-duper, hyper-air-conditioned shopping centres. I was standing in front of the gardening section looking for my Water Gardening book, when I thought I overheard the gentleman at the till (not two metres away from me) say to someone over the 'phone: "Aquarist? . . . and Pondkeeper? No, I'm afraid we don't carry it at the moment". Then, before I could get to him, he hung up.

"Excuse me", I said. "Did you just mention *Aquarist & Pondkeeper?*" "Yes", he replied smiling, but with the beginnings of a puzzled look on his face.

"Please let me introduce myself . . . I'm the editor of *Aquarist & Pondkeeper*".

Now he was *really* puzzled! So was his colleague. They were also, quite understandably, somewhat incredulous.

"No, you can't be . . . can you?"

I promptly handed him my business card and noted his changes of colour — repeatedly blushing, then going pale — as he stammered, "These things don't happen . . . they really don't!" We shook hands, I promised them a copy of *A & P* and left them holding my business card and shaking their heads in disbelief.

Now, here's where I need help. Is there any *A & P* reader sufficiently well versed in the laws of probability to be able to work out the chances of such an improbable sequence of events taking place? They must be pretty remote . . . but how remote? As my bemused friend behind the counter said, these things don't happen . . . do they?

Incidentally, discerning people that they are, Singaporeans love *A & P*. And I love Singapore . . .

John Dawes
Editor

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MERMAIDS, KRAKEN, AND OTHER FISHY TALES

This month's offering sees **Jason Endfield** delving into the world of aquatic legends and superstitions . . . and mermaids.

When I started thinking about this feature, I had in mind to make light-hearted banter about sayings and superstitions that have connections with our hobby and aquatic life in general. Researching the subject has led me to the realisation that waterlife, particularly marine life, has been shrouded in mystery for so long that, consequently, through the ages, little other than fanciful legend has emerged from the watery depths of this planet. For example, tales of mermaids and sea monsters are widespread . . . and perhaps shouldn't be mocked too flippantly. I'll be touching on them later on. It all makes interesting investigation, as long as the subject is approached with a wide-open mind and not too seriously. . .

I thought I'd begin with one of the few 'pleasant' fish-related phrases I could find among the masses of literature I have gathered around me, and I'm "as happy as a clam at high tide" to do so. That is an old American saying which arose from the fact that clams were obviously only collected from the shore at low tide; high water spelled safety for them, hence the clams were happy.

Well, from happy clams, it tends to go downhill I'm afraid, because it seems that, since time immemorial, fish have been classed as second rate creatures (we aquarists know different!). Even in the horoscope, Pisces comes last. . .

But there are exceptions to this train of thought. If you keep fish and don't eat fish, then you will feel encouraged by the philosophy behind an Elizabethan saying, "He eats no fish" — used to describe an honest man. Catfish enthusiasts will agree with another old adage: "The best fish swim near the bottom", though it doesn't, in fact, refer to our whiskered friends, but rather generally to the assumption that the best things in life are the hardest to obtain. On the other hand, that could apply to some species of catfish couldn't it?!

Old wives' tales abound, and one particularly horrible one surrounds the humble frog. In days gone by, frogs were swallowed alive as a cure for colds and other ailments — well, one has to admit that it would take the patient's mind off the illness.

On a wider issue, we can look into the misty world of legends. Our waters have yet to surrender many of their secrets. In today's stubbornly scientific world, wonderful sagas of mermaids and sea monsters have, sadly, faded, and explanations have to be found for everything — but were our ancestors stupid?

Modern theory would have us believe that what mariners of old really saw were not mermaids but Manatees or 'Sea Cows', rather ugly, albeit endearing, creatures which inhabit many of our seas. I think I'd know the difference. . .

I'm not saying that they actually exist, but it is true to say that new species of animal are coming to light all the time. Who knows what we'll be keeping in our tanks in the 21st Century? Alongside our marine invertebrates we might, perhaps, have a baby Kraken. A Kraken, for those who don't know, is the 'mythical' tentacled sea monster that terrified mariners for hundreds of years. The existence of such creatures was generally scoffed at until specimens of previously unknown Giant Squid were washed up on American beaches in the early 1900's. None have ever been taken alive, ... but there are some very adventurous aquarists among us. . . !

Shellfish seem to have attracted far more legend than our finned friends. Take, for example, reports from Donegal, Ireland, in the first half of the century, that described rat-catching oysters. It seems that the rats would forage on the beaches at low tide and, upon finding the partly open oysters, would begin to partake of this free meal. The oysters, naturally, clamped their shells closed, trapping the rats' noses therein. Consequently, when the tide came in, the trapped rats were drowned. Rat catchers take note!

Aquarists who, like me, have had terrible problems with snails (too many of them infesting a tank), take heart — should you be fortunate enough to find a black one among your flock ('flock' of snails???), pick it up by its horns and throw it over your left shoulder. According to an ancient superstition, good luck will follow at once! Depends where the snail lands I expect. . .

As a food, fish is known for its health-giving properties. We all know that fish is supposed to be good for the brain, but did you know that powdered seahorse is a popular aphrodisiac? Popular with the Chinese people, who also eat that unusual creature, the Sea Cucumber. I, too, recently partook of this 'delicacy' under the misapprehension that it was a vegetable. . . . I recommend it to be served to anybody you don't like very much. Even the thought of it makes me queasy. Oh, and on that subject — next time you announce that you're going to "feed the fish", don't be surprised if people give you a wide berth — in nautical circles, the expression means that you are suffering from sea sickness!

Here's one that puzzles me: we're all aware of blind cave fishes, some species of which are commonly kept as aquarium 'oddities' — but one thing I haven't been able to verify is the statement I found in an encyclopaedia of relatively recent origin which maintained that an African species (not identified in this case), when kept under normal lighting conditions, will develop a *single* eye on its forehead, enabling the previously blind fish to see. I can find nothing to support this in related publications.

Looking at all these tales, it does seem that, after all, much mystery still surrounds the watery depths of the world. There is certainly much still to learn and discover. It is unlikely that doctors will ever again prescribe "one frog to be taken after meals" to cure the common cold, and it might well be that nobody will again witness the rat-catching oysters of Donegal, but I, for one, expect there to be very many more discoveries of the 'Coelacanth' kind. And I, for one, will keep a dreamy eye open on the seashore for the tantalising glimpse of a Sea Cow sitting serenely on a rock, combing its beautiful long hair . . .

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Mysteries Of The Deep. Ed. Joseph. J. Thorndike jnr. **American Heritage Publishing Co.**

'Believe It Or Not!' Omnibus Edition. Robert. L. Ripley. **Stanley Paul & Co. Ltd.**

The New Encyclopaedia For The Younger Generation. **Spring Books.**

(All the above are almost certainly out of print, most of them, apart from *Mysteries Of The Deep*, being rather ancient). It's worth checking in your local library, though.

Tomorrow's Aquarist

By David Sands

SCHOOL'S OUT

I had the pleasure to say hello to Sandy, a teacher at **Brentside First School, Hanwell, London,** during my stint on the Aquarian Advisory Service roadshow at Sandown Park.

She teaches what can only be described as a wonderful class of children. They sent me a long poster-mural which displays an amazing array of fishes painted by them. **Class 14** must be very good pupils because they are only five years old — but what artists . . . I hope they are proud of their work.

I will send Sandy Edwards-Walsh and Class 14 some booklets including the new one, *Ponds for Pleasure* AND ask if our editor can find them some fish posters for the classroom *(Yes we can, with pleasure. Ed).*

TOP CAT TRIPS TO THE CHANNEL ISLANDS

Just when you thought a Channel Catfish was a North American coldwater catfish *(Ictalurus)* 'TC' became a Channel Cat. **Jane,** me and **Attila the Son** (who you may remember from a previous **TA** article) travelled to Guernsey last month to supervise the transfer of TC (the largest Red Tail Catfish in captivity outside of Public Aquaria) from Essex to the Channel Islands.

(I wonder if we have any **TA** readers in Guernsey or Jersey? We would all love to know.)

Once I had knocked TC out with Benzocaine (dentists use a similar stuff) **William Robert** just had to stroke the four-foot long beauty to check if the catfish was truly out for the count.

DAVID SANDS

'Atilla the Son', stroking TC to make sure that he was ready for his trip to the Channel Islands.

I would like to think that any **TA** readers in the vicinity (tourists or residents) will make the effort to visit TC in his new Guernsey home (a 16 foot x 4 foot x 4 foot tank) at **Pat Donaldson's** Grand Marais Fish Farm. The farm breeds Koi and, in the future, maybe, Red Tailed Catfishes . . . that's if Pat can cross a Red Tail Catfish with a Koi.

Will it be called a Katfish or a Red-tailed Coi? My stupendous sense of humour just kills **TA** readers??!

MIXED BAG

Paul Haddock from Number 6, Gainsborough Drive, in Westcliffe on Sea, Essex, wrote in and said it was a great idea to ask clubs which are local to the particular reader to supply their details. Any other **TA** reader wanting to know a local fish club should write in now and we'll appeal to club secretaries everywhere to help.

Mrs E Heath of Langford, in Beds, forwarded me a picture of her nephew **Aaron** (sitting on the wall of her new pond) who, according to his Aunty, spends a lot of time watching the goldfish, Orfe and Koi.

Another 'old' **TA** friend, **Alison,** writes in from 27 Laurelwood Ave, Aberdeen to say that **Mr Ross** from Turriff provided her with the Convict Cichlids she had been looking for. Alison writes that, thanks to **TA,** she is now the proud owner of six lovely young cichlids!

Tomorrow's Aquarist strikes yet again!!

E HEATH

Aaron, like so many TA's, adores looking at pondfish.

BACK UPON THE MENDED ROAD . . .

I received a letter from **Louise Lillywhite** . . . (Longbarn, Common Lane, Ditchling, Nr Hassocks BT6 8TN) who regular readers will know as the original **'TA Pen Pals'** girl.

In July's **TA** I asked if Louise had ever contacted **Phil Hollings** another infamous **TA** reader . . . Well, she did and they are now "good friends" quote/unquote. Louise (who is my good friend too) writes, "I wanted to say how much I like your page . . . I read other fish mags *(Oh my goodness — don't tell the editor!)* but the *A & P* **TA** is my favourite because it's more our page, where people can write in about views etc. Without **TA** *(the fabulous Louise writes)* the *Aquarist & Pondkeeper* would be *just* another magazine!"

Louise also clarified an early point about how she felt about aquatic shops. She likes those that have ordinary fishes with a few rare and unusual ones tucked away in various corners. Louise likes Paradise Fish and Phil likes other Anabantoids (Gouramis to you and me!).

Please send me a picture of you showing your fish. Did you know Cat Stevens wrote a song called Lillywhite? Check it out Louise, at your local library! (The album is called, *Mona Bone Jackon.*)

AND FINALLY . . .

Finally, let me hear from those wanting fishy pen pals or readers who are looking for a local fish club and I will do my utmost to organise your request . . . a sort of *Dave'll Fix It . . .*

LETTERS FOR **TA** SHOULD BE ADDRESSED TO DAVID SANDS, C/O THE EDITOR, *AQUARIST & PONDKEEPER,* 9 TUFTON STREET, ASHFORD, KENT TN23 1QN.

Adult pair of *Poecilia minor* (male above).

AN EXCITING FIND — *Poecilia minor*

It's interesting what you can find in a tankful of wild-caught Tetras. In **Edwin Ross'** case, it was a delightful Brazilian livebearer. *(Photographs by Graham Taylor)*

A small group of subadults — sexed out but not yet fully coloured.

Most aquarists naturally assume that new species to the hobby are always discovered in their natural habitat. However, this is the story of the discovery of an interesting fish that did not involve an expensive trip to the wilds of the Amazon basin. In late March 1990, on a visit to Cliff Murray's establishment in Glasgow, where fish are imported from far and wide, it was noticed that there were some 'oddballs' in a tank that was swarming with Amanda Tetras. *Hyphessobrycon amandae* is one of the smallest Tetras around and was discovered by Heiko Bleher in the Mato Grosso Region of Brazil in 1986.

The 'oddballs' were tiny little green livebearers, a little over 10mm (0.4in) in length, the most noticeable feature being the size of the gonopodium in the males. A careful search among the hundreds of Amandas finally produced three of the little fish, two males and a possible female.

The fish, gratefully accepted as a gift, were put in a small tank to avoid too much of a change of water. A few floating plants were added for cover. After a week or two feeding on fine dried food, micro worms and grindal worms, the two males started to show signs of colour.

BODY FEATURES

In early May, the first brood of fry arrived, by which time the males had grown to 15mm (0.6in) and the female a little larger. Both

sexes are quite slim-bodied and, as has already been remarked, the gonopodium is quite long, being almost half the body length. Body colour is pale grey green, silver underneath. Both sexes have a pale brown band the length of the body. This is more pronounced in the male which also has a bluish sheen in side light. All fins are rounded and colourless, apart from the dorsal fin in the male which is pale yellow, finely edged with black and with a black elongated spot at the base. The eyes have a silver iridescent sheen on the top half.

SMALL BROODS

The fry, when born, are very small, being only about 4mm (0.16in) in length, and broods seem to average about six to ten in number. The most noticeable thing about the fry is the iridescence of the eyes.

The young fish grow well on fine dried food. Powdered dried egg is eagerly accepted too. Growth is rapid and sexes can be differentiated at ten weeks. Breeding seems to start at four months, and broods seem to be produced at five-week intervals. The adults do not seem to molest the fry in any way.

IDENTIFICATION

When the fish were first obtained, all available books were researched tor identification. The fact that there was no success made the discovery all the more interesting. At the S.A.F.F. show in Motherwell specimens were given to Derek Lambert, who volunteered to take them to the Natural History Museum in London where Higher Scientific Officer of the Fish Section, Jim Chambers, has been able to identify them as *Poecila minor*. It would appear that they are a comparatively rare species in captivity at present.

TANK REQUIREMENTS

Being a small fish, quite small tanks are suitable. However, it is recommended that there be floating plants for cover and Indian Fern is probably the best for this purpose. These fish can, and do, jump, so a tight-fitting cover is a must.

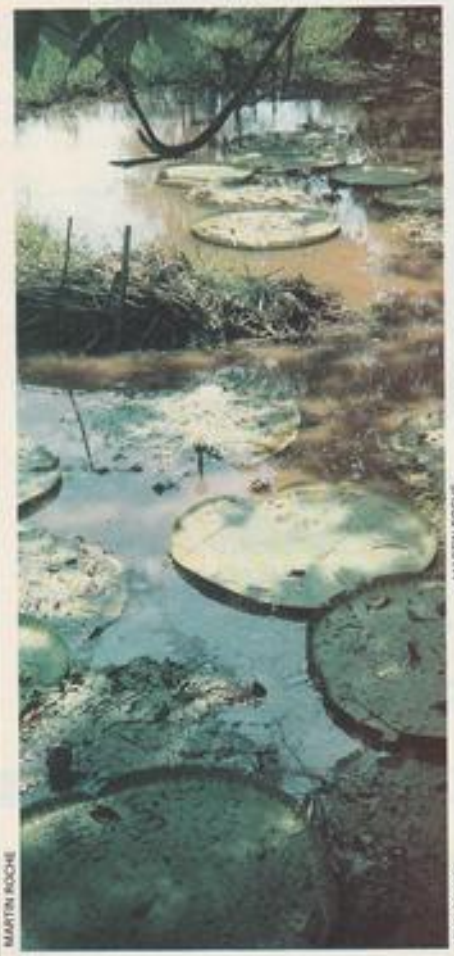
Information regarding suitable water is rather difficult to find. Living in the Greenock area, where the tapwater is very liberally treated with aluminium, it has been found that the best results with any fish are obtained by using anything but tapwater. This includes collecting rainwater that can be variable and untreated. Water with a pH of 6-8, from any available source, seems to suit these fish, which ties up with their area of origin. Softish water with a GH reading of around 3 and a temperature between 76-78°F (c24-5-25-5°C) also seems to be perfectly acceptable. It is now noticeable that, in some of the earlier fry that are maturing, the males are showing fine black spots forming a line on the caudal peduncle, raising the question of the water conditions affecting coloration, as can occur in fish such as Goldfish.

Though the fish have only been in our possession for a short while, and not too many broods have been produced, it would appear that water conditions may have an effect on the sex of the fry. Only time and careful recording will bear out this fact.

A male 'flexing' his gonopodium. This characteristically arched stance is occassionally adopted by males of many livebearing species.

MARTIN ROCHE

JOHN DAWES



MARTIN ROCHE

MARTIN ROCHE

JOHN DAWES

BRAZIL

PART 2 - IMPRESSIONS OF THE AMAZON

Irish aquarists **Martin** and **Mary Roche** complete their unforgettable Brazilian adventure in Manaus and the waters of the Rio Negro.

Far left, at the Meeting of the Waters, just downriver from Manaus, the silt-laden waters of the Rio Solimoes meet the dark silt-free waters of the Rio Negro.

Left, three Tucunaré. The two top fish are *Cichla ocellaris* (the smaller measuring around 14 inches - 40cm). The bottom fish (some 24 inches - 60cm) in length, belongs to the closely related species, *Cichla temensis*.

Bottom far left, the world-famous giant water lily, *Victoria amazonica* (formerly known as *Victoria regia*).

Centre, a beautiful, unspoilt silver beach on the banks of the Rio Negro.

Bottom centre, a young Pike Characin, *Acestrorhynchus* sp. is a perfectly 'constructed' Rio Negro predator.

Below, Manaus fish market — sights and smells never to be forgotten!

MARTIN ROCHE

Flying to Manaus — largest city in the State of Amazonas — we could not help but be awed by the sheer size of the Amazon region. Words just cannot describe or capture its breathtaking vastness. Throughout our journey, breaks in the cloud cover permitted sight of a blanket of green trees stretching as far as visibility would allow, and this was on a flight of many hours.

Regrettably, the scene changed between Porto Velho and Manaus, as we frequently saw many areas ravaged by fires — many still burning — for what can loosely be described as 'progress'. These charred clearings are a stark legacy of the western world's disregard of the rainforests. Sadly, most Brazilians appeared to have scant regard for their own environment, as is shown by the exploitation of the rainforest, smuggling of alligator skins and the ever-increasing litter pollution of towns and rivers.

NAUSEATING FISH MARKET

The visitor to Manaus, a sprawling city in the middle of Amazonas, is immediately struck by the stifling humidity, the hot moist air of an enormous sauna, where satisfying our thirst became as instinctive as blinking — though we had to ensure the water was sterilised.

On our first morning in Manaus, we rose at 6.30 a.m. to visit the fish market. This, we had been advised, was the best time to see the catch coming in. By 7.15 a.m. with the temperature at 33°C (c91·5°F) we found ourselves grateful that we had not breakfasted, as the atmosphere was nauseating.

Everywhere on this giant floating dock, people walked bare-foot amid the rotting carcasses of dead fish, decaying fruit and flies. The entire market itself resembled a nest of ants — with small boys in bare feet carrying huge boxes of fish — Pacu — (*Colossoma*) — and large Tiger Catfish (*Merodontotus tigrinus*) on thin boards. The carriers seemed blissfully unaware of the enormous prices paid by catfish enthusiasts in Britain for these magnificent fish!

TURKY'S AQUARIUM

Later that morning we called at the office of Asher Bensaquem, son-in-law of Robine Schwartz, whose late husband, Harald, was one of the pioneers of tropical fish exportation. The name is now almost as well known to tropical fishkeepers as that of their good friend Dr. Axelrod, having given their name to *Corydoras schwartzi, rabinae* and *adolfoi*.

Having spoken to Mrs Schwartz on our arrival in Manaus the previous night, we had learned that she has now retired from the business.

Unfortunately, we couldn't have picked a worse time to visit — Asher had just received news in his busy Manaus office that a large consignment of fish was being returned because the airline did not have enough space available. After much frenzied querying with the airline, it transpired that fish destined for Frankfurt via Sao Paolo were still at Manaus airport! Further documentation and payment were needed to secure their release. Asher told us that this was a frequent problem for his business, and his tolerance of Brazilian bureaucracy had worn thin.

After coffee he brought us to one of his giant holding stations at Turky's Aquarium just outside the city. En route, we passed a small insignificant building which was the humble beginning for the early business of Harald Schwartz back in the 1950's. The magnitude of the exportation business was evident when we arrived at the holding station. The station itself was most impressive — countless rows of tiled units, with in-built filtration and water-changing facilities serving each one.

This being August, and late in what was a prolonged rainy season, catches were fewer than normal. Most of the fish in the station consisted of Discus, various *Corydoras* species, *Ancistrus*, *Acanthodoras spinosissimus* and *Dianema* catfish, and above all, Cardinals — countless numbers of them. In one area, where a natural stream was running through net dividers, a leaf fell from a tree and, as we watched, the entire section turned an iridiscent blue, with Cardinals sensing food on the way. We were told that this section alone held approximately 2 million Cardinals!

The viability of Asher's business was coming under increasing pressure as he now had to pay fishermen to spend up to six weeks on fishing trips far up the Rio Negro. Given the difficult circumstances coincidental to our visit with Asher, we were most appreciative of the friendly and informative hospitality which he afforded us.

THE RIO NEGRO

Meeting of the Waters

Eager to experience the Rio Negro for ourselves on our arrival back in Manaus, we wasted no time in seeking out a good guide. We contacted Waldier who spoke reasonable English — along with Baratas — a native with no English whatsoever. We were told that Baratas' age was somewhere around 40 years, but he looked almost double that, although his crooked gait and sinewy arms belied a strong, wily man with much experience of the Rio Negro backwaters.

Firstly, he brought us on a reasonably short journey to the Meeting of the Waters where the murky grey waters of the Rio Solimoes run parallel with the black waters of the Rio Negro for about 6km without mixing. It is truly remarkable to see two contrastingly coloured bodies of water flowing together without mixing due to the difference in chemistry and the force of their currents.

Leaky canoe trip

Sighting dolphins playing in the distance, we then went up north along the Rio Negro and, after travelling for three and a half hours by motor-boat, we gingerly stepped into a small (and leaky) wooden canoe. By now the temperature was 45°C (113°F) and we had to take salt tablets to retain liquid. Waldier told us that Baratas knew of a place with "much Acara". Confusingly, Acara is one of the names given to Angelfish by the natives (another is Bandeira) — confusing that is — if you are an aquarist who always considered Acara to be a more conventionally shaped cichlid!

After quite a hazardous hour-long canoe trip, during which the small wooden craft appeared to be taking in water (wet feet were no problem — simply that Waldier told us that parts of the river were 10 metres deep), we had to walk the final 15 minutes as the dense growth had made parts of the backwater impassable to our canoe. Superbly iridiscent blue butterflies danced past us as we trekked the rest of the way with Baratas (in his bare feet) using a machete to clear the thick growth. We couldn't help marvelling at how he knew precisely where we were heading, as he led us unerringly through dark forest to a natural clearing.

The whole area was teeming with giant ants; everywhere we looked, an army was marching along in single file carrying leaves, insects, etc. totally oblivious to our presence. Especially evident here was the rapid breakdown of matter; fallen trees were spongy and covered with colourful fungi.

Rio Negro Keyholes

We spent the night in a floating cabin, the most uncomfortable we'd ever experienced, the sticky heat making it impossible to sleep, leaving us listening to the sounds of the rainforest at night, instead.

Searching the clear water the next day revealed little, as we found no Angelfish, but astonishingly, we found a single juvenile Keyhole Cichlid (*Aequidens maroni*) which, according to the literature, is normally only found much further north in Guyana. This was no case of mistaken identity, as we have studied and bred this species for many years!

Beach excursion

Further along the route — another half mile, but almost an hour of hacking and clearing — brought us to another opening which revealed a sort of desolate freshwater beach — miles of white sand fringed with trees revealed by the receding waters of the Rio Negro and displaying the most beautiful beach we had ever seen.

The tea-coloured water was warm — its surface temperature was a staggering 35°C (95°F). So warm, in fact, that it brought little relief from the oppressive humidity. The scarcity of fish in these particular waters (excepting some killifish we couldn't clearly identify — possibly *Pterolebias* species) was probably due to the extremely high water temperature, though the shoreline was inhabited by thousands of tiny black frogs. The pH was 6·3.

Further along the shore we met a rather unfriendly native woman, reluctant to acknowledge our presence, probably feeling that visitors such as ourselves represented an intrusion on her way of life — justified perhaps? She proceeded to clean out fish with an unusual and attentive audience of a cat, a dog, and a chicken! Even more surprisingly, one of the fish was a Discus (*Symphysodon* sp.). When asked by Waldier what other fish could be found in this area she continued working without giving a response.

Vivid return trip

By now darkness was falling rapidly and we began our trip back to where our boat was moored. The return journey provided us with the most vivid memory of our excursion. The sounds of the night, with the canoe gliding silently along the river illuminated only by moonlight, etched the magic of the Amazon in our memories with the sounds of birds, crickets, frogs, monkeys and the various other creatures blending into one long celebration of the forest's existence.

Back nearer our motor-boat, we met some natives fishing by moonlight. Through Waldier we asked them if we could inspect and photograph their catch. They duly obliged and found the entire episode highly amusing, nudging and laughing as we took photographs of *Cichla ocellaris* (Tucunaré), a savage looking *Hydrolycus scomberoides* (Pirandirá) and what appeared to be a very large predatory Characin — probably *Acestrohynchus* (the Pike Characin or Cachorro).

Thanking the men with gestures and handshaking, we left for our long haul back to Manaus, and a six and a half hour flight from Manaus to Rio, before leaving for Geneva, bringing back with us a greater knowledge and appreciation of the natural world and increasing our awareness of the natural habitat of the fish in our aquaria.

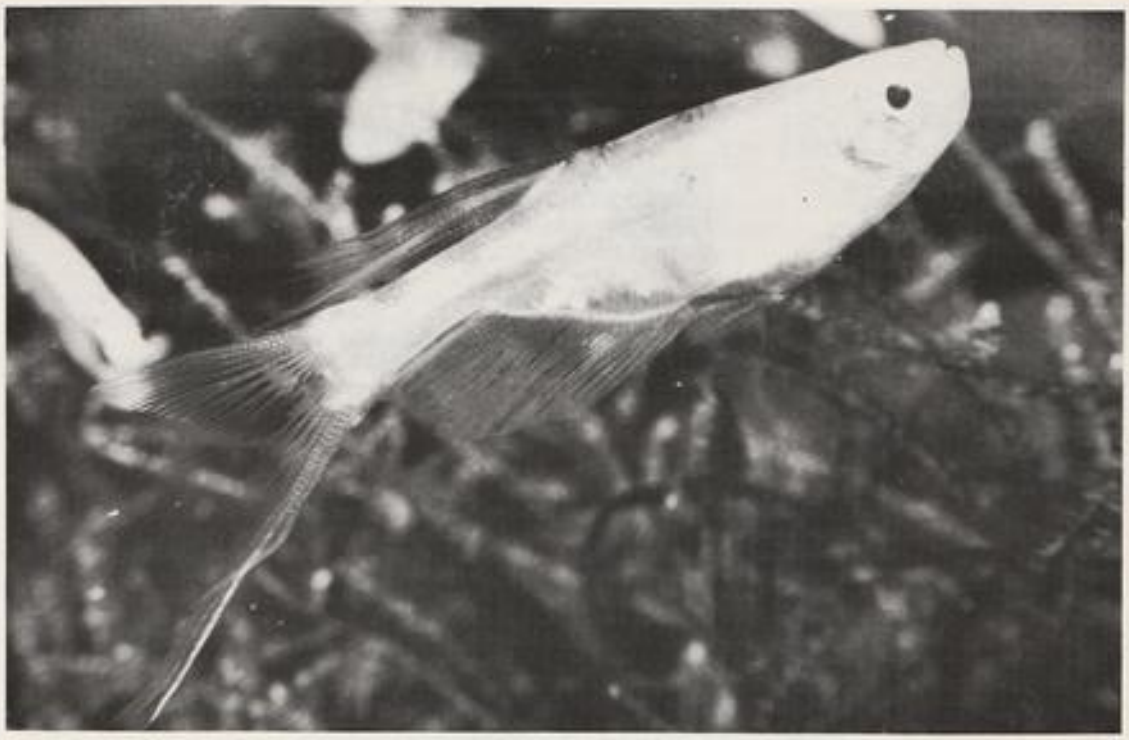
COVER STORY — Blue and Gold Striped Snapper *(Symphorichthys spilurus)*

(Photograph: Max Gibbs, The Goldfish Bowl, Oxford)

This impressive tropical Western Pacific fish, which can grow up to around 50cm (c.19.5in), belongs to the family Lutjanidae, commonly referred to as snappers. Most snappers — as long as they are housed with fish which are too large to swallow — are generally peaceful and hardy shoaling fish.

Juvenile *S. spilurus* display a black longitudinal stripe that runs from just behind the eye, along the whole length of the body, ending well into the caudal fin itself. As the line passes the caudal peduncle (the most posterior part of the body), it 'touches' the top edge of the peduncle itself. It is at this point that the black spot typical of adults (who lose their black stripe) develops.

S. spilurus takes a wide range of non-vegetable foods but, obviously, requires a large aquarium to accommodate its quite substantial frame.



A male Swordtail Characin. Note the extended lower rays of the caudal (tail) fin. This specimen is carrying its 'paddle' in the resting position, extending back from the gill cover. The extreme tip is just visible about two thirds along the base of the anal fin.

THE SWORDTAIL TETRA

Peter Capon 're-introduces' a unique characin that is long overdue for a comeback.
(Photographs by Bill Tomey)

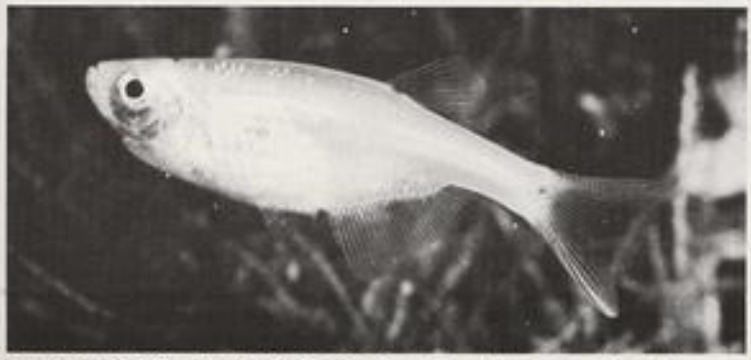
The Swordtail or Paddle-gill Tetra, *Corynopoma riisei*, is not one of the more colourful of aquarium fishes, being a silvery grey with a metallic sheen, though some specimens show a bluish band along the flanks, from the operculum (gill cover) to the caudal peduncle. The body is elongated and slightly compressed and the fish usually grows to 6.4cm (2½ inches).

THE PADDLE

The dorsal fin is set well back and, along with the anal fin, is larger in the male. The lower lobe of the forked tail is extended and, coupled with its size and the lighter lower edge, gives rise to the common name of Swordtail Tetra or Characin.

Another feature of this characin is the strange filamentous appendage that grows from the operculum of the male; this process is thickened at the end, forming what resembles a paddle or spoon. A male of a body length of one and a half inches (3.8cm) can have a paddle and stalk of ¾ inch (1.9cm).

Normally, the paddles are carried parallel to the body. The male is able to regenerate a paddle if it is broken, but the regenerated organ is never as long as the original. The female's gill cover has a slight extension, but nothing like the peculiar growth of the male.



Female Swordtail Characins lack the fin extensions and paddles possessed by males.

BACKGROUND

In the early literature, the Paddle-gill is to be found under the scientific name of *Stevardia albipinnis*, under which it was first named in 1858 by Gill. The *Corynopoma* genus is placed in the sub-family Glandulocaudinae, so named because of the patch of glandular tissue which males have on the

caudal peduncle. This tissue is composed of secretionary cells, but their function has yet to be discovered.

Corynopoma riisei was first introduced to Europe in 1932 by Otto Winklemann of Altona Germany, from the Rio Meta in Colombia. The generic name means a gill cover with a club; the specific name is in honour of the Danish zoologist A H Riise.

AQUARIUM CARE AND BREEDING

The Swordtail Characin has a wide temperature tolerance, from 68° to 85°F (20–29°C), with the higher end of its range preferred for breeding. Ideally, the water should be moderately soft, although one German publication suggests hardness to a maximum of 25dGH. A pH just on the acid side (about 6.8) seems ideal.

The first recorded breeding in the aquarium took place in 1942. Courtship begins with the male swimming around the female and darting towards her as though he were going to bite the lower lobe of her tail. He stops just short and stretches his fins in a trembling motion and then retreats, only to repeat the actions.

All the while, he is moving his paddle towards her and waving it about, occasionally stroking her flanks. The female approaches his 'lure', thus ensuring the close proximity of the pair necessary for mating. On several approaches, the male bends his anal fin and rubs or jabs it against the female and, at the same time, folds the bottom lobe of his tail towards her. The response of the female is to remain motionless for a short while and then to swim away. When his actions finally meet with her approval, she will swim in the same direction as the male, with his anal fin pressed to either her flank or her anal fin.

A close inspection of the male's larger anal fin shows that the posterior edge is convex and rays 3 to 10 are furnished with tiny hooks which point to the base of the fin. These hooks, which, can be damaged if caught in a net, allow the male to hold onto the female's anal fin or ventral scales so that their genital apertures are close enough for a sufficient time to ensure sperm transfer.

Eggs are not laid during courtship, but are fertilised internally, to be laid at a later time. In fact, it has been shown that sperm can be stored for between 7 and 10 months! The courtship couplings usually take place at dusk or dawn, and so, are often missed by even the most observant aquarist.

It has been shown that a male with amputated paddles is still able to fertilise a female. But, if the hooks are removed from the anal fin, fertilisation does not take place, so the hooks appear to be essential to the mating process. Indeed, males with mutilated anal fins were found to be able to fertilise females as soon as their anal hooks had regenerated, demonstrating that the hooks do play an important role in sperm transference.

The original theory held was that the sperm was transferred on the paddles to the female's mouth and thence onto the spawning site, but experiments with males that had their paddles removed shows this to be incorrect.

Pair during courtship. Note how the male has raised his paddle away from his body.

EGGS AND FRY

Once fertilised, the female can lay a number of batches of eggs over several months, so after a few days together, assuming the male has complete anal hooks, the female can be placed in a spawning tank alone.

The female will lay between 50 and 60 eggs on a leaf, or even a rock. The fry hatch in 36 to 40 hours, depending on temperature and, once free-swimming, should be fed the normal foods for small characin fry. It has been reported that the female guards the eggs and doesn't molest the fry, but it is probably best to remove her after she has deposited the spawn, just to be on the safe side.

Close-up of the fleshy tip of the paddle.

CLOSING REMARKS

The Swordtail Characin is an unusual fish that is only rarely offered for sale, notwithstanding the fact that, just after the last war, it was commonly available and much kept. It probably suffers from its subdued beauty, the modern aquarist appearing to relish the more gaudy or violent species.

Yet, this active fish has no bad habits, excepting for its ability to leap, so a close covered aquarium is a must. Whether it is currently available or not, I am not sure, but I have been unable to find it on any import lists. The last time it was at all readily available was in the early 80's, so perhaps we are ready for another introduction to this curious South American fish.

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R E Macdonald Fertilisation of the Swordtail Characin. *Aquarist & Pondkeeper* **Volume XXV, p 239** February 1961.

Albert J Klee* A-thirty-one-Year-Old-Aquarium Mystery Solved. *Aquarium Journal* **Volume XXXV No 1 January 1964 p36** and **Volume XXXV No 2, February 1964 p72.**

Elizabeth Harrington Species of Characins Old and New. *Water Life & Aquaria World* **Volume 6 No 5 (New Issue) p232.** October 1951.

J Lee Spawning the Paddle Gill. *Petfish Monthly* **Volume 4 p 63.** May 1969.

***NOTE:**
In his article, Al Klee quotes the following reference when referring to the anal fin hooks:

Kutaygil, Nebia. *Stevardia albipinnis* GILL. 'de dollenme cinsi differensiasyon ve sekonder esem karakierlerinin telkiki, *Istambul Universitesifen Fakultesi Mecmuasi,* **Seri B, Cilt XXIV, Sayi 1-2, Temmuz** 1959.

Letters

LAURENCE E. PERKINS

European Pond Turtles sought for research and conservation purposes.

European Pond Turtle supplies needed

We would appreciate hearing from anyone who can advise us on a source of supply for the European Pond Turtle *(Emys orbicularis)*. We would also welcome information as to which countries have a 'Closed Door' policy on the export of *Emys orbicularis* and which are 'open'. Information on newt sources, particularly the Alpine and Crested newts, would also be appreciated.

We are presently breeding the North American Wood Turtle *(Clemmys inculpta)* to re-introduce this beautiful species back into areas where they have become seriously depleted.

C. Teachout,
Reptile Research — Conservation,
Ontario,
Canada.

Editor's Note

Should any A & P readers be able to help Mr Teachout in his search, we would be pleased to pass on the relevant details.

John Dawes

A & P Index Request

May I say first of all, how much I thoroughly enjoy, and look forward to, reading each issue of *A & P*.

Permit me to make a suggestion, though (and this is by no means meant as a criticism). Is it possible, at the end of every year, to include an index covering the past 12 months' magazines? I've often found it very frustrating when I know there's been an article pertaining to a particular subject, and can't even find which month's magazine it appeared in. It would certainly help me and, no doubt, many other readers greatly.

My bound volumes of *A & P* are full of slips of paper to help me locate information on various subjects. Not only does this look unsightly, but these slips often do 'slip' into the pages, and remain hidden until I stumble across them while trying to find something else.

May I make an even more daring suggestion? Perhaps an index covering let's say the last five years' magazines? It could be made as a separate issue which I, for one, would gladly pay for.

In the meantime, keep on with this good and noble work.

Paul Hardy,
Sheffield.

Editor's Note

Thank you, Paul, for your kind comments regarding A & P. They are very much appreciated. You'll, no doubt, be pleased to learn that we've already started work on the preparation of an index. There's been a need for one for a long time but our development programme for the magazine has been so packed with ideas that, inevitably, some things are taking longer than others to be put into effect.

We plan to go back three years to the date when Dog World Ltd bought Aquarist & Pondkeeper. *This is not quite as far back as you suggest in your letter, but it does mark a key date in the history of the magazine.*

We will probably publish the index in three stages, one for each year, hopefully, coming right up to date by next spring.

John Dawes

Troubled start

I live on the West Coast of Scotland. My nearest city is Glasgow — around ninety miles away.

Being new to fishkeeping, I put my trust (and money) in a certain fish tank shop not far from Stirling. After a long wait, I got my tank and cabinet: wrong size and wrong colour.

After several more months, the replacement arrived. The workmanship was 'unreal', while the tank was full of, not just scrapes, but gouges, with bits of solid glass embedded in the silicone sealant. In fact, the cabinet was so bad that it had to be finished by a local joiner. The tank, of course, went back yet again and was duly replaced.

Having been given every excuse under the sun during my six visits, I was eventually sold a filter which, it later turned out, was designed for a 30-40 gallon tank (my tank holds 116 gallons!).

By this stage, my desire to become a fishkeeper was being sorely tested and was slowly melting away.

Good shops are like gold dust — extremely valuable, but a few (sadly) spell trouble. We, up here in Scotland, don't have as wide a choice as our counterparts in England. It's therefore well worth checking things out, particularly if you are a beginner. Finding a good shop not only provides a sound start, but also a cheaper way of getting into fishkeeping than I have experienced.

Alan Stewart,
Ardrishaig,
Argyll.

P.S. I am, as I write this letter, 450ft under the sea, in a Saturation Chamber in the North Sea, with a copy of *A & P* by my side!

Editor's Note

Glad to see that, despite your troubled start, you are still in the hobby. As you say, there are, fortunately, far more good shops than bad ones, I am delighted to say. Here's hoping you continue to enjoy A & P . . . *wherever you might be!*

John Dawes

"Jim's very proud of his furnished tank . . . it won first prize in the club this year."

THE AQUARIUM MARINES REVIEW

(Part 3 — Crustacea [continued]: Moulting, Growth Cycle and Selected Forms)

Andy Horton continues his discussion of crustaceans, including some of the biological factors which should be of particular interest to aquarists.

JOHN DARVES

One of the lesser known crustaceans is *Axius*, a burrowing prawn-like Anomuran.

ANDY HORTON

When a crustacean moults, its cast-off exoskeleton is sometimes mistaken for the live animal. The species shown in the photograph is the Louisiana Red Swamp Crayfish *(Procambarus clarkii)*

Stalk-eyed crustacea are so called because their compound eyes are attached on stalks. In the crabs, they will be shielded by the hard external carapace. This can be observed clearly in the Shore Crab, *Carcinus maenas*, a widespread and commonplace crab of a noticeable size found on sheltered coasts and in tidal estuaries of the British Isles.

MOULTING (ECDYSIS)

If you look really closely at a crab, you may notice the absence of eyes. If so, you are then looking at the discarded exoskeleton (or *cuticle*) of a crab which can be mistaken for a live animal, so perfect is the shell's appearance. As the tide rushes in, these empty shells are often lifted off, and can be seen floating on the surface of the water.

If possible, crabs will feed on their discarded shells and scientific examination of the exoskeleton of crabs has shown them to contain two vital ingredients: chitin and mineral salts.

Chitin is a flexible protein material that is obtained through the intake of food. Of the mineral salts, calcium is the most important. In the Decapoda and larger Crustacea, chitin is combined with calcium and other salts to strengthen the exoskeleton.

Demise of crabs and other crustaceans in captivity often occurs when the animal is in the process of changing its exoskeleton. Research into the moulting cycle indicates that several stages can be described. This is well known to anglers who use 'soft-backs' for bait.

The growth cycle in crustaceans is controlled by hormones and modified by environmental conditions. In the crabs, the various stages could be summarised as follows:

(1) Premoult (Peeler) stage:
A new soft exoskeleton forms underneath the old outer shell, and the calcium from the old skeleton is resorbed into the blood.

(2) Ecdysis:
The old exoskeleton splits open and the crab withdraws and begins to absorb water rapidly. Prawns 'jackknife' out of their skeleton, leaving a spectre of their former selves.

③ **Postmoult (Soft-back) stage:**
The crab hides away until the new skeleton hardens. In large crab species, feeding stops for several days.

④ **Intermoult:**
This is the intervening stage between moults. However, it should be noted that changes are constantly in progress; the carapace becomes rigid first, before the legs, and tissue growth continues internally.

⑤ **Terminal Anecdysis:**
Some species, the Spider Crabs especially, eventually reach their full growth size, after which no further moulting occurs.

PLANKTONTS

The majority of Crustacea are planktonic (swimming) forms. Copepods form the largest group, comprising some 70% of all zooplanktonic crustaceans. Despite their small size, usually 2mm (c0.08in) or smaller, these animals are omnivorous, absorbing mostly phytoplankton, but also preying upon animal protozoa and other copepod larvae.

Calanus finmarchicus (5mm - c0.2in) is the principal copepod in the North sea, and is an important food for Herring.

SMALL CRAWLING FORMS

On British shores, and in submarine habitats and on the intertidal zone of most coasts of the world, the small crawling crustaceans are an important part of the food chain, and perform the role of scavengers, mostly feeding on organic remains of plant and animal material. The aquarist first notices these miniature animals when they are inadvertently introduced into the aquarium.

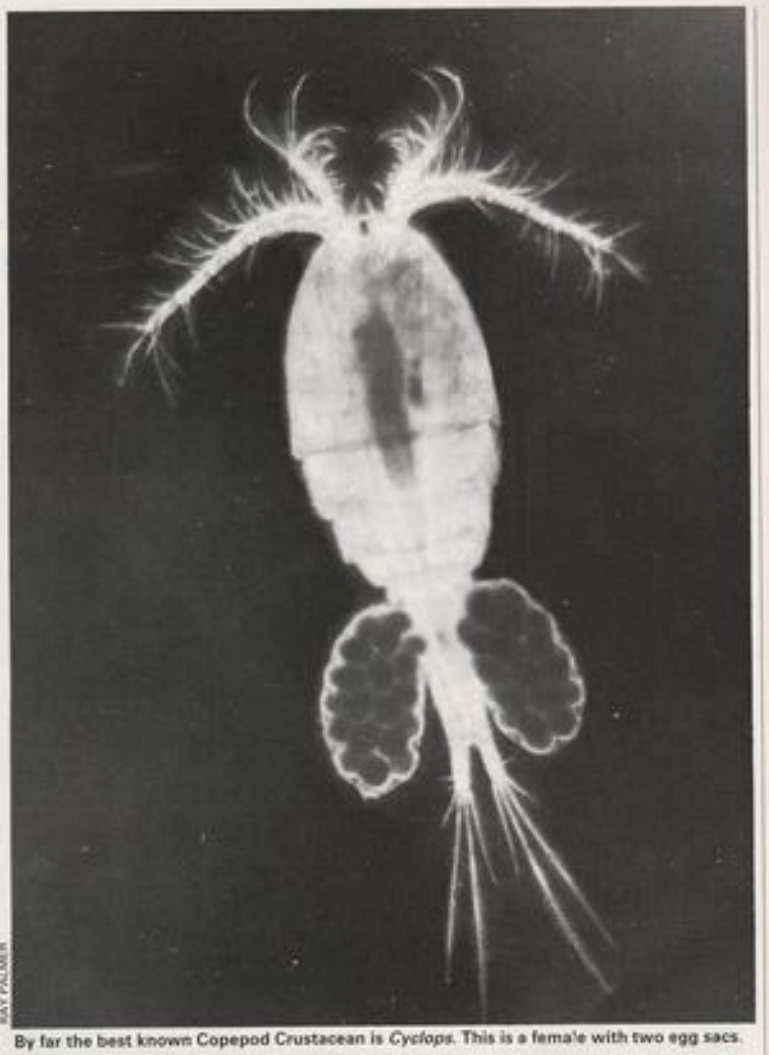
They can perform a useful role in two respects:

① They consume small particles of uneaten food.

② They provide food for plankton feeders and larvae.

In a well maintained aquarium, they will remain hidden between the sand granules at the bottom of the tank. Some people worry unnecessarily about the presence of a few 'bugs' because they can indicate an aquarium in poor condition. Do not forget these tiny organisms form a natural and essential part of the natural world. They tend to remain in the sand when an undergravel filter is in operation, because the pump draws small particles of food into the substratum.

Only when the food has been left to rot in the aquarium are these bottom dwellers likely to venture into the viewing area. Small fish will readily eat these small copepods (about 1mm — 0.04in), and the larger amphipods and isopods. In nature, they will inhabit every conceivable place of shelter, between sand grains and (especially abundant) among the fronds of seaweeds.



RAY PALMER

By far the best known Copepod Crustacean is *Cyclops*. This is a female with two egg sacs.

TAXONS OF DECAPODA

The large decapod crustaceans prove of greatest interest to aquarists because of their size and complexity.

The order Decapoda is distinguished by the presence of ten legs, including at least one pair of claws called chela(e). They are classified into the following groups:

Caridae — Prawns and shrimps, and prawn-like crustaceans

Astacidea — True lobsters and crayfish.

Palinura — Lobsters with small claws, Spanish Lobster, etc.

Anomura — Hermit Crabs and Squat Lobsters.

— Porcelain Crabs.

— Burrowing, superficially prawn-like, crustaceans e..g *Axius*.

Brachyura — True crabs.

All crustaceans possess antennae, which

CORAL WORLD - EILAT

Like its better-known relative, the Boxing Crab *(Lybia tessellata)*, this Grenadier Crab from the Red Sea has small anemones attached to its claws.

are often called tentacles, and shorter antennules. Decapod Crustacea all feed in a similar way: the *sagma*, known as the *mandibles*, and the *chelae* (claws) function to manipulate the food to the mouth.

Some of the walking legs have different functions, and the uses of the *pleopods*, or swimmerets, is markedly different between the crabs and the prawns. For this reason, the swimming forms e.g. prawns, were previously grouped in a different suborder, the Natantia, from the walking forms, the Reptantia.

Decapod Crustacea are comprised of three major parts: the head, to which the feeding bits are attached; the thorax, which is covered by the carapace; and the abdomen, to which the pleopods are fixed.

EVOLUTION

As the first multi-cellular forms of life were emerging on earth about 500 million years ago, Tribolites evolved in the Cambrian oceans. These animals, known only from fossil remnants, are classified as Pseudocrustacea, because they possessed only one pair of antennae (i.e. absent antennules), and lacked other true crustacean characteristics.

The small Ostracods (shrimps enclosed in an external shell-like case) measuring about 1 to 5 mm (0.04-0.2in) are the earliest form of true crustacean that evolved for the last 450 million years. Decapod prawns have been around for between 185 and 155 million years, and the first crabs (Brachyura) have fossil records indicating their first presence about 130 million years ago.

CONCLUSION

The class Crustacea is so numerous and variable in terms of species, that I have only glossed over the major groups, concentrating on just their general aspects.

Many Crustacea are omnivorous feeders and are easy to keep, but some species may also be on sale that have a specialised diet, like the attractive Harlequin Shrimp, *Hymenocera*, which feeds naturally on the Crown-of-Thorns Starfish. The European Edible Crab, *Cancer pagurus*, should be 'rigidly' avoided because its destructive behaviour is likely to destroy the aquarium.

Smaller crustaceans fare better in aquaria, which sometimes is a mixed blessing, because of the hardiness of parasitic species. Copper medications will, however, kill many invertebrates, and with temperate species like the Squat Lobster, *Galathea intermedia*, ensuring the correct temperature is crucial to success.

Small crustaceans breathe through their body surface, but the larger Decapoda have gills for oxygen diffusion underwater, while others, including the Shore Crab of British shores, are able to breathe out of water. The blood of the Decapoda is usually blue, containing haemocyanin, a copper and protein compound. Other crustaceans, notably *Daphnia*, contain the red haemoglobin.

Visitors to London Zoo aquarium may have noticed their Horseshoe Crabs. These species lack the antennae of insects and true crustaceans, and are classified in a different Arthropod subphylum; the Chelicerata, class Merostomata (see **Lucky Horseshoes** by Dr Gareth Evans in the September 1990 issue of *Aquarist & Pondkeeper*).

GLOSSARY

Chitin: A non-living proteinous material ($C_8H_{13}O_5N$) excreted by the epidermis in large Arthropoda, including Decapod Crustaceans, which, together with salts of calcium carbonate (limestone), forms the protective exoskeleton in crabs etc. Chemically, chitin is a nitrogenous polysaccharide, horn-like, insoluble in water and other solvents, and resistant to acids and alkalis.

Epidermis: outermost cells of the body. (*epi* = upon; *dermis* = skin)

REFERENCES

Please write to Andy Horton, British Marine Life Study Society, specifying interest, c/o *Aquarist & Pondkeeper*.

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OUT AND ABOUT

WORLD OF WATER — ROLVENDEN

By John Dawes

(Photographs by Jon Montgomery)

Not three years ago, no-one had heard of Sparsholt College's various diplomas in ornamental fish management. Today, as I do my rounds of the aquatic trade, Sparsholt comes up with great regularity, and there can be little doubt that the qualifications obtained by Sparsholt 'graduates' are becoming (quite rightly) highly regarded up and down the country.

The link between Sparsholt and **World of Water** at Rolvenden in Kent, is **Peter Walsh,** a determined, very capable and forward-thinking possessor of a zoology degree, who is already making his mark in the aquatic world.

On meeting Peter, something rang a bell at the back of my often-wayward brain. I had seen that face before, but where? He soon sorted me out. He was, in fact, a student at Sparsholt when I did the first of my now-annual presentations as Visiting Lecturer on the course.

Peter has come a long way in a remarkably short time. In less than a year, he has also made substantial changes at World of Water (Rolvenden), one of a chain of six such retail centres — the others being based in Romsey, Crawley, Chertsey, Reading and (most recently) Hailsham in East Sussex.

As our accompanying photographs show, the Rolvenden outlet is a large garden-centre-type establishment. It is however totally and exclusively dedicated to aquatics. The interior shot, in which I'm chatting to Peter, shows less than one third of the tropical freshwater section, so this gives you an idea of how spacious this department actually is. In the foreground, a large attractive display from John Allan Aquariums Ltd, shows off the aquatic plants to great effect.

This tropical freshwater section is located within one of the four glasshouses that can be seen in our general photograph (although, in reality, we are talking of one massive glasshouse with four ridged roofs).

The rest of the indoor area is taken up with dry goods of every conceivable kind, plus, at the back of the first section, World of Water's coldwater department. Here, the fish — mostly Goldfish, Japanese Koi and the other well known coldwater species — are housed in excellently maintained large cement-walled raised ponds, with everything clearly marked and with plenty of room to move about in.

Having a chat in the tropical freshwater department. Note the *A & P* posters on the extreme left of the picture (clearly, Peter Walsh and his crew can recognise a good thing when they see it!).

Outside, a statuary/stone ornament section leads to a selection of differently-shaped/sized pools laid out to give potential customers some ideas which they can then adapt to their own circumstances. Being clay, the landscaped areas between the ponds had not yet been planted up when we visited World of Water (this section had only been operational for a few months and it didn't really make economic sense to spend thousands of pounds planting it all up, only to lose part, or all of it, during a long hot summer). Little could Peter have known that, at least, the early part of the summer was going to turn out to be as wet and cold as it did. By next spring, though, everything *will* have been fully planted and decorated — worth looking forward to.

World of Water, Rolvenden — light, airy, clean and full of aquatic products and livestock.

World of Water at Rolvenden is a very new retail outlet with tremendous scope for expansion and development. Under Peter Walsh's dedicated leadership, I have little doubt that it will soon rank alongside the very best aquatic centres around.

Opening Hours: 9.00 am – 6.00 pm (seven days/week).
For further details, contact **Peter Walsh, World of Water, Hastings Road (A28), Rolvenden, Kent. Tel: 0580 241771.**

MIDLAND KOI ASSOCIATION OPEN SHOW

By Dr David Ford ('Aquarian' Advisory Service)

A record number of nearly 900 people attended the 16th annual Open Show of the Midland Koi Association (MKA) on a glorious summer's day. Entrance was £1, which included a very useful booklet with data on Koi varieties and disease treatments.

The venue was, as usual, Baginton Village Hall near Coventry, with the show being open to the public from 11 am to 6 pm on Sunday 7 July. Traders included Clear Water Koi Direct, Conquest Koi, Cosby Koi and PWL Koi, all selling pedigree fish.

Home-made hot and cold food was available all day, along with tombola and raffle prizes. During judging, visitors were entertained by a martial arts display and dog obedience demonstrations, while the MKA stand had an advisory panel to help Koi keepers with any problems.

There was a festive atmosphere with the small stands for garden plants, skittles, 'Lupins' Crafts, R. Collier Wildlife Artist and a bouncer castle for the children.

As MKA President I was honoured to present the prizes for Best Koi in each class, plus samples of the latest 'Aquarian' Pond Food.

The MKA was formed in 1974 for Warwickshire and other Midland Koi keepers. Meetings are held at St. Thomas' Church Hall, Wickham Close, Keresley, Coventry, on the first Saturday of every month. There is also a lively, informative magazine. For more information, ring the Secretary, **Graham Parker** on **Leamington Spa (0926) 813661.**

Prize presentation underway at the MKA Open Show.

TOP M.K.A. AWARDS

Best in Size Categories

Size 1: S Hammond
Size 2: S Finney
Size 3: C Grislod
Size 4: M Gess
Size 5: J Gess
Size 6: J Gess

Best Baby Koi: J Finney
Best Adult Koi: M Gess
Best Tategoi: M Gess
Best Mature Koi: J Gess
Largest Koi (Jumbo): M Gess
Best Dealer: P.W.L. Koi

Spotlight Special: Catfish

BREEDING THE INDIAN STRIPED CATFISH IN CAPTIVITY

Jiri Palicka reports on his success in breeding this great catfish using hormone injections

(Photographs by the author. Text translated by Mary Bailey).

The members of the catfish order (Siluriformes), like the attractively coloured characins and cichlid species, large and small, are frequently encountered in aquaria. To date, more than 2000 species, classified in more than 30 families, are known. They include small species ideally suited for maintenance and breeding in captivity, as well as species which are quite useless for these purposes on account of their large size.

With a few exceptions, they are all fishes which are adapted to life close to the substratum. They may be diurnal or nocturnal, and have a variety of dietary requirements. It is common knowledge that their maintenance is basically problem-free, and that they are one of the most tolerant groups of fishes kept in captivity.

By contrast, however, we have relatively little practical experience and knowledge of breeding and rearing even the best-known species. Recently, the use of hormone treatments has been employed, and although the results have sometimes been variable, this can be described as a step forward. Modern technology has supplied a new route to the increase of our knowledge, and, in the near future, we should be able to make many new discoveries which would probably not be possible otherwise.

DISTRIBUTION AND CHARACTERISTICS

I would like to dedicate this article to the genus *Mystus* and the well-known species *Mystus vittatus* (Bloch 1794). This fish has been successfully bred in captivity with the assistance of hormone treatment. By virtue of its size, it is ideally suited for aquarium culture and, in consequence, has been imported frequently for several decades.

It inhabits India, Burma, the island of Sri Lanka, and other parts of SE Asia, and is found in both still and running waters. Wild specimens measuring up to 20 cm (8in) have been caught, but in captivity, the species attains no more than 15cm (6in). The coloration is rather variable and depends on the age of the fish, its size, and its environment. The base colour varies from silver-grey to green. There are two light longitudinal bands on the sides of the body, ending on the caudal peduncle. There is a large dark spot on the base of the tail.

The (slimmer) male curves his body in front of his stouter partner during spawning.

The mouth is rather broad and has four pairs of barbels, two on the upper jaw and two on the lower. The barbels of one of the pairs on the upper jaw are so long that they extend almost to the tail. This pair is dark, while the others are light below and dark above.

The lower body is light silver-grey. Sexual differences become apparent only in adult specimens at least 1·5 to 2 years old. As the female grows, she begins to increase appreciably in width, and by the time she is ripe, her body is twice as stout as that of the male.

The female I kept was also, compared with the male, longer by the length of the tail. Males are more deeply coloured, and the longitudinal bands are more distinct and blue-green in colour. There are visible differences in the form of the fins, too; the hard spine of the pectorals is more strongly developed in the female, and I have observed that, in males, the shorter barbels on the upper jaw are more robust.

AQUARIUM REQUIREMENTS

Keeping *Mystus vittatus* is very simple, as is the case with the other members of this genus. Their demands regarding water chemistry are astonishingly small, and even significant fluctuations in pH have no ill-effect. Ideal conditions for maintenance are a pH of about 7 and a total hardness of 10-20 dGH. Large fluctuations in water temperature have no significant effect on the activity of the fishes, either. They are just as happy at 18°C (c64°F) as at 28°C (82°F).

When adult, the fishes are predominantly nocturnal. By day, they remain hidden among the rocks and roots and lonly come out at twilight to hunt for food. If the bottom of the tank is dark and the lighting is not too bright, then they can sometimes be seen swimming around during the daytime. But if they are disturbed, they disappear like lightning into their hiding-places.

This catfish is peaceful towards other fishes and can be kept with small species, eg tetras, without fear for their safety. Young specimens are more suitable for show tanks, as they are more active during the daytime.

The Indian Striped Cat is not choosy or fussy about its diet. It prefers live food, but also takes dried food enthusiastically. An important factor in the successful maintenance of this fish is an adequate supply of food, constantly available. Failing this, the fish will lose weight relatively quickly, and, later, may experience distortion of the vertebrae and a susceptibility to a variety of infections. Particular attention must be given to this factor where the animals are intended for breeding stock. If one wishes to produce vigorous healthy animals then, wherever possible, the diet must consist of a variety of live foods. It is best to feed during the evening and at night when the fishes are fully active.

BREEDING

When it comes to breeding, only females that are sufficiently full of completely ripe eggs should be used. Recent studies have shown that the ripening of the sex cells in females takes about three months from the time when it becomes obvious that the female is starting to fill up with eggs.

If hormones are applied before this time, then, either the female will not spawn at all, or else, the eggs are not capable of fertilisation. It is thus very important to get the timing exactly right; otherwise it is not possible to breed successfully fishes to which the method is applied. The ripening time varies from species to species, as I have established by a comparison of successful breeding attempts with different species of fish.

As the female, (with mouth agape) releases a batch of eggs, they are quickly fertilised by the male.

I injected a pair of *Mystus* with the hormone preparation Gonadex, manufactured in Sweden, using a concentration of 500 units to 0·8 ml of water. I gave each fish 0·2 ml of this solution. Sexual activity peaked after 10-12 hours. During spawning, these fishes are very timid and can be frightened incredibly easily. I therefore injected them towards evening so that spawning would take place during the night or early morning.

Spawning takes the following course: the male is constantly moving, and positions himself in front of the female. The two fish then touch each other with their barbels. After a few minutes, the male, rapidly curving his body, encircles the snout of his partner, and, if possible, seizes her firmly by the pectoral fins. The female waves about as if trying to shake him off. After a few seconds a batch of eggs appears, and these are fertilised by the male. The process is repeated again and again and the pair continue spawning until dawn. By morning, they are quite exhausted and lie motionless on the substrate.

Each individual spawning pass produced 200-300 transparent eggs, and a total of some 3000-5000 eggs were laid during a single spawning. Average egg size was 0·8-0·9mm. At a temperature of 22° (c71.5°F) the fry hatched after 20 hours, and measured 3·0-3·2mm. They began to take food after a further three days, and I fed them on newly hatched Brine Shrimp (*Artemia salina*) without any problems.

REARING THE FRY

During their first week of life, the fry changed colour and became black dorsally. Growth was very rapid, and by the end of the first week they measured 1cm (0·4in). Four/five weeks later they had attained a length of 3-4cm (1·2-1·6in), were adopting the adult colour pattern, and their growth rate was rather slower.

The chemical composition of the water has no practical significance in the development of the eggs. On average, 10-15 dGH and a pH of 7 is ideal. I investigated the effect of different Carbonate Hardness levels, from 0-5 KH, and the results were the same in all cases. An increase in water temperature likewise had no particular effect on the development of the eggs.

On the basis of the above experiences, I conclude that, all in all, breeding this species is easy, and does not differ appreciably from reproduction in other catfishes.

Note from the Editor

While hormone injections can produce excellent results, they should only be used by suitably qualified aquarists or vets. Hormone administration should also be carried out with the greatest of care, since inappropriate techniques, or miscalculated dosage levels, can cause undue hardship to the fish, while unsafe use could lead to accidents.

As our translator, Mary Bailey, pointed out in her most original, and quite appropriate way (for which I am most grateful), if you get things wrong, you could "run the risk of becoming a circus exhibit!"

Has any *A & P* reader managed to breed these great catfish 'naturally'? If so, we would dearly love to know.

John Dawes

Spotlight Special: Catfish

Large rivers, such as the Essiquibo in Guyana, provide excellent Giant Whiptail habitats.

SOUTH AMERICAN GIANT WHIPTAILED CATFISHES

David Sands of the 'Aquarian' Advisory Service reveals all you ever wanted to know about a rarely-seen species of Whiptail, but were afraid to ask.
(Photographs by the author)

Regular readers of this historic magazine may well have noticed my recent four-part series about South American 'Suckermouth Catfishes'. Despite the many words and pictures, based on 10 years of enthusiastic research, I barely opened a 'bedroom window' in the 'mansion' known to science as the Silurid family, the Loricariidae.

In this follow-up article, I want to attempt to shed some more light on a rarely encountered species, the keeping of which would test the fishkeeping skills of even the most experienced aquarist.

SO MUCH FOR SCIENCE

The genus *Loricariichthys* brings together 15 or 16 species ranging the faster flowing rivers of Peru, Ecuador, Paraguay and the slower moving rivers of Argentina, Guyana, Surinam, French Guyana and Brazil.

I have seen foot-long (30cm) specimens of *Loricariichthys platymetopon* imported from Paraguay and known that few aquarists would have the wherewithall to sustain them in captivity.

The main scientific researchers, Nijssen and Isbruker, working on the family Loricariidae in 1979, recorded preserved specimens from the Paraguay River, Paraguay, measuring 222mm to 297mm (8.7–11.7in). Nijssen and Isbruker noted that specimens had been recorded from Argentina (the Rio Parana) and Brazil (Rio Uruguay and Rio Solimoes).

Loricariichthys have been given the common name 'Spoon-head' Whiptails from a suggestion of mine in *Catfishes Of The World*, Volume Four, in which I detailed as many catfishes from the family Loricariidae as known to be imported up to 1983. In subsequent updates, published between 1985 and 1991, I have struggled to keep up with the many new and unusual forms that have been collected and exported from South America.

The 'Spoon-head' Whiptails are closely related to *Datyloricaria*, *Loricaria*, *Paraloricaria* and *Pseudoloricaria* but the differences between these genera are not relevant to fishkeepers, unless they are interested in taxonomy! If any reader wants to know more, then I suggest they seek out papers by Messrs Nijssen and Isbruker or read my attempts to unravel the detail in *Catfishes Of The World*.

All these genera have one special area of interest for fishkeepers; they are very difficult to keep in standard aquaria.

HABITATS AWAY

Imagine a wide, curving river, sweeping into and inside a jungle wall of trees. Perhaps, there is a sand bank where the butterflies stop to drink in their thousands and the lines of Cayman 'crocodiles' bask in the heat of the day.

In this place, where the river naturally slows, there exists hundreds of square yards of sand substrate on which Giant Whiptails can roam and graze. The Giant Whiptails probably wait for twilight before magically raising themselves up from under the sand where they have rested. They have been buried, perfectly hidden from predators (from the air and from the water), with only their eyes poking through, like crocodiles on the water.

The *Loricariichthys* and allies sweep the sand searching out crustaceans and aquatic debris. They sift sand continually, flattened mouths sucking in the sand and passing it out through the gills, in the hope that the food search will provide the required tid-bit they need to survive.

Compare that habitat scene with an aquarium. Few aquaria are wider than 18 inches (45cms) front to back; even fewer are longer than four or five feet (120–150cm) — not much space for a foot long 'Spoon-head' Catfish to move around in. Most aquaria also have a gravel substrate which is alien to many catfishes, even though it is great for undergravel filtration. (Yes, not everybody employs huge outside filters, trickle systems etc.)

HONESTY BLAZE

If I was being honest, I would think that only a handful of catfish enthusiasts would be capable of sustaining large Whiptail Loricariids for any period of time.

In my experience, imported fish barely live beyond a year although, before the 'animal activists' start and the wholesalers/traders want to murder me again, I will state that very few are imported in the first place.

How could a fishkeeper keep Giant Whiptails thriving rather than simply surviving?

Firstly, the aquarium dimensions are critical. The base area needs to be large (I currently keep a study group of *small* catfishes in a 36in long, 36in wide and 15in deep — 90 x 90 x 38cm — aquarium). Something slightly larger than this working example would be ideal for 'Spoon-heads' or any other Giant Whiptails mentioned (including *Pseudohemiodon* which was featured in Part Four of my recent series).

LORICARIIDS LOVE LIVELY WATER

The next area to put into perspective would be the filter system. I would employ the *largest* external filter I could afford. I would fill it from the bottom with scourer, middle – ceramic pots or Siporax, and top, a high-quality filter fibre. (I prefer the last to sponge because when sponge becomes saturated with organic material, water flows over, rather than through it.)

I would use a spray bar, perhaps to return some water into a trickle tray, running just at the water level. An air pump running a large stone would finish the system nicely.

The penultimate part of the jigsaw is the substrate. River sand, *thoroughly* washed, is ideal. Silver and coral sand is *NOT* ideal, despite what anyone might tell you!

Don't tell me there isn't a river nearby. Even the largest tank only needs a few handfuls. A scattering, with a few little areas of small rounded gravel, is enough for the average Suckermouth Catfish to be made to feel at home.

Add to the aquascape a few sea-washed and 'smooth worn' granite boulders and a couple of large, 'well dead' Beechwood branches (like the one pictured) and the aquascene is set to make a Giant Whiptail happy . . . even if the tank is small by comparison with Nature!

There's only one thing better than a happy Giant Whiptail Catfish — two happy, Giant Whiptail Catfishes! (male and female . . .)

On a biological note, males develop enlarged mouth flaps which enable them to carry eggs during the breeding season. This aspect of reproduction is shared by all these large Whiptails.

Head detail of a *Loricariichthys* showing the characteristic mouth flaps.

Water quality prevailing, I would recommend a neutral pH (despite all you may have read), a low hardness and temperatures ranging 78-84°F (25.5–29°C). Any subsequent collapse of the pH would indicate the need for a major water change; 50% and more, and a week or so afterwards, a major clean of the filter in a bucket or two of aquarium water.

WHIP UP A QUICK MEAL

The final part of the requirements for large Whiptails is certainly diet. The ideal diet would be a blend of a good flaked food (for vitamins and minerals), Gamma-frozen shrimp (for calcium) and softened peas/lettuce (for roughage). This simulated diet, which could be made up and frozen into cubes, could be enhanced by finely chopped small earthworms, a few occasional unshelled and softened prawns and a slice of softened potato.

The major difficulty is not to underfeed and yet, not to overfeed. It is so easy to do both, or one of the other! Even so-called experts (myself included) have been guilty of both crimes.

In the desire to see a fish healthy, I have piled food into a tank so that the less voracious feeders can still find some food after feeding time. This is a sure way to pollute the tank and 'over power' and swamp the filters with organics. In fact, I have traced high nitrates to overfeeding flaked foods (among many other foods). Underfeeding is usually out of ignorance rather than deliberate error. Most fishkeepers are warned at an early age about overfeeding.

"It'll kill the lot!!" decrees the oldest fishkeeper in town.

There's underfeeding and *underfeeding*, of course. If fishes eat all that is provided *before* some of the more nocturnal members of the aquarium arrive at the 'dinner table', then a bit extra would be in order at 'lights out' time. Relying on starvation to draw fishes out of hiding is not recommended.

Presuming every detail I have listed is seen to, a Giant Whiptail — that has *incredibly* survived the rigours of catching, holding, export (more catching), import, wholesale (even more catching), retail (that old devil, catching again) and, finally, your aquarium . . . given the right system and correct diet, will stand a fighting chance of thriving in captivity.

Is that something, or what?

***Loricariichthys platymetapon* — a real challenge for any aquarist.**

Coldwater jottings

By Stephen J. Smith

VIC CAPALDI

A sense of acute numbness fell upon this Goldfish enthusiast and 'Coldwater Jotter' upon hearing the news of the death of one of the hobby's greatest ambassadors, **Vic Capaldi**.

Approaching his 65th birthday, Vic was show secretary and a life member of Bristol Aquarists' Society. A former secretary of the society, he was always on the committee and, throughout his 40-year involvement with Goldfish, developed a great reputation as a breeder, exhibitor and judge.

Stan Lloyd, also a life member of the society and a former president of BAS, remarked, "Victor was a good friend and always a gentleman; his death has shocked many friends at home and throughout the coldwater fish world."

Another stalwart of Bristol Aquarists' Society, **H.C.B. 'Tommy' Thomas**, the society's longest-serving president, commented: "I have lost a good friend and the hobby a great servant.

"When I first knew Vic, about 40 years ago, he was breeding Angels. Later, he devoted himself to Fancy Goldfish, especially Fantails and Lionheads. He was an expert breeder, and the number of people to whom he had given 'just a few tiddlers' must be legion."

He continued, "He was always to be found where the work was being done, and he never spared himself. This was most obvious at shows, where he was a very successful exhibitor and judge over many years.

"One of Vic's characteristics was that he could do anything to which he turned his hand to well," explained Tommy. "He was a good fishkeeper and, in the 50's, decided to have a go at producing red-scaled Veiltails. It should be remembered that, at this time, the availability of stock was quite different from the conditions today, and, needless to say, he succeeded. However, his affection was always for the red-scaled Fantail."

Tommy concluded: "Vic Capaldi's contributions to Bristol Aquarists' Society and to the hobby were immense. He was truly a gentle man."

STEPHEN SMITH

Jim Bundell, president of the Goldfish Society of Great Britain, presents the 'Best in Show' trophy to Vic (left) at the 1989 Bristol Aquarists' Society Golden Jubilee Open Show.

Editor's Note

Having known Vic for many years, and having often relied on him, like so many others have done, for information and advice, the news of his untimely death (broken to me by Stephen) came as a most unwelcome bolt from the blue. Another great loss, of another great man, following the sudden death of that other stalwart, Mervyn Strange.

John Dawes

DARIUS — THE FINAL INSTALMENT

Alex Stephenson has kept us well-entertained with his intriguing insight into the mind of a championship Goldfish. In this concluding episode, the story turns full-circle . . .

Darius was dead. The news spread quickly, like ripples on a pond, to every part of the colony. Other colonies would get to know eventually when the campaigners went abroad. The outsider had seemed somehow subdued when disposing of the body. Perhaps the passing of Darius had meant something to him. You never could tell with outsiders.

Darius had been the paramount male for many years and his influence on the colony had been immense; he had left a legacy of greater understanding, particularly regarding outsiders. His theories about life being governed by these creatures were accepted even by other colonies. Darius had become larger than life, even before his death. Often misquoted and misunderstood, he was something of a cult figure.

Now that he was gone, he would be credited with powers he had never possessed, and with feats he could never have achieved. Those who had been closest to him would do their best to dispel the myths and to contain the most fanciful stories to a believable level. They would fail, of course.

There's nothing like a good ancestor story to pass the long winter nights. Such was the impact of Darius upon his race; he was going to be a hard act to follow and there were no natural successors; that's often the way when leaders go.

Becoming top male or female had as much to do with mental ability as physical strength. A strong mind in a strong body, containing wisdom, as well as learning, were the usual qualities found at the top.

Outsiders didn't decide these things; how could they, they knew nothing. Their actions and interference, however, shaped things enormously. The selection processes they practised removed all but a small percentage of contenders right from the start. Further decisions they made then shaped the lives of all in the colony.

To be chosen as a campaigner, for instance, provided an opportunity for learning. The career also proved a testing ground of strength and stamina. Above all, it carried a lot of prestige. Ex-campaigners tended to have a distinct advantage when chosen. To be successful as a breeder, automatically put you into the mandarin class. There were many ways to the top, of course, but no shortcuts, each individual being assessed by all the others.

The current paramount female was a typical example. Although only a short career as a campaigner, she had been moved to the breeders' quarters while very young. There, she had obviously proven her worth, being responsible for many well-known offspring over a long period. When she retired, she had taken her place among the matriarchs, passing on her knowledge to others and gradually rising until she automatically succeeded her predecessor.

The vacancy left by Darius had many pretenders. One or two could even be described as having something to offer. Those who could claim Darius in the ancestry naturally made much of this, whereas those who didn't were understandably scornful, pointing out that none were of the same calibre.

The power struggle going on in male circles left the females decidedly unimpressed. They refused to be lobbied by any kind of contender, finding this kind of political manipulation in very bad taste. Males and females simply didn't get involved in each other's affairs, at least not openly. Whatever the result, it would be academic, as without the recognition and confidence of the females, the position would be of no real importance. As in most worlds, it was ultimately the females who held real power.

Two young females were discussing the attributes of some young males in the adjoining tank, always a popular pastime. "I know, let's ask Inca," decided one of them, "She knows everything."

Inca was a half-grown young female with a rather cavalier outlook on life. She had a laid-back attitude and a great sense of humour. She was the one who wouldn't be caught until she was ready. She was the one who almost lost her life when a tank was emptied with her still in it. She was the one who decided to start her own breeding programme by courting a young male out of season and spawning all over the place. She had even been chosen to campaign a couple of times. For one so young, she was a very experienced young lady.

Had she not been so like-

DARIUS (Continued)

ble, the other girls could have hated her very easily. The trouble with Inca was that if you asked her for her opinion, that is exactly what you got. Sometimes, her views were difficult to understand. She tended to be very far-sighted, which was not too surprising when you realised that she carried Darius on both sides of her pedigree. Not only could she read her own ancestry but, with a little deep mind-probing, she could read other's as well. You had to be careful when communicating with Inca that you didn't learn too much for your own good.

The two young females were joined by a couple more and they all gathered around Inca for a consultation. The subject was the males next door. Inca was bound to know all about them; males were never far from their thoughts. What transpired was a revelation. When asked her opinions and preferences regarding the males, she gave them. She then added that they would all soon be overshadowed by a newcomer.

He was still in quarantine, which was why his scent was still very faint. In that case, how did she know, they all enquired.

"Think about it," she replied. It was unlikely that the outsider would import a single young male unless he was better than what was here already, they thought.

And it made sense. But where was he from, and who was he? Inca didn't know. She told them that much more would be revealed when the quarantine period was over. And so it was.

Hannibal, the new male, was indeed a fine acquisition. His sire was a well-known campaigner and his dame the daughter of a full brother to the great Darius. There had been only three of the Darius group: Darius himself, a female who had died young, and a male who had changed owners. This male had made a lasting impression upon his new colony, one of the results being Hannibal.

All this, once it was known, caused great excitement among the female populace, the males having a rather different point of view. Any male with half a brain would realise that this newcomer was not only a good physical specimen, but also had a wealth of knowledge from a different colony. There was no doubt that he would soon prove himself and become the paramount male.

Inca approached a group of her peers who were discussing Hannibal. They discussed little else these days. The girls eagerly awaited Inca's contribution to the discourse. Inca, however, had little to say and seemed preoccupied. She exchanged polite signals and a few witty vibrations, but refused to be probed further. She moved off to meditate alone.

Inca's thoughts were on outsiders. Presumably the one they saw regularly was their owner. She wondered what had led this owner to choose this particular young male. There was no way the creature could know anything about him. Outsiders made no attempt to communicate, so what was the choice based on? She knew that outsiders had a different set of criteria based upon physical appearance only. It wasn't their fault; limited sight was almost the only sensory equipment they had.

Suddenly, the reason became obvious. All the signs were there. The outsider had hoped to produce another Darius. If she was correct, the future looked very good for her. The Darius cypher was very strong within her, so she would be an obvious choice.

The more she considered it, the more certain she became. Inca wasn't ambitious, she just wanted the best out of life. One of the ways to ensure this was to be considered valuable. To be expected to produce another Darius should be more than enough to guarantee her future. In fact, it would do her career no harm at all to be matched with Hannibal a few times. Who knows, it might produce a rash of little Incas as well.

Inca, well-pleased with her assessment of the situation, became her normal self and went off to commit a little mischief somewhere.

Diary dates

Portsmouth Reptile and Amphibian Society

The 1991 P.R.A.S. show will be held on **31 August** and **1 September** at the Fratton Community Centre, Trafalgar Place, Portsmouth. Doors open: 10.00 am – 6.00 pm. Full details of this, the largest display of reptiles, amphibians and invertebrates on the South Coast, are available from Jon Hillingsworth, 39 Wykeham Field, Wickham, Fareham, Hants PO17 5AD. Tel. 0329 833017.

Walthamstow & District Aquarists Society

The 1991 Walthamstow Open Show will be staged on **Sunday 8 September** at Pathfinders Lodge, Leucha Road, Walthamstow E17. Open to the public: 3.00 pm approx. Entrance is free. Further details and show schedules: Roy Parnell, 52 Rensburg Road, Walthamstow, London E17. Tel: 081 521 3383.

Lincoln & District Aquarist Society

The L. & D.A.S. Open Show will be held on **Sunday 8 September** at Skellingthorpe Community Centre, Skellingthorpe Village, Nr Lincoln. Benching: 11.30 am – 1.30 pm. Exhibits: 20p per entry. For further details, contact C Hildred, Secretary & Show Secretary, 69 St Catherine's Grove, Lincoln LN5 8ND.

Evesham and District Fish Keeping Society

The 9th Open Show of the E.D.F.K.S. will be held on **8 September** at Evesham High School, Four Pools Road, Evesham. Benching: 9.00 am – 11.45 am. For more information, ring Jack Williams on 0527 26938.

Lancaster and Morecambe A.S.

The third Open Show of the Lancaster and Morecambe AS will be staged at St Joseph's Hall, Aldrens Lane, Skerton, Lancaster, on **Sunday 22 September**. The date has been changed to avoid a clash with the Open Show of the Northern Area Group of the Catfish Association of Great Britain which will be held on **15 September** at The Mill, Wigan Pier.

Schedules and other details of the Lancaster and Morecambe show are available from Mrs Ann Blundell, 19 Berwick Way, Heysham, Morecambe, Lancs LA3 2UB.

Tel: (Home) 0524 53424; (Work) 0524 54512.

Meetings of the society are held on the first Tuesday of every month at Morecambe Cricket Club, starting at 7.30 pm. Full information from Ann Blundell.

Catfish Association of Great Britain (Northern Area Group)

The Northern Area Group of the C.A.G.B. have announced that the Northern Catfish Show will be staged at the Mill at the Pier, Wigan, on **15 September.** There will also be an auction and other attractions. The Best in Show fish will qualify for the Champion of Champions competition. For further information, contact the Show Secretary, Steve Anderson, on 0257 481876.

Plymouth and District Aquarists' and Pondkeepers' Society

The Plymouth Annual Open Show will be held on **14 September** at the new venue of Plymouth Polytechnic Main Hall, Drake's Circus, Plymouth. Further details from J Rundle, 87 Crossways, Woodford, Plympton, Plymouth.

Northampton & District Aquarist Society

The N. & D.A.S. 1991 Open Show will take place on **Sunday 22 September** at The Gladstone Centre, Gladstone Road, Northampton. Full details may be obtained from the Show Secretary, P de la Mare, 2 Southampton Road, Far Cotton, Northampton NN4 9EA. Tel. 0604 766668.

Mid-Sussex Aquarist Society

The Silver Jubilee Open show of the Mid-Sussex Aquarist society will be held at a new venue and on a new date. Venue: Southgate Community Centre, Ditchling Hill, Southgate West, Crawley, Sussex. Date: **Sunday 29 September.** The FBAS Championship Class to be judged at this show is Class E.

In addition to the Mid-Sussex stand, there will also be an FBAS stand, a canteen, a tombola and a raffle. Full details from John Smith (Chairman) on 0273 602407, or I. Shoosmith (Show Secretary) on 0293 513408.

The East London Aquarist and Pondkeepers Association

The 43rd Breeders Open Show of the E.L.A.P.A. will be held on **28 September.** Venue: Catterall Hall, Cecil Road, Chadwell Heath, Essex. Open to the public: 2.30 pm onwards. Show schedules are available from Miss Donna Howells, 30 Kinfauns Road, Goodmayes, Ilford, Essex.

West Cornwall Fishkeepers

This year's highly regarded W.C.F. Open Show will be held on **Sunday 27 October** in Camborne. Early interest in the show indicates that the 1991 event could be even more successful than its predecessors. Full details are available from Bob Williams, Secretary — W.C.F., Parc Cottage, Park Lane, Camborne, Cornwall. Tel: Camborne 717971.

Dunstable and District Aquarist Society

There will be a lecture by David Sands entitled **The 'Aquarian' Sponsored Expedition to Peru** on **Sunday 29 September.** Doors open: 2.15 pm. Entrance fee: £1. Programmes and directions are available (on receipt of an s.a.e.) from Kevin Scott, 17 Carterweys, Dunstable, Beds. LU5 4RB. Tel. 0582 664875.

News from the societies

Skelmersdale & District Aquarist Society

The 7th annual Open Show of the Skelmersdale & District Aquarist Society was held on Sunday 9 June at the Skelmersdale Labour Club, Westgate. Despite the poor weather, attendance was very good, and there was a total of 306 entries in the 46 different classes.

The main awards were:

Highest Pointed Individual — S. and T. Derrick

Highest Pointed Club — C.A.S.T. '88

Highest Pointed Fish/ Best Fish in Show — An A.O.V. Livebearer owned by Mr & Mrs Cobb (C.A.S.T. '88).

The members of Skelmersdale & D.A.S. would like to thank all those who attended the show, particularly those who travelled a long way to get there.

S.D.A.S. is always happy to welcome new members. The society meets at the Skelmersdale Labour Club on the 1st and 3rd Wednesday of each month, at 8.00 pm. For further details, contact Frank Carlson on 0695 21610 or Ron Lewis on 0695 28971.

FBAS Supreme Weekend of Fishkeeping 1991

The elements are all coming together, as the date of the **1991 FBAS Supreme Weekend of Fishkeeping** draws near although, in the best Weston-super-Mare tradition, it cannot be promised that the tide will be in! However, what will be in store is an activity-packed weekend for the fishkeeper at **Pontin's Sand Bay Holiday Centre.**

The international flavour of the weekend will be maintained with two new attractions: an **International Guppy Show** will be backed up by the launching of a new international Specialist Society for **Gobies and Rainbowfishes.** The accent will again be on information for visiting hobbyists, with no lack of expertise on hand to dispense it.

In addition to a good number of trade stands (many making a repeat appearance from last year), there is an impressive list of guest speakers including **Manfred Meyer** from Germany, an authority on Rift Valley Cichlids and well-known to the German Aquatic Societies, **Peter Burgess** from Portsmouth Polytechnic who will be dealing with Marine Diseases, **Tony West** has expert B.K-K.S knowledge (and how to put it over) on Koi, **Brian Walsh** from Darwen A.S. the widely-recognised Characin expert, Aquarian's **Dr David Ford** on Nutrition, Interpet's **Adrian Excell** and Tetra's **Dr David Pool.** Newcomers to the Specialist Societies attending will be the **Characin Study Society, Thames Valley Catfish** and the **International Marine Association.**

Two extra-special society-based attractions will be a combined **Coldwater Display** by **South Park A.S.** and the **Isle of Wight A.S.,** and a **Silver Jubilee Photographic Competition** featured by **Mid-Sussex A.S.** who are celebrating their 25th Anniversary this year.

There are plenty of things to do and win at the weekend. Hobbyists are invited to bring along samples of their aquarium water for **Interpet's** 'While You Wait' analysis; there will be the chance to win **Airport Aquaria's Fully-fitted Furnished Aquarium Cabinet** and, if you want to watch other people win, then there's the **Aquachamp Final** hosted by 'Aquarian'.

The biggest attraction for fishkeepers will be the outcome of the **FBAS Supreme Championship** in which prizewinning fishes from the 1990/1991 season battle it out.

Don't forget that there will be retail selling this year, so you can take home anything that takes your fisheeping fancy as long as (a) you can afford it, and (b) you can carry it home!

Weekender tickets for the event (Friday evening to Sunday afternoon) are available at **£57.00 each** (there is a limited number of family chalets available for youngsters to share parents' accommodation at reduced prices); the full facilities of the Centre will be available to weekend residents and there will be complimentary transport to local aquatic centres for those wanting to escape all the built-in excitement.

You can obtain a Booking Form from **Colin Richards, 3 Uplands Avenue, Chesham, Bucks HP5 2EA** but don't delay too long; there's only a short time left to reserve your place (and a chance to see the sea?)...

PLEASE SUBMIT DETAILS FOR OUR DIARY DATES PAGE *AT LEAST* 8 WEEKS IN ADVANCE OF THE EVENT.

Spotlight Special: Catfish

BREEDING ARMOURED CATS

Ruda Zukal describes his successful attempt at breeding the Port Hoplo, or Armoured Catfish, *Hoplosternum thoracatum*.
(Photographs by the author. Text translated by Mary Bailey)

This catfish, which grows to almost 18cm (c7.1in), needs no introduction to most catfish enthusiasts, as in recent years, it has won all their hearts completely. Although the fish grows so large, it can be kept in a community aquarium with peaceful species and those which are not too small, but the tank should not be less than 100 litres (c22 gals) in capacity. This fish (sometimes called the Port Hoplo) is also known as the Elongate Armoured Catfish. It was first imported to Europe in 1911 from its homeland in northern South America and the adjacent islands of Trinidad and Martinique.

SEXUAL DIFFERENCES

Sexual differences first become apparent at an age of about 6 months, but the fish are not sexually mature until they are a year old. The male has larger pectoral fins, and in particular, the first pectoral ray is stouter and red-coloured.

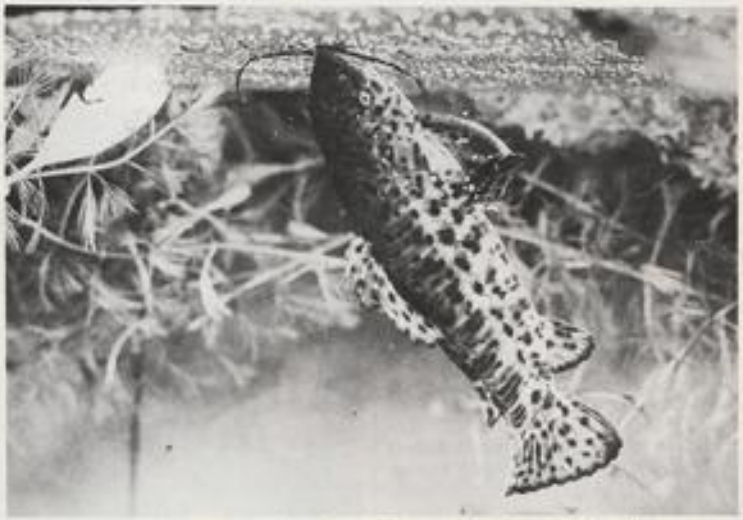
He is larger than the female, which has a greater girth, and a larger space between the breast plates.

The pectorals are rounded in both species and have a short, dark, almost black, stripe. The underside of the body is whitish, and, as can be seen in the photos, decorated with dark spots.

AQUARIUM MAINTENANCE

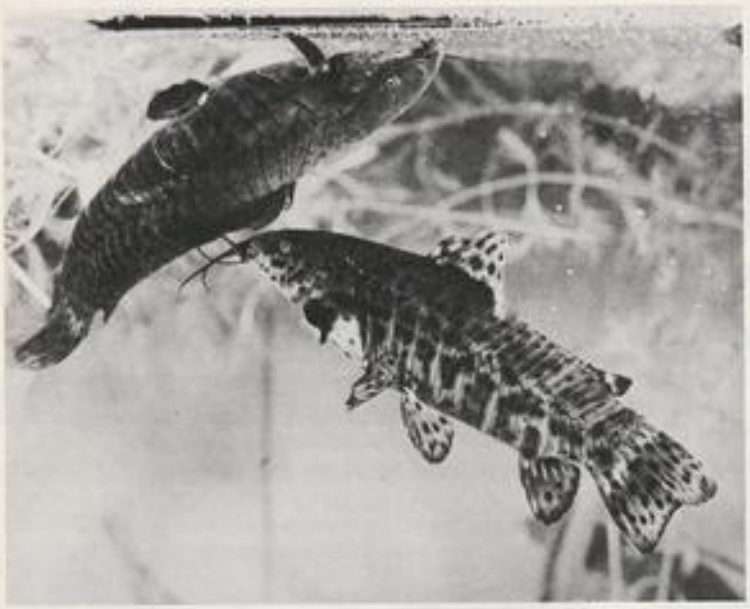
As far as maintenance is concerned, these fishes make no special demands; they are happy with a temperature of about 18°C (c64.5°F), have no special requirements regarding water chemistry, and will eat anything, but they prefer to feed on the substratum. As already mentioned, the tank should be a good size, and dense plant cover and artificial hiding places will enhance the well-being of the fishes.

Sometime ago, I kept two pairs of these catfishes together in my tank. The larger pair was older, and the younger pair was more than two years old.



The male building his bubblenest. Note that bubbles can be emitted via the gill covers.

As preparations are completed, the female (lighter, stouter fish) approaches the male.



The female turns upside down and mouths the bubbles just before egglaying.

I must add that I had not previously had an opportunity to study these fishes. They lived a rather secretive existence. Now and then, I would see one of them take a gulp of air, but as soon as it had taken in air at the water surface, it would disappear back into the plant cover at the back of the tank.

AQUARIUM BREEDING

I badly wanted to breed these fishes, so in order to achieve this, I floated a sheet of polystyrene measuring 20 × 30cm (8 × 12in) and, using a rubber band, attached a black artificial plant to its underside. The whole was attached to the glass with the help of a piece of wire, so that it could not move or float away. I then raised the water temperature to about 26°C (c79°F).

The next day there was already a bubble-nest on the underside of the polystyrene, and, soon afterwards, I had a very 'pleasant' experience! When I raised the cover glass and put my hand in the water to put in some *Tubifex* worms, I was violently attacked by the male catfish. I was so surprised that I jerked my hand, worms and all, out of the water. There was water and worms all over the place. After this, I was so scared of a repetition that I used a piece of glass to push the nesting fish gently away while I quickly did whatever was needed in the tank.

When, after 14 days, nothing had happened, apart from constant improvement of the nest, I had an idea. I fished out the aggressive male, leaving both females for the younger male. The next day the young male had already occupied the nest built by his rival, and, by the afternoon of the same day, there were signs of breeding activity involving the older, and therefore larger, female.

The female kept approaching, but hesitantly, and as soon as the male displayed his fins vigorously, she would swim in fright back into the plants. This type of foreplay continued for several hours and then the spawning progressed further.

Some of the stages of the spawning sequence are shown in the photos. I was, however, unable to observe the vertical position of the male beneath the nest described by some authors.

The male waited patiently until the female pressed herself to him, then embracing her with his pectoral fins and releasing his sperm; the female folded her pelvic fins into a 'pouch', turned her belly towards the nest, and guided the eggs into the bubbles.

This routine was repeated many times and the entire spawning lasted about three hours. Afterwards I removed the female, and the male undertook the care of the eggs. Obviously, I also removed the other female, who had remained hidden in the plants throughout the spawning.

Four days later, there were fry hanging in the nest, and I then removed the male as well, and carefully siphoned off water until the surface was about 20cm (8in) lower. I fed the fry, which numbered more than 500, on the tiniest live foods. They grew rather quickly and, after six weeks, were already taking small *Tubifex* worms.

The male turning upside down to fertilise the eggs.

What's your opinion?

Billy Whiteside, BA, ACP

I'm writing this column in July and have been amazed by the amount of plant growth in my garden. The frequent rain, combined with the heat and light, have caused astonishing growth. There will also be good crops of flowers and fruit on many plants because of the weather.

Although I don't have a garden pond, those who do in my area are delighted by the growth of their water lilies this year. There are five flowers/buds on one plant in a teenage friend's small pond. I think the flowers are most exotic and very beautiful. I hope to introduce several young aquarists to readers in some **Meet the Aquarist** features in the near future.

ANGEL SUCCESS

I've mentioned problems with Angelfish in recent columns and my comments have brought an interesting letter from **Mrs Jean M. Dadswell**, who lives at 34 Burnage Lane, Burnage, Manchester M19 2HY. Jean writes: "I began keeping Angels in December 1990, after many years of keeping Fancy Goldfish, and purchased several small fish at first. On three separate occasions I purchased one large Marbled Angel of approximately 3in (c 7.6cm) in length. To my complete surprise, the last two fish bought paired and spawned within two weeks of the arrival of the last fish.

"I moved all the other Angels, leaving the pair alone in a 24in (60cm) tank. I fed the free-swimming fry on Liquifry, but sadly, most still died. To date, seven remain. Two weeks later the pair spawned again. This time, I had to find a way of hatching sufficient Brine Shrimp for the new fry. My solution was to use several large coffee jars sitting in a small, spare tank of heated water. I used a Whisper pump to run an airstone in each jar and had sufficient shrimps to feed several times each day to the steadily-growing fry — which are now six weeks old."

Jean continues: "At two weeks I moved the fry into their own tank and carefully cleaned the parents' tank. Within two weeks, they had spawned again. They have not eaten any eggs or fry and have been the most attentive parents. I have no worries about leaving them with their eggs or young, despite what the books say.

"As you can see, my Brine Shrimp hatchery worked quite well; but I have not yet found a way of separating the hatched shrimps from the few remaining unhatched eggs. The shells are easily removed by putting the contents of the coffee jar into an inverted squash bottle with the bottom removed and a tap in the lid, allowing the solution to settle and then letting it run through the tap back into the jar, leaving the shells sticking to the sides of the squash bottle. However, as I said before, the solution does contain a number of unhatched eggs, though, in my experience, the fry appear to ignore them and they are gradually gathered up by the filter. My Brine Shrimp hatchery has now been moved to a spare 24 x 15 x 12in (60 x 38 x 30cm) tank which also acts as a nursery for the ever-increasing number of babies."

Jean Dadswell provides the following information: "Technical details — tank size: 24 x 15 x 12in (60 x 38 x 30cm), containing rocks, six small potted Amazon Swords; just enough gravel to cover bottom of tank. Water, soft; temperature 80-84°F (c 26.5-29°C). Filter, Fluval 2, covered by a mesh breeding net to prevent fry from being drawn in. Spawning site, piece of slate angled against side of tank." Jean enclosed an s.a.e. and was keen to hear my comments about her experiences.

I must say I think she has done very well with her Angel-breeding system. It's probably best to do as she did and have several fish of breeding size together. A suitable male and female will often select themselves and, once the aquarist has identified such a pair, if the first spawning is unsuccessful, as occurs in a community tank, then the pair in question can be provided with separate quarters — either by moving them, or by removing their tank-mates. The chances are that they will mate again in the future, under more appropriate conditions provided by the aquarist, and the owner can subsequently decide if (s)he will allow the eggs to remain with the parents or remove them for hatching without the parents. The accompanying photograph shows a breeding Angel in one of my tanks.

For me, much of the fun of fishkeeping comes from observing the fishes and plants. There's much more interest and pleasure to be gained from watching a pair of adults tending their eggs, and then their fry, even if the fry are lost. I think it's unfair to remove the eggs from the parents after they have spawned. However, there are occasions when it may be better to remove the eggs or parents and hatch the eggs under artificial conditions. There's plenty of fun to be had from helping to hatch the eggs and raise the fry by hand, as it were.

One of my male Angelfish fertilising its partner's eggs on an Amazon Sword leaf.

PLANT OFFER

Have you written to me yet? I received a lot of letters when I resumed **W.Y.O.?** earlier this year, but I have not received very many letters (as expected) during the summer months. Are readers too busy to write; or too poor to afford a stamp; or has letter-writing dropped out of fashion in the past few years?

I hope you'll drop me a few lines for a future feature. If none of the topics suggested in this month's feature appeal, then please feel free to select your own topic for a letter.

My tanks are over-flowing with aquarium plants at the moment and, as I don't like to throw out plants, I'll make a suggestion: I'll send a few of my spare plants to the writer of the letter I find most interesting that reaches me as a result of his/her reading this month's column.

FUTURE TOPICS

I hope you'll drop me a few lines for a future feature. Write to **Billy Whiteside, *Aquarist & Pondkeeper*, 9 Tufton Street, Ashford, Kent TN23 1QN.** I'll be pleased to have your opinions on any of the topics raised in the article above, plus any topics you'd like to air your views on, along with your opinions on: (a) breeding Cardinals; (b) quiet aquarium pumps; (c) breeding live foods for fishes; (d) feeding aquarium plants; (e) local dealers: quality of stock on sale, and quality of advice and service on offer; (f) further/higher education courses available to aspiring professional aquarists; and (g) keeping coldwater fishes in decorative aquaria in the home.

I look forward to receiving a letter from you. Good-bye until next month.

Spotlight Special: Catfish

COMMUNITY CATS

As **Gina Sandford** — co-author of the recently published *Tank Busters* — shows, there are quite a few catfish species which can be kept in community aquaria.
(Photographs by Mike Sandford)

Years ago, catfish were regarded as a necessary evil in the community aquarium. They were looked upon purely as cleaner fish to eat the algae and left-over food. They had a reputation for being boisterous, uprooting plants and rearranging the substrate to create a lunar landscape. Most people considered them dull and uninteresting. After all, what could a plain grey or brown fish have to offer, and why waste money on them when there were beautiful Cardinal Tetras and Angelfishes on offer?

But time heals all and, fortunately, many aquarists have now seen the light. Catfish are now as much part of the hobby as any other group of fish. There are many delightful creatures offered for sale and, as long as a little research is done to discover the nature, size and compatibility of the species concerned, there is one to suit almost every need. But they are still not regarded as a number one choice for the furnished aquarium, even though this would be an ideal home for many of the smaller species.

When choosing inmates for the aquarium, it is the norm to divide the tank into three zones: bottom dwellers, mid-water fishes and surface fish. So, Silver or Marbelled Hatchets fit the bill for the upper levels; Angels or shoals of tetras, rasboras or barbs occupy the middle regions, and catfish can be found on the bottom. It may therefore come as a surprise to find that there are catfishes which will fit the bill for all these areas!

SOME CORYDORAS AND BROCHIS SPECIES

Perhaps the best known of all are the smaller members of the Callichthyidae (Armoured Catfishes), the various *Corydoras* species. They range in size from the small *Corydoras habrosus*, fully grown at 25mm (1in), to *Corydoras barbatus* which attains 100mm (4in). *Corydoras paleatus* (the Peppered Catfish) and *Corydoras aeneus* (the Bronze Catfish) are probably the best known, but there are other, much more attractive species available, such as *Corydoras axelrodi*, *Corydoras panda* and *Corydoras caudimaculatus* if you are prepared to search for them and, in some instances, if your pocket permits.

When purchasing the fish, look for young specimens and buy half a dozen or so. With good feeding, these will soon reach maturity and may even spawn in the community tank. Feeding is no problem, as *Corydoras* will thrive on a mixed diet of *Daphnia*, *Tubifex* and Bloodworm, supplemented with flake or tablet foods.

Although the majority of *Corydoras* are bottom dwellers, there are two that swim freely in open water: *C. hastatus* and *C. pygmaeus* (often referred to as Pigmy Catfish). Both are small, reaching no more than 25mm (1in) in length and should be kept as a shoal of 10 or more to see them to their best advantage.

Another genus of the Callichthyidae is *Brochis*. There are three species currently available: *B. splendens* (the Emerald Catfish), *B. multiradiatus* and *B. britskii*.

Their care is the same as for *Corydoras*, but they are larger (to about 120mm – 5in), more boisterous fish which should only be kept in larger community tanks.

TALKING CATFISH

The Doradidae, or Talking Catfish, are often overlooked as possible tankmates for the community aquarium. This is a great shame, as there are several beautiful, if somewhat delicate, species which come into their own in the furnished aquarium.

Hassar notospilus and *Opsodoras stubeli* are two of the more delicate species. They require soft, mature, well filtered water and regular changes. In fact, if the water quality is not maintained, the barbels (which are branched in these species) will degenerate.

Their long conical snouts indicate that they like to sift through the substrate for food so, to avoid damaging their mouths and barbels, a fine substrate should be provided. Care should be taken when handling these fish, as their stiff fin spines can easily be entangled in the net.

***Corydoras habrosus* is suitable for the smallest community aquarium, reaching no more than 25mm (c.1in) when fully grown. This catfish likes the company of its own kind.**

***Otocinclus paulinus* can usually be found among the plants or on wood in the upper levels of the aquarium, particularly where there is a current from the filter return pipe.**

Both *Hassar* and *Opsodoras* have the single row of bony plates down their flanks, but in these genera, the backward projecting scutes (hard scales) are small. *Astrodoras asterifrons* (9mm – c3.5in) and *Amblydoras hancockii* (100mm – c4in) on the other hand, are more robust, having much heavier bony plates and more thorny backward projecting scutes. Their mottled brown coloration renders them almost invisible when they hide in crevices in wood or among the plants during the day.

The Doradids are most active at dawn and dusk when they feed on small crustaceans and insect larvae. In captivity, they will readily consume frozen foods and tablet foods.

ALGAE EATERS

Algae are always a problem in any aquarium and, although they can never be completely eradicated, there is one family of catfishes that will help to control them — the Loricariidae. Everyone must be familiar with the *Hypostomus* sp. (incorrectly sold as 'Plecostomus') which, although attractive when 75mm (3in) long, are not at all suitable for the planted aquarium when they reach 300mm (12in).

There are many alternatives. Various species of *Loricaria* and *Parotocinclus* are readily available, as are members of the

genera *Loricaria* and *Rineloricaria*, the Whiptails. These fish not only live on the substrate, but are also, more often than not, found high up among the plant leaves in the brightest part of the aquarium which, if you think about it, is exactly where they should be — up where the algae grow.

In the wild, the most luxuriant growths of algae would occur in brightly lit, shallow areas of water. Damage to the retina of the eye could result under such conditions, so it's not surprising to find that these species have developed a retractable iris lobe which covers part of the eye when they are in bright light, but which retracts completely during the hours of darkness. It is possible that these fish will spawn in the aquarium, so buy several of them so that you have a good chance of a pair.

Other members of the Loricariidae suitable for mixed tanks are *Peckoltia*, *Ancistrus* (Bristle-nosed Cats) and *Chaetostomus*, although all of these may become territorial, especially if they are about to breed, so ensure that the tank is large enough and that there are sufficient caves or other hiding places for them.

There will not be sufficient algae in the tank to maintain any of these creatures. Therefore, supplement this with lettuce leaves and peas. This will also help to prevent them from feasting on your prize plants! Tablet and vegetable flake foods are also accepted. The diet of many Loricariids includes insect larvae and invertebrates, so the addition of live or frozen *Daphnia*, *Tubifex* and Bloodworm is beneficial.

GLASS CATS

Overlooked and underrated among the catfish is the Glass Catfish, *Kryptopterus bicirrhis*. A large shoal of this free-swimming, midwater catfish makes an impressive display.

This catfish is built to swim. It has no heavyweight bony structures, such as armour plating or heavy fin spines (the very things that would help it keep stable on the substrate). Instead, its slim, lightweight body enables it to glide through the water just as well as any characin or barb.

Easy to maintain in the aquarium, these highly transparent catfish thrive on a diet of invertebrates supplemented with flake and frozen foods.

DEBAUWI CATS

Another shoaling catfish is the Debauwi Cat, *Eutropiellus debauwi*, which grows to about 10cm (4in). With this creature, it is essential to keep a shoal. A single fish will quickly pine away, as will two or three. Buy at least six, and feed them on live or frozen foods. Although they will accept flake, to see them at their best — a silvery white fish with three dark steel blue stripes — live foods are essential.

E. debauwi is often difficult to establish in the aquarium. The temperature should be in the region of 72-74°F (c22 – 23°C) and the water mature, well-oxygenated, well-filtered and with a reasonable flow. Tankmates

Always available and often overlooked, *Kryptopterus bicirrhis* thrives when kept in a shoal and fed live foods.

should not be too boisterous or these catfish will hide away. If under stress of this nature, they become prone to diseases, particularly White Spot. However, with a little patience and care, these fish will reward you by breeding in the aquarium, scattering their eggs over fine-leaved plants.

NAKED CATS

In recent years, a small Bagrid (Naked Catfish) has come onto the market, *Pelteobagrus ornatus*. A very beautiful little fish, its body is transparent with small black blotches. It acclimatises easily to aquarium conditions and is active for most of the day.

***Astrodoras asterifrons*, the Stargazing Dorad, is long-lived, given plenty of live food and good conditions.**

Once established, females can be easily distinguished by the presence of green eggs in their body cavity. Feeding is no problem as these fish are omnivorous, but to get them into breeding condition, live food is recommended.

FLAT-NOSED CATS

The smaller Pimelodids are always popular. Most are purchased without any regard to their feeding habits, though (their long barbels should give an indication of their requirements). Most, but not all, predatory catfish have long barbels which they use to judge the location of their prey before making a lunge at it. Fishes such as *Brachyrhamdia* sp. and the smaller species of *Pimelodella* are no exception.

During the day the Pimelodids lurk in a darker corner of the tank, but in the evening and at night, they are on the prowl for anything edible, and a resting tetra is just too good to miss. But, kept with fishes that they are unable to swallow, they make a delightful addition to the community tank. These catfish are omnivorous — worms, small shrimps, tablet foods, etc are all avidly consumed.

They are also tolerant of most water conditions but, if their barbels start to degenerate, it is a sure sign that you should have done a water change the day before! Regular water changes and good filtration will keep 'Pims' in peak condition.

UPSIDE DOWN CATS

From Africa comes the ever popular *Synodontis nigriventris*. Although *Synodontis* are commonly known as Upside Down Catfish, this is one of the few that are actually geared to spending their live inverted. Very attractively patterned, the ventral surface is dark brown and the dorsal surface lighter and more mottled. Thus, it is afforded camouflage from predatory birds when it swims inverted. Compare this to other species which spend their time the right way up — their ventral surface is lighter than the dorsal surface.

S. nigriventris likes the company of its own kind, so keep them in a group of six or more. During the day they spend their time inverted under leaves or pieces of wood and will make regular forays in search of food. They take dead insects and insect larvae from the surface, so mosquito larvae make an excellent food. They will also accept flake foods.

CLOSING REMARKS

So there we are, a catfish for all situations. Whatever catfish is chosen for the aquarium, the rewards will be great. Just observing their habits can give even the newest aquarist the opportunity of seeing something that may never before have been seen.

The thrill of waking up one morning, looking into the aquarium and seeing a clutch of eggs on the glass with a male *Loricaria* on guard, makes all the trouble taken worthwhile. More than that, it fires the enthusiasm and opens a new window on the hobby — breeding. Now that's something else . . .

The Upside-down Catfish, *Synodontis nigriventris* — so-called because it swims downside up!

News

Haddonstone Launch New Brochure

Haddonstone — leading suppliers of ornamental and architectural stonework — have produced a new perfect bound 88-page full-colour brochure to launch their 1991/92 collection.

The extensive standard range includes everything from urns, troughs, statuary and fountains, to balustrading, columns, cills, pier caps and copings. The company even produces chimney pieces, table supports and table lamps for interior applications.

Copies of the new brochure are available from **Haddonstone Ltd., The Forge House, East Haddon, Northampton, NN6 8DB. Tel: 0604 770711.**

Far East Distributor for King British

King British, manufacturers of aquatic and herpetological foods, treatments and hardware, enjoyed a highly successful Aquarama show (held between 27–30 June at the World Trade Centre in Singapore).

Top of their list of successes (besides being filmed for a TV documentary/video) was the appointment of **Outram Marketing Services**, one of the largest (probably *the* largest) pet supplies distributors in Asia, as distributor of King British products in Singapore, Indonesia, Malaysia and Thailand.

With the whole King British range already in place in Singapore — where there is keen interest from Koi keepers for King British's special Koi pellets and water treatments — Outram Marketing Services have been able to take on the distributorship with effect from 1 July.

For further details, contact **Keith** or **Paul Barraclough** or **Gordon Holmes, King British, Haycliffe Lane, Bradford, West Yorkshire, BD5 9ET. Tel: 0274 573551; Fax: 0274 521245.**

New Koi Centre For Bristol

Bristol City has a new aquatics centre retailing under the name of **Pond Life** and specialising in Japanese Koi and the accessories needed for their upkeep and wellbeing.

Situated close to the main Templemeads railway station in Bristol, Pond Life offers a wide range of top quality Japanese Koi, together with a selection of Comets, Shubunkins and Sarasas.

This family-run concern does not aim to be the cheapest, but does aim to offer the best value, added to a high level of service.

As **John Kempson**, the General Manager of the centre, states: "We looked at the garden centres already offering cold-water aquatics and decided that, with a few exceptions, the general level of service needed improvement. This is what we aim to offer."

Opening hours: Tuesdays through to Saturdays, plus Bank Holidays — 9.00 am to 6.00 pm. Sundays — 10.00 am to 4.30 pm. with late night to 7.30 pm on Thursdays.

Pond Life is situated at **45 St Lukes Road, Bristol, BS3 4RX. Tel: 0272 777729; Fax: 0272 710982.**

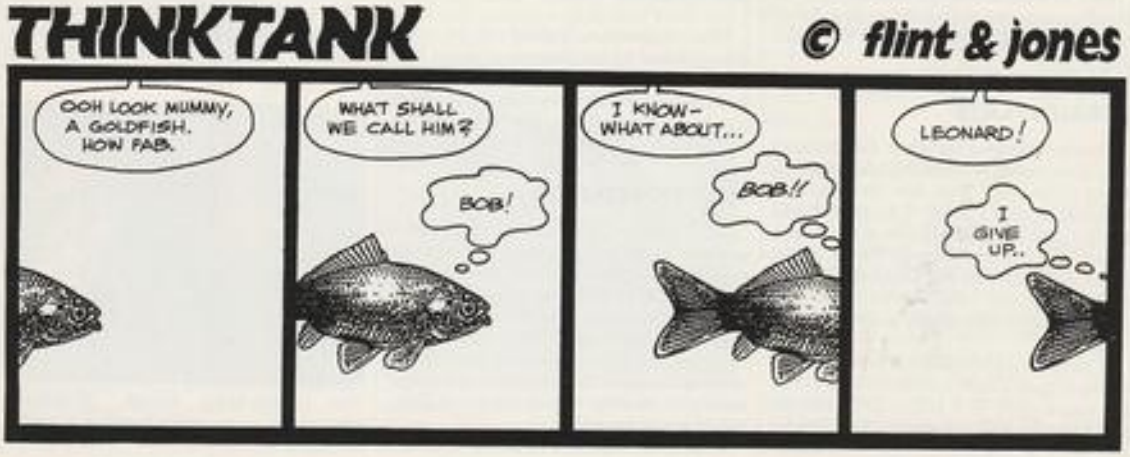
Free Ponds For Pleasure Offer

Well over one million households nationwide have already discovered the pleasures of pond keeping, not only for the beauty it brings to the garden, but also for the wildlife attracted to live and feed in this fascinating environment. Now, thanks to the makers of the new 'Aquarian' Floating Pond Food, creating a wonderful water garden of your own couldn't be easier.

'Ponds for Pleasure', written and produced by the experts at the 'Aquarian' Advisory Service, is a free 16-page A5 booklet giving a simple step-by-step guide to installing a garden pond.

The guide covers everything from the type of pond to buy and where to position it, to the different types of fish available, how best to feed them and how to maintain your pond season by season. Full colour photographs and illustrations throughout help absolute beginners avoid mistakes and achieve the very best results.

The comprehensive 'Ponds for Pleasure' guide is available free of charge to any reader, simply by writing to: **'Aquarian' Advisory Service, 'Ponds for Pleasure', PO Box 67, Elland, West Yorkshire HX5 0SJ** (please enclose SAE at least 6 x 9 in. with your application.)



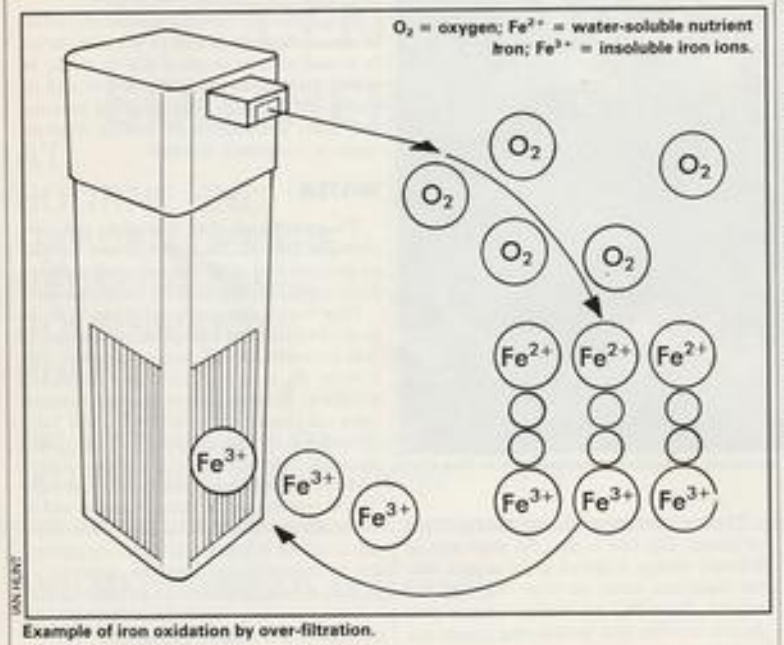
reaction between an acid and a base. Any acid can react with any base. Considering the existing number of different acids and bases, the possibility of reactions and, therefore, the number of different salts possible, is very large indeed. The specific type of salts and their ratio is very important for the biological balance of an aquarium. When these salts dissolve in water they are split by the water molecules into pairs of ions: a positive ion (Cation) and a negative ion (Anion). This process is known among chemists as *dissociation*.

A number of Cations are indicated with $^{2+}$ in the table on the previous page (= bivalent form), because plants can only absorb them in this form. Some ions can, of course, be present in different forms, eg. iron as Fe^{3+} — instead of Fe^{2+}, and manganese as Mn^{4+} — instead of Mn^{2+}, but it means that they are no longer high in iron (Fe^{3+}) contents!

Iron can, however, be kept water-soluble ('plant-accessible') in higher oxygen levels, if it is bound onto natural chelates. These chelates are certain organic compounds, which can 'enclose' various Cations so tightly, that they are no longer capable of chemical reactions of their own. They can't even be traced any more; they are totally 'masked'.

Plants can then absorb 'whole' mineral-chelates and transport them to their cell membranes, where the protecting chelates are broken up and the iron re-appears within the plant as available nutrient.

Most of the Cations in the water (see chart) are vital plant nutrients. Therefore, to use activated filter carbon in an aquarium that is meant to be heavily planted, is a biological nonsense as these vital plant nutrients will be taken out.



Example of iron oxidation by over-filtration.

'plant-accessible'. These ions are then often bound onto natural chelates (organic compounds) which plants can absorb in order to obtain the nutrients they need.

Example:

Iron exists as nutrient-iron Fe^{2+} only in waters with oxygen levels of less than 1 mg/litre. Because it is, in this form, water-soluble, those waters can contain up to several mg/litre of nutrient-iron. A typical example for this are groundwater springs; because they are poor in oxygen and rich in water-soluble mineral nutrients, they are frequently plant paradises.

Once the water has been exposed to the air it absorbs so much oxygen, that the Fe^{2+}-ions change to Fe^{3+}-ions and are no longer water-soluble. A similar process takes place in the aquarium, in particular inside the filter: the oxygen-rich water becomes rapidly void of nutrient-iron and the black-brown sludge, later found in the filter material, is extremely

② Gases

All natural, open waters constantly exchange gases with the atmosphere; mainly oxygen (O_2), nitrogen (N_2) and carbon dioxide (CO_2). All three gases are vitally important for the health of the fish and plants.

Oxygen

The oxygen content in the water is of great importance for a viable biotope. Not only is it needed for the respiration of fish, plants, bacteria and micro-organisms, but it also determines the availability of 'plant-accessible' nutrients in the water. A number of substances oxidise at a certain level of oxygen and the protective chelates are destroyed.

Let's take the iron-ion, for example: It is only water-soluble in its bivalent form (Fe^{2+}) or as chelate iron (Fe^{2+} EDTA). (EDTA is a chelating agent, as explained in 3, on the facing page, under Organic Compounds). In water with oxygen levels of more than 1.0 mg/litre iron is no longer water-soluble and becomes

Iron in the filter. Every filter medium will in time turn a dirty dark colour. The familiar brown sludge consists not only of dirt or food- and plant-remains, but mainly of iron, manganese and other trace elements. This iron, however, has become trivalent and is no longer of any use to plants and fish. Iron and trace elements precipitate relatively quickly in the aquarium and are then no longer soluble in water, therefore, no longer available as plant food. They have to be supplemented frequently.

trivalent (Fe^{3+}). Trivalent iron is no longer of any use to fish and plants. The same applies to most other plant nutrients. The idea of: "The more oxygen, the better", ie, vigorous filtration or even aeration via air-pumps, is biologically totally absurd in a well-planted aquarium.

Fish are accustomed to the oxygen levels in their natural habitat (averaging between 2.0 and 6.0 mg/litre) and higher O_2-levels through over-filtration or mechanical over-aeration are, therefore, for the fish just as detrimental as for the plants:

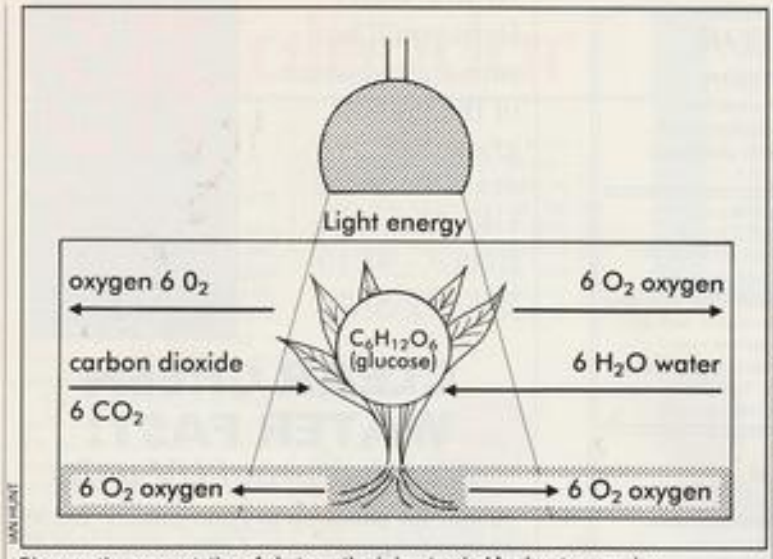
Firstly, fish take large quantities of water-soluble trace-elements and iron in through their highly developed skin system. If oxidised, due to high oxygen levels, these substances are no longer water-soluble and, therefore, no longer available for fish or plants.

Secondly, high oxygen levels cause stress and many fish ailments are stress-related. No physician would approve if the air we breathe were to be constantly, and over a long period, enriched with oxygen well above the natural 21% we are accustomed to in our atmosphere.

Thirdly, high oxygen levels increase the pH-value, with the accompanying risks of ammonia poisoning (see under ammonium).

No aquarium should have more than 8.0 mg/litre of oxygen as, above this level, the chelates, which normally slow down the oxidisation of nutrients, are very quickly destroyed. In the really well planted aquarium the oxygen *must be produced by the plants only*. I must be quite clear on this: under such circumstances, any mechanical aeration, air-pump or otherwise, is, in my opinion, not only superfluous, but totally adverse to plant growth and the health of the fish.

By utilising the light, green plants can synthesise vital organic substances out of various nutrients. This rather complicated



Diagramatic representation of photosynthesis in a tropical freshwater aquarium.

process, known as photosynthesis, is the basis of all life on earth. Simplified, one could say: carbon dioxide and water are, under the absorption of light energy, transformed into glucose (sugar) and oxygen:

Simplified Summary Equation —

$6\ CO_2 + 6\ H_2O \xrightarrow{\text{Light energy, Chlorophyll}} C_6H_{12}O_6 + 6\ O_2$

(Carbon dioxide) (Water) (Glucose) (Oxygen)

The plants have at this point no further use for their 'waste product' oxygen and they release it over the leaves into the water and over the roots into the ground. (See **Krause, H-J** (1990): *Handuch Aquarienwasser.* **Bede, Kollnburg,** page 95.)

The most exuberant plant growth is frequently found in those aquaria, which have an astonishingly low oxygen level. The reasons are: better nutrient supply, easier emission of the 'waste' product', oxygen, and a better internal 'climate' for photosynthesis. The optimum O_2-level for plant growth seems to be between 3.0 mg/litre (morning) and 6.0 mg/litre (evening). (Reference: **Krause, H-J** (1988): *Oxygen and its influence on the Growth of Aquarium Plants, 2nd Intern. Congress of Aquariology, Monaco.)*

Carbon dioxide

Wherever oxygen is consumed, there is carbon dioxide produced, eg, fish produce, depending on species, size, temperature, etc, approximately 15 to 40 mg CO_2 daily for every 1 gram of body weight. Plants constantly produce CO_2. During the day the process is hardly noticeable due to the oxygen production during the photosynthesis. But, all the same, plants daily produce approximately 5 mg CO_2 per 100 cm^2 (4 square inches) of leaf size.

Carbon dioxide CO_2 is also produced inside filters during the 'oxidative' cleaning process aided by aerobic bacteria. The breakdown process, for instance, of 1 cm^3 (approximately 0.25 grams) of flake food produces near enough 700 mg CO_2!

Bacteria in the substrate of every aquarium produce large amounts of CO_2; the substrate-water frequently contains 100 mg/-litre of CO_2. (This might come as a surprise to those aquarists who still argue: "I have always grown plants successfully and never used any CO_2.")

The main consumers of CO_2 are the aquarium plants themselves, as carbon dioxide is their most important nutrient of all (about half of their dry matter is carbon!). Plants need approximately 15 mg of CO_2 per 100 cm^2 of leaf size per day. They also draw a considerable part of their needed CO_2 through their roots from the substrate water and transport it to the 'centres' of photosynthesis.

In a well-planted aquarium, the demand for CO_2 is also much higher than the amount that can be supplied by the fish and other CO_2 producers. That's why additional CO_2 fertilisation is so important to meet the requirements of the plants. Some plant species, eg *Elodea* and *Myriophyllum*, can assimilate the CO_2 out of the 'solid' bicarbonates (HCO_3^-) by splitting them into CO_2 and OH-ions. But, in doing so, the plants use a lot of their energy reserves, which eventually weakens them. Besides, by freeing the OH-ions, the pH-value in the water can increase up to 11. This has to be avoided under all circumstances by constantly fertilising the aquarium water with sufficient CO_2.

The CO_2 content of water should, ideally, be 35-45 mg/litre. (The average daily need for a 100-litre aquarium, at a temperature of 25° C (77°F) is 1.5 grams of CO_2.). This will make it clear what enormous damage to plants over-filtration (ie, over-powerful filters and over-vigorous spraybars which turn the tank volume over more than once every hour, causing strong water movements, aeration and surface turbulence) can cause to the biological balance in tropical freshwater aquaria in general, and the plants in particular. The water surface of the aquarium should be like a pond, since, under certain circumstances, a strong surface turbulence can very quickly reduce the CO_2 level in the aquarium to less than 0.5 mg/litre.

③ Organic Compounds

Organic compounds are, chemically speaking, frameworks of carbon atoms; these frameworks tend to bind onto themselves other elements, in particular hydrogen, oxygen, nitrogen, sulphur and phosphorus. The possible combinations are extraordinarily multifarious, and the estimated number of existing different organic compounds tops 5 million!

Natural waters contain large amounts of organic compounds. In fact, tests have shown that there is 10-20 times more dead organic matter dissolved in the water than there is present in the live bio-matter (micro-organisms, fish, plants). Organic compounds are, basically, the result of decomposing waste matter. In the aquarium, this waste matter consists, for instance, of dead micro-organisms, dead plant matter and, mainly, of food remains and fish excretions.

A certain amount of organic substances in the aquarium water is necessary for the health of the fish, though. Fresh and 'clean' tapwater is very irritating and aggressive to the delicate gills and membranes, this very often causes ailments and even death in newly-installed aquaria (the so-called New Tank Syndrome).

Aquarium plants, too, appreciate a certain amount of organic substances, as many of them act as natural chelates and protective carriers for oxidisation-sensitive nutrients; they can even act as catalysts during the bacteriological reduction process to re-activate nutrients and make them water-soluble and 'plant-accessible' again.

For instance: in an established and well run-in tropical freshwater aquarium, the addition of a small amount of organic and natural citric acid can increase the nutrient-iron contents noticeably; a similar amount of hydrochloric acid, of course, would have disastrous effects! Therefore, the addition of only one chelating agent (ie, organic acid) can greatly stimulate plant growth. Much better suited than citric acid is, for instance, Ethylen-diamintetra-acetic (EDTA) which is present in nearly all aquarium plant fertilisers.

However, natural chelates (present in organic compounds) are biologically far superior to the synthetic ones. This makes it clear that water, which is, in hygienic conditions, 'clean' and does not contain organic compounds (drinking water) cannot be classed as ideal aquarium water.

It follows that very strong and intensive filtration in tropical freshwater aquaria, which, by increasing the oxygen level, destroys the chelates very quickly (see also under: **Salts**), can cause a lot of problems. It impedes plant growth as vital plant nutrients (ie, Iron, etc) are quickly oxidised and filtered out. In fact, most home aquaria are vastly over-filtered! The chelating effect of organic compounds in natural tropical freshwater biotopes is examined and explained in depth by **Steinberg, C** and **Stabel, H** (1978): *Untersuchungen über gelöste organische Substanzen und ihre Beziehungen zu Spurenmetallen.*

(TO BE CONTINUED)

Koi Calendar

By David Twigg

RECENT EVENTS

Northampton Section

At time of writing, I have attended two Koi shows. The first was the **Northampton Section BKKS Closed Show.** A small 'private' show, held in the superb garden setting of Section members **Chris** and **Angela Hanley.**

This event was marred by the rain, which relented for only the odd moment on occasions during the day. It was, however, as they say "lovely weather for the fish!" It never ceases to amaze me how a common enemy (rain) brings out the best of humour from people.

The team of judges, led by **Alan Rogers,** huddled under umbrellas to make their selections from the 98 Koi entered. Their choice of **Grand Champion,** a Sanke belonging to **John Beattie,** must have been difficult, as there were some very nice fish to choose from. A GinRin Showa belonging **John Phipps** certainly caught my eye.

The most successful entrant was **Peter Robinson** who picked up seven 1st prizes and the Judges' special award (the Eric Almond Trophy) as well.

Congratulations must go to Chairman **John Byles,** in his first year in that office, and his enthusiastic team, far too numerous to mention individually, for putting on a grand show despite the torrential rain.

large two-day show at Tatton Park heralded the start of summer for me. When I wrote in June's **Koi Calendar** that the Northern Section had booked the sun for the last two days of June, I didn't realise just how right they were to be. Chairman **Tony McCann** won't let me in

TATTON PARK

Pete Waterman (left) presenting Greg Peck with his Grand Champion award at the Northern Section's Open Show held at Tatton Park.

DAVID TWIGG

Northampton Section: John Beattie's Grand Champion Sanke.

Northern Section

By contrast, the second show I visited was the Northern Section BKKS Open Show. This on his secret powers, but whatever they are, they worked well for the Northern Section that weekend.

A total 341 Koi, a new record for the Northern Show, were entered, and a team of seven judges led by **Nigel Caddock** were kept very busy by this large selection of high quality fish. A Kohaku owned by **Greg Peck** emerged as **Grand Champion** and a Sanke, owned by **Peter Waterman** of **PWL Fish Industries,** won the title Best Dealer (Mature Koi).

The section membership stand was kept busy, not only signing up new members, but selling what must be the best value for money **'Koi Care'** video that money can buy. I reviewed Part 1 a couple of months ago but will have to wait a while to see Part 2, as by the time I got to the stand, all 67 copies available had been sold!

Details of these videos from **Mike Donlan** on **061 643 9107.**

In addition, 15 dealers from around the country attended with a wide range of fish and dry goods on sale. My wife particularly liked the Craft Fair which housed a good selection of stalls selling jewellery, paintings and other craft items.

I had a great day out and wish that I could have stayed longer for the presentation of what can only be described as a fantastic selection of trophies. Well done Show Chairman **Mike Donlan** and his team.

Brit Koi

On 12 July I attended the formal opening of the new 4000 sq.ft **Brit Koi** premises in Syon Park, London (opposite side of Thames to Kew Gardens). I have visited Brit Koi before at this new venue, but not seen the finished product. Hammers, ladders and hosepipes seemed to be everywhere and **Tony** and **Andrew** were always in a hole! Not now, though; all is complete and is crowned by the magnificent 23-thousand gallon Eric Devis pool. This pool (34ft across) has a 23ft plate glass front and raised balcony so visitors get both unique and traditional views of some wonderful Koi.

All 12 pools (50+ thousand gallons in all) are made from a relatively new material to Koi keeping, Medium Density Poly Ethylene. This material, which is 1 mm thick, comes on enormous rolls and is heat welded in situ to the shape of the pool. It has a hard surface and should be easy to keep clean. I am green with envy!

Apart from being a specialist Koi retailer with an excellent range of Koi-associated dry goods, Brit Koi is offering a wide range of water plants and a pond construction and landscaping service, Japanese style

DAVID TWIGG

Gathering of friends at Brit Koi's official opening.

being the speciality, of course. As part of the Syon Park complex, Brit Koi is developing a Koi Information Centre which will provide visitors with a thorough history of our hobby and a pictorial guide to the many varieties of Koi.

Brit Koi can be contacted on **081-847-4730.**

JOBS FOR THE MONTH

The evenings are drawing in now and we will be finding water temperatures dropping. Keep an eye on the weather forecast and adjust feeding accordingly.

Have you arranged for a winter cover for your pond? If not, it would pay to make a start on the design before it gets too cold. For the last two winters, I have used a 'polytunnel' manufactured by Citadel which, apart from being quite cheap to buy, is excellent for giving me access to my Koi even when the gales are blowing and the rain is falling.

All the usual pond chores can be carried out without any difficulty, and in reasonable comfort inside these polytunnels. Fish can also be seen clearly, and the biggest bonus is that I am minimising my heat loss to the atmosphere, hence water temperatures stay higher longer, and are far more stable. Although my tunnel is of conventional design, Citadel will assemble parts to your requirements of size and shape (even a vertical-sided tunnel is available now). Citadel can be contacted on **0926 640196.**

WHAT'S ON IN SEPTEMBER

1 Shows

Three shows advised again this month.

1 — Crouch Valley Section BKKS 'Japanese Style' Open Show at Prince Avenue Junior School, A127 Southern Arterial Road, Southend-on-Sea. Show opens at 10 am. Admission £1.50, with children and car parking free. Contact Alan Ward on 0268 543600.

1 — Avon Section BKKS 'English Style' Closed Show. Park Garden Centre, Over Lane, Lower Almondsbury, Bristol. Free entry to this show which is under cover, has plenty of free parking, the Tetra stand, decorated in Japanese style and open from 8.30 am.

7/8 — Mid-Somerset Section BKKS 'English Style' Closed Show. Showerings Pavilion, Bath & West Showground, Shepton Mallet, Somerset. Show organiser, Alan Purnell, tells me that this is their biggest yet, and will be the largest show in the South & South West. Apart from the six Koi dealer stands and craft stalls, Farmer & Clark (Bristol) Ltd., (Koi insurers) are attending. The show's sponsor, Bristol Water, is supplying water for the vats. This show is part of the Countryside Cavalcade, and just about every event and exhibition of livestock possible is held. Heavy Horse Championships, fur & feather, aerial, vintage and traction displays are designed to make this an attractive day out. Over 6000 people attended in 1990. Contact Alan on 0458 72132.

2 Meetings etc

5 — Middlesex & Surrey Borders Section BKKS. Guest speaker is Keith Quick on *Purchasing Koi in Japan*. Contact Steve Gould on 0932 848147.

11 — South Hants Section BKKS monthly meeting at the Denmead Church Hall, Hambledon Road, Denmead, Hants at 8pm. Details from Tony Price on 0705 261085.

15 — Middlesex & Surrey Borders Section BKKS. Koi Auction. Contact Steve Gould on 0932 848147.

15— Northern Section BKKS. Monthly meeting entitled *Back to Basics*, at St James Hall, Pendleton. Contact Tony McCann on 061 794 1958.

18 — Crouch Valley Section BKKS monthly meeting at Laindon, Basildon. A guest veterinary speaker. Contact Allan Ward on 0268 543600.

18 — Mid-Staffs Section BKKS. Monthly meeting at 8 pm, RNA Club, Elmore Green Road, Bloxwich. For details of what's on, ring Joan Rutter on 0543 876699.

NOTE TO SECRETARIES

Secretaries, please don't forget; if an event of yours is missing from this calendar, or if quoted details are insufficient or incorrect, then please write to me at your earliest convenience via the editor at 9 **Tufton Street, Ashford, Kent, TN23 1QN.**

Bob couldn't wait to tell his friends he'd been bought by a glass blower.

Large appealing eyes and a friendly face — just two of Whites Tree Frog's many desirable features.

FROG APPEAL AT ITS BEST

When it comes to endearing qualities, few species can beat Whites Tree Frog, as **Paul Donovan** explains.
(Photographs by Les Edmonds)

It is hard for the layman to comprehend that some reptiles and amphibians are not quite as 'gross' as they would like to believe. There are many examples I could choose with which to dispel this belief, but none, I feel, typifies it quite as successfully as Whites Tree Frog, *Litoria caerulea*.

If you were to make a child's toy based on a frog, everyone would say, "Oh, isn't it cute?" And that is exactly what this frog is. It has such endearing qualities, and such an appealing face, big black eyes and broad compelling smile, that one could easily separate it from all other frogs I know.

SKIN WITH A DIFFERENCE

A further factor has to be the appearance of the skin. Most people who have phobias towards a specific group of animals, do so in part, or totally, because of their appearance. The common phobia with reptiles and amphibians is due largely to the belief that their skin is covered with 'slime' — an unjust myth which has been passed down from generation to generation. During my years working in a reptile house, I took great delight in dispelling this myth. The fact that Whites Tree Frog has a bright green or bluish-green 'porcelaine-like' skin, in contrast to the 'slimy' look of most other frogs, helped me greatly in doing so.

Touch this frog and it does not feel as one would expect it to, because its skin takes on very much the texture of human flesh. It is surprising how a single species can change one's views towards a much larger group.

OTHER FEATURES

Litoria caerulea originates from Australia and New Guinea, and, because of the restrictions placed on the export of Australian fauna and flora limiting what comes out of the continent, it is thanks to a dedicated band of breeders that those wishing to get their hands on these frogs can do so.

This is a powerfully built, arboreal frog which attains a length of some 10cm (4in) and, as with other frogs, has a vocal 'song'. It also shares several features common to other tree frogs, in particular the large circular, sticky toe pads which adhere to surfaces like chewing gum.

I know experienced herpetologists won't do this, but if you have to remove one of these frogs from a surface (particularly glass), *never* forceably pull them off, otherwise damage to the feet and legs will occur.

You may very well deduce from its appearance, that this is not a particularly active frog. In fact, when Charles Dickens saw this frog he wrote, "Can I see thee lying on a log, expiring frog?"

This is quite a natural conclusion to come to, as when approached, unlike other frogs, this species does not immediately take flight, but either stays in situ, or has a typically slow and easy-going nature. If we were still in the 1960s, we would probably call Whites Tree Frog a "cool dude"!

As with other reptiles and amphibians, Whites Tree Frog sheds its skin. This is an amusing process to watch, as the frog rolls the skin off its body with the forelegs, in an action which resembles a cat washing its face.

Koi Talk

By John Cuvelier

WINTERY SUMMER SPAWN

We have a kind of unwritten agreement in our house which runs along the line of: In the winter I decorate the house, while the summer is taken up by playing in the garden and pools. Thus, I spent the whole of June '91 decorating the house! Need I say more?

That's more or less my last word about the weather, save to say that my Koi finally spawned five weeks later than usual, but the rain relented just long enough for me to finish off my hatching pool, the result being shown in the picture, complete with various types of spawning media.

JOHN CUVELIER

Hatching pool with egg-laden spawning media.

We did appear to have a much higher than usual percentage of infertile eggs, so the 'body count' will, I fear, be very low this year. I can always blame it on the weather!

KOI SHELTER

There must be countless horror stories going the rounds about the so-called backyard Koi dealer 'cowboys', only in it to make a fast buck. Undoubtedly, some of these stories are true, but there's always the exception.

Having learned of a small 'private' outlet opened only some twenty miles from home, we set off one afternoon for a nose around, but fearing the worst, in spite of all the reassuring noises from various friends who had already visited this particular spot.

The **Koi Shelter** is situated in a tiny hamlet of Llansovy just a stone's throw from Usk in Gwent. The layout consists of three tanks in a brick garage, each of which is separately filtered and a medium-sized pool in the garden for the larger Koi.

What immediately impressed us was the pristine condition of all the Koi on display and, more importantly, the absolute cleanliness of the premises and equipment. This is one place where you can have every confidence that whatever you buy has been properly cared for and quarantined.

The Koi are around middle class Japanese and top class Israeli, which means affordable to peasants like me, and I must admit to going away with a nice white Matsuba and a white Purachina, both without a blemish of any kind. While there aren't too many Koi on sale, those that are have obviously been carefully selected and are good. Anyway, I'll say no more apart from recommending a visit should you be in the South Wales area.

The full address is, **The Koi Shelter, 4 Church Lane, Llansovy, Nr. Usk, Gwent. Tel. 02915 383.** He's open every day, bar Thursday.

HIGH TECH SLUDGE

My mentioning of 'High Tec' media and the need for efficient pre-filtration which appeared in the June issue, appears to have struck a nerve in certain quarters, for which I humbly apologise as I never like causing pain to anyone, however vested their interest!

I can only reiterate my contention that, however efficient the medium, unless most of the suspended solids are removed prior to biological treatment, there will inevitably be a build-up of sludge which will block media pores and, irrespective of bacterial activity (be it aerobic or anaerobic), the time will eventually come when the filter throws in the towel.

Taking the argument a little further, let's have a look at a 'system'; mine as it happens. My pumps are pushing pool water through the filter at about 2000 galls (nearly 9,100 litres) per hour, 24 hours per day, seven days a week. You don't need to be a genius to work out that that's a lot of water, 48,000 galls (nearly 22,000 litres) every 24 hours. This water contains, in addition to the waste products from upwards of 100 Koi, ranging from large to tiny in size, all the natural products which evolve in any body of water, such as single cell algae, bits of blanket weed, living and dead insects of all descriptions etc. etc.; the list is endless.

Are we seriously to believe that this great quantity of solids can be left to bacterial activity to dispose of? Simple logic should give us the answer and, as far as I'm concerned, does! Anyway, this column is not a discussion/debating medium for endless argument such as found in other places, so let's drop the matter now while the going's good.

BAD ROLLER NEWS

I heard some very sad news the other day from **Dave Woodward** from up in Birmingham. For those of you who don't recognise the name, Dave is the chap who, for the past seven years or so, was the sole source of hair rollers in bulk for use in filters (and of late, those wonderful lengths of redundant car wash brushes as spawning medium). Unfortunately, Dave informs me that, owing to a change in policy and attitude at the factory where the rollers are made, it is now so awkward to obtain them in small quantities that it has ceased to be a viable operation.

There is, I understand, still a possibility of obtaining them in larger quantities, but what constitutes larger quantities I just don't know. A call to Dave on **(021) 4445186** will probably get you an answer.

They do say that, as one door closes, another door opens. I've been given to understand that Flocor are now producing a smaller version of their ring medium more suitable for domestic use. I've always had some regard for Flocor as a medium, apart from its great bulk which required filters of almost industrial proportions, so this development should be an improvement.

Anyway, those of you who were clever enough to listen to my ramblings and stocked up with hair rollers, hang on to them, as they could well become collectors' items within the Koi keeping world!

HERON CONVICTION

On Central Television recently, there was a piece about a Koi farmer who was convicted and heavily fined for shooting a heron which was decimating his stock. I was always under the impression that, where an individual's livelihood was concerned, there was a dispensation allowing the humane destruction of such predators. Have I been wrong all these years?

If the gentleman in question happens to read this article, please get in touch as I'd love to visit you and have a closer look at those fabulous Koi of which we were only given a fleeting look. I don't propose to name the area, for obvious reasons, but I'm sure he'll know who I mean, and it's within my restricted area of travel.

MORE KOI TALK FROM JOHN CUVELIER NEXT MONTH

A DIFFERENT KETTLE OF FISH

David Franklin got into 'big-fish-keeping' by mistake. Now, he's glad he did, and offers some personal thoughts on the joys, challenges and tribulations that lie in store for anyone contemplating joining the Oscar fraternity

I bought my first tropical fish tank at the tender age of fourteen, and can remember happily spending hours setting it up. After approximately seven months, everything was going fine. My Neons all swam in an electric shoal; my *Corydoras* peacefully roosted around in the gravel; and my coral-red Platies dramatically added a vivid splash of colour. Altogether, my aquarium represented a successful ecosystem, in which the plants and fish co-existed, side by side, without a hint of mismanagement.

But, as I studied the tank, I began to think that something was missing. Gradually, the answer came to me — all the fish were small. There were no medium-sized fish whatsoever, none whose contrasting sizes would give added interest to the observer. I queried my dilemma for a while, and decided to pop down to my local garden centre to see what I could find.

I quickly strode down there, dreaming about that final finishing touch that would make any one of those aquariums down at Seaworld look like a mere goldfish bowl in comparison. I eagerly began surveying the numerous tanks, jumping up to see into the top tiers. I wanted something special that would patrol my tank with an air of authority.

Rivetting sight

Suddenly, they caught my attention. I zoomed over to the tank, my eyes glued to the two perfect fish inside. They were about two-and-a-half inches long, and a marvellous marbled black colour, continually swimming about, with big knowing eyes that followed your every action begging, "Take me home!"

Recalling I'd read somewhere that healthy fish have healthy appetites, I dropped in a couple of food pellets that were lying around. The two fish immediately jostled for position, zeroed in on the pellets and greedily gulped them down, before returning their rather disconcerting, unblinking stare to me, with what now seemed like a slightly altered message, "Feed me more and *then* take me home!"

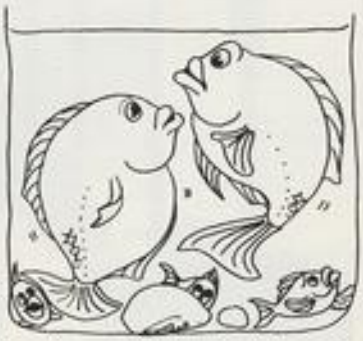
I realised I did not even know what they were called, so I hastily examined the tatty piece of Dymo tape stuck on the top left hand corner of their temporary home. Oscars. £1.75 ea. A small fortune to someone like me, but as I desperately turned out my pockets, I found I just about had enough (if the assistant would accept a couple of kilos of coppers). Eagerly I took my prize home. My tank was about to be completed!

Even today I'm not sure who was more to blame; the assistant who failed miserably to inform me that my two fish were going to grow to a foot long (which at that time was about one-third of my size), or me for naively assuming that they would stay the same size for the rest of their days. So, to my horror, approximately two months after I had bought them, I found this fact out.

Major problem

What was I to do? Killing the assistant might prove gratifying, but I quickly realised that I needed to do something much more practical, otherwise I was going to end up with an empty tank and two gorged Oscars whose bellies would make Cyril Smith's look quite petite.

Getting rid of them seemed to be the obvious answer, and one ignorant mate, who would only show interest in a fish if it was on a plate next to chips, suggested that the toilet was as good a place as any. However, explaining to him that I had grown very attached to them already, proved to be a pointless exercise. They endlessly fascinated me (even more than my solitary Coolie



Loach who now patently refused to come out) and I simply did not want to part company with them.

So, the only other alternatives open to me were either to perform some pioneering transplant surgery on them to convert their gills to lungs and, subsequently, keep them in my vacant gerbil cage, or perhaps less messily, to buy them a big new tank all of their own.

But that more realistic option presented one major problem. Being fourteen years old, I did not really have immediate access to the money required. My capital was all tied up in property, stocks and shares, and valuable art treasures(!?), and this would take time to convert into the hard cash needed. I did have a paper round, but I figured that I'd have to deliver about three thousand papers that afternoon to raise the kind of rapid money that was called for.

That left only one option: Dad. I pleaded with him for the money, swearing I'd pay it all back, and even did the washing up twice in one day to show my sincerity, and eventually under non-stop pressure and the threat that I would hold him morally (and legally) responsible for any missing-presumed-swallowed fish, he cracked and paid up. Hastily, the new tank was set up, where the Oscars grew and grew . . .

Centre of attention

Now, they're the centre piece of my bedroom. Although they stand fairly close to my original tank of community tropicals, invariably, visitors are always drawn to the Oscars with comments like, "Ooh, aren't they big?" or "Ugh! Aren't they ugly?", or even, "That one looks like someone I know."

Whatever the remark, people spend far more time gazing into the Oscars' home than they do the other. While I do not want to belittle all the 'bread and butter' tropicals, and certainly do not want to sound callous, I have found that these smaller fish rarely have any personality to speak of.

When your Neon or the like dies, you don't really grieve for it; you're more concerned with the factors that caused its death. Then you mechanically go out and replace it with an identical replica to get the shoal back to its norm. With larger fish, it is very much a different story, for fish, such as a large Jack Dempsey or Koi, can become firm friends and real characters, in a way that little fish simply cannot.

Although I am sure that some aquarists would disagree with the above statements, I have consistently found that Big Fish, such as my favourite Oscars, are very much a different kettle of fish (pardon the pun) to,

for example, a Harlequin. Oscars can recognise you, swim up to your hand for a stroke, or happily take food from your fingers. In short, they come about as close as can possibly be, for a fish to be considered a 'real' pet, and not just a decorative addition to your home.

I recently read that one aquarist trained his Oscar to jump through a hoop when he held food above the water. If I tried to do that with my monsters, knowing their enthusiasm, I'd end up with either: (a) a black eye; (b) bite marks up to my elbow; (c) claiming on the house insurance for flood damage when he relanded; or (d) an Oscar embedded in the ceiling.

Great, messy eaters

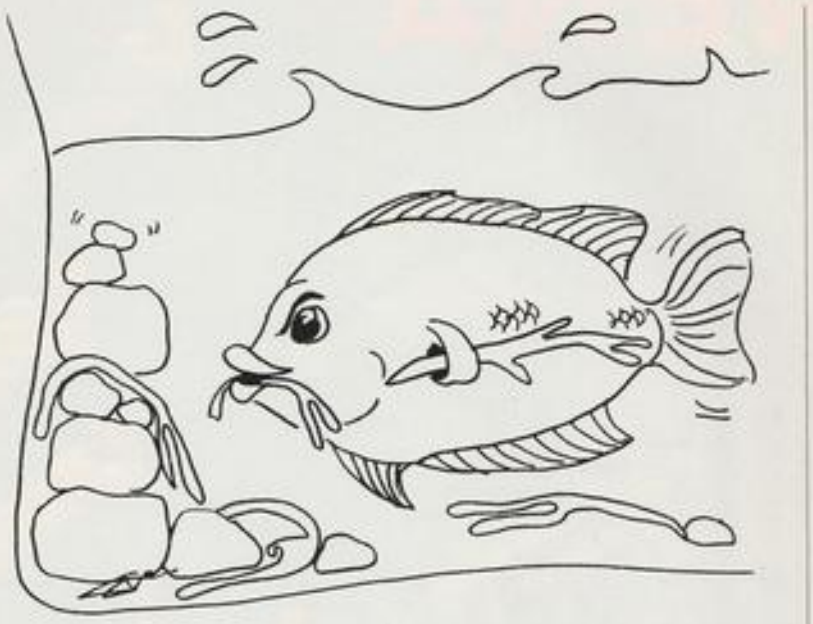
Big fish usually love their food and Oscars are no exception. Indeed, they are quite keen to have a go at things even larger than themselves. The downstairs cat often comes up on the pretence of wanting a bowl of milk or some similar wheeze, when, in reality, what it really wants to do is spend a couple of hours watching all the mouthwatering fish swim tantalisingly by in the community tank. It occasionally flicks out a paw, confused by the wall of impenetrable glass, its tail idly swishing about. And then across the other side of the room, there are the Oscars, eyes glued to (in their opinion) the quite edible cat, tails swishing in unison and frustrated by the glass. I'm convinced that the cat is aware of this threat to one of its nine lives, and always gives the Oscar tank a wide berth.

From day one, they have constantly begged me to shovel food down their throats, be it large or small, piscine or feline. Being as weak-willed as I am, I usually comply with their demands. With the variety and amount of different meats in their diet, they probably eat better than me (especially as I'm a poor student!). Of course, one potential problem of continually feeding high-protein food is the dangerous effect that it can have on water quality. Oscars are not among the most graceful of diners. In fact, they chomp and spit out their food so much that they can make a chimps' tea party look distinctly sophisticated.

Bearing in mind the type of food and the messy eating habits of large fish, it obviously means that a good filtration system is required. Fortunately, there is a wide choice of filters and systems available, but not all are suitable. For example, an air-driven sponge filter in an Oscar tank is not really much use. Undergravel filtration is much more suitable for day-to-day filtering, and, if used in conjunction with a power filter and gravel tidy, can be an excellent method.

Tank redecoration

Unfortunately, big fish often have the annoying habit of suddenly deciding that they don't like the way you have set up their tank and, therefore, want to rearrange it. Holding an argument with a belligerent Oscar intent on smashing its home up, about man's intellectual superiority regarding aesthetics and practicality, holds no sway when it comes to keeping the interior of the aquarium the same as it was originally designed.



Oscars are particularly adept at rearranging things to suit themselves, and if one wants to move something, then it usually will. So one day, you might come home and find half-a-pound of gravel on the floor and/or a heater wedged in the hood.

Big fish normally do not get on with plants either. Nice, delicate, pretty plants are a definite no-no. If they're not being uprooted, they're either being eaten, torn apart or simply sat on. If you want to see a piscine lawnmower in action, then put some bunches of *Cabomba* in with a full-grown Tinfoil Barb. The only way to stop an Oscar taking an active interest in its surroundings is to take it out, stuff it, and then put it back in, but somehow that's rather a defeatist approach . . .

Ultimately, you have three choices, which are: (a) no plants; (b) some sort of Triffid that can fight back; or (c) perhaps best of all, plastic plants. These days, this last choice can be a wise one, as plastic plants are now extremely realistic and durable, and a handsome addition to any tank. Even so, it is still best to take the precaution of gluing them down with a little rubber silicone adhesive. As usual, a small bit of planning beforehand saves a great deal of time and reduces a lot of future destruction.

Tank mates

Keeping companions with big fish can also present its problems and is sometimes best avoided, but if you want to add some extra colour and movement, the larger barbs are often a good choice. If you are in any doubt about a prospective tank mate, make sure you use some commonsense and seek advice (unless you're fourteen years old, of course!).

Don't blame a fish for exercising its natural behaviour if it decides to attack a fish put in with it. However, a fair-size 'Plecostomus' catfish will usually make an excellent companion, as it will do some 'hoovering up' on the tank bottom, and control normal algae which may run rampant when there are no live plants about soaking up the nitrates. A further benefit is its armour-plating, which can probably withstand an attack from an Oscar in a bad mood.

Netting big fish can also be a hazardous pastime. Unless you have a penchant for very wet wallpaper, this operation (in my opinion) is best avoided. It seems to be a lot less stressful to the fish (and much less wet for you) to guide it gently into a submerged transparent plastic bag, and then lift it out.

New avenues

Well, these are a few of the problems you are likely to encounter if you decide to opt for some big fish. Perhaps most aquarists end up with large fish through accident (i.e.) like me, they unknowingly buy a fish that will eventually (or flipping quickly!) outgrow its tank and welcome. I was lucky in that my mistake worked to my advantage, and opened up a whole new avenue of fishkeeping for me.

Hopefully, then, the point of this article is quite clear. Keeping ornamental fish should be a constant learning process and, above all, a challenge. You can only broaden your horizons through practical experience. Don't let your hobby become stale and taken-for-granted; channel your energy and imagination into a brand new field.

If you are tempted to take my advice, then I wish you the best of luck. All I ask is that you think a little, read a little and plan ahead. With a small amount of readjustment and perseverance, you, too, can reap handsome dividends from this life-long hobby of ours. And, do you know my only regret about deciding to keep those Oscars when I was a young boy? I'm still paying dad off!

Books

Aquarama Proceedings, Vol. 1

(First International Aquarium Fish and Accessories Conference)

Edited by: John Dawes
Published by: **Academic Associates Pte Ltd** (see address at end of review).
ISBN: 981-2639-0
Price: S$59.95 (Singapore dollars), plus S$25.00 postage and packing.
(Approximate exchange rate: S$2.90/£1).

In aquaria and at Research Institutes throughout the world, studies are being conducted on the biology, health, genetics and nutritional requirements of ornamental fish. Unfortunately, much of this work is not made available to hobbyists or those involved in the ornamental fish industry.

At the **First International Aquarium Fish and Accessories Conference,** held in Singapore during **Aquarama '89,** many of the leading authorities in this field gathered to discuss and exchange views on their areas of expertise. The **Aquarama Proceedings — Vol. 1** — edited by *AGP* editor John Dawes, contains the best (and majority) of these papers. Inside its pages there is a wealth of original information, making it essential reading for anyone with a serious interest in our hobby or trade.

Conference proceedings, by their very nature, tend to contain papers which summarise each author's area of expertise and include original data. The **Aquarama Proceedings** are no exception. Within this volume there are sections devoted to Maximising Market Opportunities; Export/Import issues; Health, Nutrition and Reproduction; Water Management and Public Aquaria; New Developments and a Hobby Section. Each paper is not a comprehensive guide to the subject, but does provide 'state of the art' information which is not available elsewhere.

Of particular interest are two papers by workers from the Department of Zoology at the National University of Singapore on the packaging of freshwater aquarium fish and Clown Fish (*Amphiprion ocellaris*). These studies identify the water quality and behavioural changes which occur during transportation (eg a 120 x increase in ammonia concentration and a 2.0 unit pH drop in seawater). In freshwater there are also suggestions as to how such problems could be avoided using clinoptilolite to absorb ammonia, a tris buffer to maintain a constant pH and an anaesthetic to reduce stress and oxygen absorption.

There are also excellent papers on immunology and the development of vaccines to protect our fish; on the handling of fish during transportation; and on methods of improving water quality in public (and home) aquaria.

I could continue . . . instead, I would strongly recommend that you obtain a copy of these proceedings in order to update yourself on what is a constantly advancing industry. Anyone trading in ornamental fish will find the volume of particular interest. So will aquatic societies.

The **Aquarama Proceedings** are not widely available within the UK, at the moment. They can, however, be obtained direct from the publishers.

Academic Associates Pte Ltd,
46A Horne Road,
Yong Tai Seng Building,
Singapore, 0820.

Dr David Pool,
Head of Tetra Information Centre.

Tropical Aquarium Fish — Comprehensive Edition

By: Dr Chris Andrews and Dr Ulrich Baensch
Published by: **Tetra Press.**
ISBN: 3-89356-131-5
Price: £13.95

When two ichthyological authorities get together and write a handbook on aquarium fishes, you should expect nothing but the best. Tetra have produced two such combinations — their *Marine Aquarists Manual — Comprehensive Edition*, by Dr Hans Baensch and Paul V. Loiselle, reviewed by Gordon Kay in the July issue of *AGP*, and this freshwater tropical volume, written by two of Europe's best — Tetra's Ulrich Baensch and, just before his departure for America, London Zoo's Chris Andrews.

The result is a very pleasant mix of the thoroughly scientific approach tempered with commonsense explanations, something not all books manange to achieve. Scientific terms emerge where they need to, but never without good reason or clarification and, again, even within normally 'mundane' equipment descriptions, full reasons for choosing 'this filter' rather than 'that one' are provided.

The opening chapters cover the establishing of the aquarium environment, and readers should really appreciate the fact that both American and European gallonages are quoted — a small detail, but one that annoys often by its omission in books from either side of the Atlantic. Throughout the text, excellent, quick reference tables appear to accentuate the important points and to answer some of the questions that may be forming in the reader's mind. Examples include Fishkeeping at a Glance, Filter Facts, Tank Maintenance Check List, Some Common Fish Diseases etc.

The major part of the book deals with fishes, on 'a species per page' format. Obviously, this cuts down the total number of species that can be covered, but, usually, the notes on any individual species will apply equally well to other members within the same genus. At the beginning of each of the fish group (Anabantoidei, Characoidei etc) a full-page introduction describes the general tendencies, from native conditions to aquarium temperament and breeding habits (where pertinent). Each species is described in a similar fashion: Name (common and scientific), Distribution (range), Approximate Size (fully grown), Sexual Differences, Suitability (or difficulty for aquaria), Recommended Water Conditions, Diet, Some Important Pointers.

As far as species coverage goes, it's a 'community selection', with the occasional proviso; few 'alternative' livebearers are included, and one that is (*Dermogenys*) has the dubious honour of being pictured upside down! However, as any aquatic author will tell you, the worse problem in planning a book is the choosing of species; you can't please all the readers all the time.

On the production front, quality is excellent throughout, from the clarity of artwork, through the crisp photographs, to the 'readability'. The scientific names of species appear to have been correctly updated (I was interested to see *Epalzeorhynchus* — the Flying Fox — is now *Crossocheilus*) and the proof reader let very few errors slip through (a pleasant change from the Marine Aquarist Manual).

What really surprised me, was that, despite the understandable appearance of Tetra filters and water testing kits, you had to wait until the Fish Catalogue for any definite reference to what they're really famous for — food! Ah well, I did notice eventually. Nice one Tetra!

Dick Mills

Bleher's Compendium

(Now re-titled; Bleher — The Fresh and Brackishwater Fishes)

IMPORTANT NOTICE FROM THE AUTHOR/PUBLISHER

Readers of *Aquarist & Pondkeeper* will, no doubt, remember that advertisements placed by Water Features Publications Ltd., the UK distributors for the above book, appeared during 1989. Also at that time, they ran a competition, in which six leather-bound, autographed copies of the book were to be awarded.

The response, both to the competition and the advertisements, was extremely positive. Unfortunately, for a number of technical and legal reasons, publication of the then called **'Compendium'** was delayed and, by the time these difficulties had been resolved, it had become apparent that some revision and updating of the text would be desirable. Since it has always been my intention to publish as comprehensive and up-to-date a volume as possible, I therefore decided to carry out the necessary alterations, although this meant that the publication date would have to be delayed further.

I am now pleased to be able to report that all the additions and revisions have been carried out, resulting in a considerably larger and more extensively illustrated work than was originally intended. It will now be printed in two volumes: over 500 pages of text (Volume I) and more than 1,250 pages, with more than 15,000 full-colour photographs and 40 distribution maps (Volume II).

I hope, by now, to have submitted the material for printing and expect the book to be available for distribution before Christmas.

A considerable number of *AGP* readers responded to the original advertisements by sending in deposits to Water Features who were acting as UK distributors for the original book. Although this is no longer the case, these 'depositors' have been unable to obtain refunds from Water Features, despite repeated requests. My personal involvement and correspondence with the company has also not been answered.

I would like to contact all those who have been thus affected and will honour their deposits as part payment towards the new (and much bigger and more comprehensive book) on submission of documentary evidence to me at the address given below. Suitable forms of documentation would be receipts, invoices, or similar. Those readers who have sent in requests, or placed orders, please also contact me directly.

I would like to reassure the six competition winners that they will, of course, receive their leather-bound, autographed copies of **Bleher — The Fresh and Brackishwater Fishes** shortly after publication. It is my intention to clear up all outstanding problems without any further delay and therefore look forward to hearing from readers in the near future.

HEIKO BLEHER,
Aquaprint Verlags GmbH, Am Hengstbach 3, D-6078 Neu Isenburgh 4, Germany.

Cichlid Fishes Behaviour, Ecology and Evolution

Edited by: Miles H. A. Keenleyside
Published by: **Chapman & Hall, London.**
ISBN: 0-412-322005-5
Price: £49.00

It must be stated at the outset that this is not a book for the beginner, but, for the serious and committed student of cichlid behaviour, it is a treasurehouse of information. The list of contributors reads like a Who's Who of ichthyology (or, rather, 'cichlidology'), and includes such well known scientists as Barlow, Greenwood, McKaye and Ribbink, as well as the editor himself.

The book is the second in the **Fish and Fisheries** series commissioned and published by Chapman & Hall, the intention being to "present timely volumes reviewing important aspects of fish biology", aimed at not only professional researchers, but also non-specialist readers, including aquarists. Unlike many such 'anthologies', it is not a collection of already-published papers, but consists of chapters written specially by the contributing authors at the request of the editor.

The work covers such topics as taxonomy, evolution and speciation, and genetics; ecology and functional morphology; fisheries and aquaculture; and, most interesting to the aquarist, aspects of behaviour — feeding, breeding, communication. Both African and Neotropical cichlids are discussed. The illustrations are largely in the form of line drawings, with some black and white photos, but this does not detract from its value. On this occasion, it is the text that is of prime importance, as we are learning about the biology and behaviour of the fishes, rather than their appearance.

Obviously, such a book is fairly technical in style, but it is nonetheless extremely readable, and will be an invaluable work of reference for many years to come. I am inclined to endorse the view expressed in the foreword, that this is a 'landmark' in cichlid literature, comparable with Fryer & Iles' (1972) great work on *The Cichlid Fishes of the Great Lakes of Africa*, and I cannot, in all honesty, think of any work of this type published in the interim which can compare with either, or which I have coveted as much!

It would be optimistic to assume that the book will be available at many, if any, aquatic retail outlets, but any good bookseller should be prepared to obtain it to order, or it can be purchased by post from **The British Cichlid Association, (Dept AP), 7 Delamere Avenue, Sale, Cheshire,** price £49 + £4.00 P&P and insurance (P&P etc free to BCA members).

Mary Bailey

FBAS PUBLICATION NEWS

Most aquarists within the organised hobby are familiar with the wide-ranging services available to societies by the Federation of British Aquatic Societies. However, there may be many fishkeepers who are not part of the 'society scene' and yet want to be, but have no convenient local society to join. The Federation's latest publication is aimed at specifically those, as yet, left out in the cold.

BOOKLET No 8: Formation and Organisation of an Aquarist Society (FBAS — £1.00) examines all aspects of starting up, and subsequently successfully running, a fishkeeper's society right from the outset.

Divided into two parts, the book first explains how to locate and drum up interest among local fishkeepers, looks at inexpensive ways of holding those critical first meetings, where to meet, how to plan programmes, create further interest in the society and so on.

The second half then looks at each job of the society's main officers and committee members — what makes a good Chairman, is there anything a Secretary doesn't do, keeping track of the finances, booking Judges and Speakers, preparing for a Show, social entertainment and all the other hundred and one things required to keep the society flourishing.

Use this book to get started; the Federation will provide the rest.

FBAS Merchandising, 14 Upper Dane Road, Margate, Kent.

COMING NEXT MONTH

GOLDEN RULES OF SUCCESSFUL TROPICAL FRESHWATER AQUARIUM KEEPING

Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Each query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. *Please indicate clearly on the top left hand corner of your envelope the name of the experts to whom your query should be directed.*
All letters must be accompanied by an S.A.E. and addressed to:
Your Questions Answered, The Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.

Herpetology, Julian Sims. **Koi,** John Cuvelier. **Tropical,** Dr. David Ford. **Coldwater,** Pauline Hodgkinson. **Plants,** Barry James. **Discus,** Eberhard Schulze. **Marine,** Graham Cox.

KOI

KOI TANK PROBLEMS

I have a 48in (120cm) coldwater aquarium in which I keep five Koi, four of them measuring about 8in (20cm) in length, a small Green Tench and a small Koi measuring 3in (7.6cm) in length.

Before you throw up your hands in horror at keeping Koi in such an aquarium, I must say in my defence that I bought them three years ago when they were very small with the intention of transferring them to a pond which I was planning.

For a number of reasons, I was unable to construct the pond, so I've kept the Koi in the original aquarium. My main problem is excessive growth of algae. I try to keep the water as clean as possible. I've even cleaned out the tank completely. Using live plants doesn't work either — the Koi eat them! What do I do?

As you are the first to admit, an aquarium is not the most ideal of homes in which to keep Koi. Quite apart from the matter of room for growth (anything up to 24 inches - 60cm - in the UK), their feeding habits preclude the addition of plants, which means a rather clinical environment for them.

Having said that, your problem with algae is very common among all forms of fishkeeping. In quite a few areas of the country, water changes merely serve to worsen the situation, as tapwater today often has very high levels of nitrate which algae thrive on.

One possible step you could take would be to change your lighting for an ordinary fluorescent tube as, although some makes of tube bring out the colours in fish, they were originally intended to stimulate plant growth and, as algae are a primitive form of plant life, the result is self-evident.

Apart from suggesting the purchase of one of the now-available nitrate removal treatments, there's not much else I can do to advise you at the moment. We must just hope that you will eventually be able to build your pool.

MAN FAI MA

Carp and Koi are less than ideal aquarium choices, particularly since they grow to a large size, eat plants, root about in the gravel . . . and pollute the water.

COLDWATER

GOLDFISH INFO

As a newcomer to Goldfish keeping I would be very grateful if you would suggest some good books and contacts.

There are many books now available which are really worth reading on the subject of Goldfish. The following list of titles includes what I think are some of the more informative books on the subject.

Fancy Goldfish Culture by Frank W Orme. **(Nimrod).**

The Goldfish by George F Hervey & Jack Hems. **(Faber & Faber).**

Goldfish Guide by Dr Yoshiichi Matsui. **(The Pet Library Ltd).**

Fancy Goldfishes by Dr Chris Andrews. **(Interpet).**

Handbook of Goldfish by Yoshio Watanabe. **(Hello Publishing Co).**

A Complete Guide to Goldfish by Robert Mertlich. **(T.F.H. Publications Inc).**

The ABC's of Goldfish by Neal Teitler. **(T.F.H. Publications, Inc).**

I certainly think that it is well worthwhile becoming a member of one of the goldfish societies. You can contact the secretaries if you send a self addressed envelope to:-

Northern Goldfish and Pondkeepers Society. Mr W Ramsden, 18 Ainsdale Road, Bolton, Lancashire.

Goldfish Society of Great Britain. Mr R Saltrick, 38 Herent Drive, Clayhall, Ilford, Essex IG5 0HE.

Bristol Aquarist Society. Mr R A Jones, 27 Acacia Road, Staple Hill, Bristol.

INTERPET

The Interpet Guide to Fancy Goldfishes — a comprehensive and very readable introduction to the hobby.

PLANTS

RED SWORDS INDENTIFIED

I have seen a lot of adverts for 'Red Amazon Swords' in the magazines. Are they really 'Red' and what is their correct name? Are they difficult to grow?

Commercially, there are two varieties of Red Amazons offered. *Echinodorus osiris* has long-stemmed ovate leaves, with very strong and pronounced veins. This is the form often offered. It is grown emersed and the leaves are olive-green in colour. Submerged, the leaf shape changes to blunt-lanceolate. The colour when submerged and grown in bright light is deep-pink to pale-red.

A newer variety which has come on the market during the last twelve months is *Echinodorus barthii* (probably, more correctly, *E. uruguayensis*). This plant is somewhat similar in overall appearance, but the leaves are a distinct wine-red in the submerged state.

Both varieties prefer a rich bottom soil, bright light and grow best at cooler temperatures. Something like 72°F (22°C) suits them very well in our nursery.

SOUTH ISLAND AQUARIUM – SINGAPORE

Some *Echinodorus* plants (this is *E. barthii*) are now being produced using tissue culture methods in Singapore.

UNDERGRAVEL 'HUMATICS'

I have acquired some material which is used underneath the gravel as a substrate for growing plants. However, the instructions state that it must not be used without an undergravel heating cable. Is this essential, or can I use it with my normal heater/stat unit?

The product in question almost certainly contains 'humatic' material, such as peat or leaf mould. With a heating cable, convection currents ensure that a supply of oxygen penetrates the gravel and, in these conditions, humatic material decays cleanly under the influence of 'aerobic' bacteria.

Without a cable, the decay process proceeds 'anaerobically', which can lead to a build-up of toxic gas in the aquarium.

MARINE

OVERFILTRATION

Is it possible to overfilter a 36 x 15 x 12in (90 x 38 x 30cm) tropical marine aquarium?

Yes, you can certainly overfilter a marine aquarium although, given the usual financial restraints which act on most of us, and the limitations of custom-built aquarium filters, it is certainly difficult to overfilter.

However, given a little quiet thought and the use of one's imagination and sense of humour, you could readily perceive the spectacular mess-up that would result from using even the *smallest* (ie 2000 galls per hour) swimming pool filter on your aquarium! You'd be picking coral gravel and coral sand out of the ceiling and carpet for months afterwards... and divorced in only a fraction of that time!

MOVING MARINES

I am shortly moving house — albeit only a few miles — and plan to install a 7ft x 18 x 18in (c2.1m x 45 x 45cm) marine tank in my new home. My present marine tank is 48 x 18 x 15in (120 x 45 x 38cm), and I would welcome your advice as to how best to transfer my fish etc to the new tank, bearing in mind that my existing tank has been set up and running for at least five years, but will not have a sufficient amount of gravel, sand and water in it to be able to effect a straightforward change-over.

I would appreciate any guidance that you may be able to give me on handling this difficult matter.

First of all, please allow me to congratulate you on the imminent ownership of such a massive, spectacular tank. At almost 100 gallons (454 litres) gross capacity, such an aquarium opens up opportunities which would be denied to you in the decor and stocking of your old 47 gallons (210 litres) capacity aquarium.

In answering your query, I must assume that you will have access to your new house for two or three days BEFORE you have to give up the occupancy of your old house — otherwise the logistics of the whole operation become truly horrendous.

You should proceed as follows:-

① Set up the new 100 gallon tank in your new home complete in every respect, ie with brand new coral sand, coral gravel, heater / thermostat, pumps, etc and, of course, 85-90 gallons (c385-410 litres) of brand new seawater.

② Let the whole system run for at least 24 hours, and then, after a final check of specific gravity, temperature, pH, nitrites, etc, transfer the fishes *(which shouldn't have been fed for the previous 4 days)* into the new tank.

To achieve this transfer I suggest that you beg/borrow/buy a few polystyrene fish-shipping boxes and, after a thorough warm tapwater wash internally, siphon the minimum depth of old seawater possible into each box and, without overcrowding, transport the fishes in this way to your new tank. There is no need to float the boxes since, being made of insulating styrofoam, no temperature balancing would occur anyway. Simply use a clean milk bottle to transfer your new seawater into the box until the seawater in the box is roughly one inch (2.54cms) deeper than previously. Wait 5 minutes and then take an inch of seawater out of the polystyrene box and add it to your tank.

③ Continue the process in 2 above for at least half an hour, and then gently transfer the fishes into the new tank.

④ Repeat the process outlined in 1 and 3 above for all the living rock and invertebrates until they are all safely transferred into the new tank.

⑤ Return to the old tank and thoroughly stir up all the coral gravel/coral sand to dislodge all the sea humus into suspension in the remaining seawater. Now quickly siphon off to waste all the seawater from the old tank, taking as much as possible of the floating sea humus with it.

⑥ Transfer all the old, bacterially-mature coral gravel and coral sand into the new tank, scattering it evenly over the surface of the new coral sand.

⑦ Feed your creatures only *very lightly* for the next 6-8 weeks so that toxic nitrites don't re-occur before the entire filterbed has fully bacterially matured.

⑧ Ideally, transfer your old 47 gallons (210 litres) tank to your new house as a hospital/quarantine tank.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

HERPETOLOGY

DIET FOR BOX TURTLES

We have recently acquired a 10-year-old female Three-toed Box Turtle. We would, obviously, like to ensure that we are feeding her properly. Your advice would therefore be most welcome.

North American Box Turtles are omnivorous in their choice of food, ie they eat both meat and vegetation. Thus, the food offered to these reptiles does not have to be exclusively 'meat-based' but should be as varied as possible.

Lean beef, earthworms and white slugs are all eaten with relish. However, these three examples of favourite foods must be chosen with care:

(i) **Lean beef** must be selected to avoid feeding excessive fat. Fat is difficult to digest and can accumulate in the liver. Feed good-quality meat, and not offal, as this can carry *Salmonella* bacteria which will then infect the Box Turtles.

It is probably not a good idea to feed tinned cat or dog food. Although many species of reptile will eat this form of protein, tinned cooked meat is not as 'clean' as raw beef. Therefore, if tinned meat is not completely eaten up, it can become infected with bacteria more quickly than raw beef.

(ii) **Earthworms** must be fed, as opposed to the banded Brandling Worms from compost heaps. These contain poisonous fluids, including the yellow juice which escapes when they are picked up. Thus, there is the possibility that, if numbers of Brandling Worms are eaten, they will poison any animal which feeds on them.

(iii) Do not feed **slugs** which may have come in contact with slug pellets. These poisonous products used by gardeners to control slug pests will also prove toxic to reptiles.

Favourite vegetable material which is quickly taken includes ripe, red slices of tomato, lettuce leaves and slices of sweet apple.

Feed your Box Turtle as often as she will take food. In this way, she will tend to put on weight during the warmer summer months. A good summer is essential to ensure survival through the leaner, winter months.

In addition to fresh meat and vegetation, the diet of Box Turtles should also contain an adequate supply of calcium. Calcium is necessary for the healthy formation of the carapace and plastron — the upper and lower halves of the shell.

However, although calcium is essential, it is not always easy to get reptiles to eat sufficient quantities to remain healthy. One way in which calcium (together with other essential minerals and vitamins) can be offered, is by dusting food with a multi-mineral and vitamin powder, such as **Vionate.** This is now manufactured by:

Ciba-Geigy Agrochemicals,
Whittlesford,
Cambridge CB2 4QT

In case of difficulty in obtaining this product, contact:

Polcrome Limited,
11, Mount Road,
Feltham,
Middlesex TW13 3JG.

DAVID ALDERTON

Box Turtles are not quite as herbivorous as some people believe them to be.

Most forms of food which are offered to Box Turtles can be treated in this way. Unfortunately, the smell and taste of multi-mineral powder can put some of these reptiles off their food, rather than encourage healthy feeding.

Therefore, an alternative method of providing calcium for chelonia is sometimes required. Such a method is to use cuttlefish bone (an entire cuttlefish bone can be provided because some chelonia will bite pieces off these calcium-rich structures). Powdered cuttlefish bone can also be sprinkled over the food of Box Turtles.

Prominent claws are a characteristic of some Box Turtles and can be used in the naming and identification of some subspecies, for example the Three-toed Box Turtle (*Terrapene carolina triunguis*). The continuous growth of claws is an indicator that a Box Turtle is in good health and is eating a well balanced diet with sufficient minerals and vitamins.

Box Turtles which are allowed to wander 'free range' in the garden will naturally continuously wear their claws down. For Box Turtles which are kept in an indoor vivarium — if part of the floor of this enclosure is covered with sand paper as used for cage birds, for example Caperns **'Tydisan'** — this will help to wear down their claws. However, if the claws do grow too long, they can be trimmed by a vet.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

TROPICAL

AGGRESSIVE SNAIL EATER

I have recently seen a species of Pufferfish in my local aquatic shop. It was whitish-creamish with lots of black spots. I assume that these fish live in freshwater but, other than that, I know nothing else about them. Can you help?

The various species of Puffers which are generally available within the hobby belong to the genus *Tetraodon*, with many species ranging from Africa to Southeast Asia. Some are found in brackish waters and need salts in the aquarium, while some are freshwater only. Some are aggressive and tear the fins off other fish. Some also grow very large (2 feet-60cm) and so, are not suitable for the home aquarium.

The fish you describe as having black spots is probably *Tetraodon fluviatilis* or Green Puffer, from India and surrounding areas. It is nasty-tempered and only suitable for tanks of fish that can stand up to it. Water chemistry is not too critical but very soft water is not tolerated. It eats snails in the wild — which can be useful where the tank is overrun with them. It will also take *Tubifex*, *Daphnia* etc, but dried flake is usually ignored.

The Green Puffer will breed in the aquarium and the male is guardian of up to 300 fry, but feeding is a problem; snails eggs have been used by some successful breeders.

LAURENCE E PERKINS

Like most of its close relatives, the Green Puffer is aggressive towards other fish. It will also eat plants.

Seaview

By Gordon Kay

WHALING UPDATE

The meeting of the International Whaling Commission, in June, threw up a couple of surprises. My greatest fear had been that they would stoop to pressure from countries like Norway and Japan to allow the killing of whales again after five years of the practice being banned. To my great delight, they again said something akin to "on yer bike, mate" and voted to retain the moratorium for another year. Amen to that.

However, the same countries will still get away with the slaughtering of certain species (notably Minke whales), because of the laughable clause which allows catching whales for 'scientific purposes'.

The second surprise was the decision to withdraw a resolution which was designed to save endangered dolphins — including two species of River Dolphin, from China and Pakistan, and the Vaquita Porpoise from Mexico. All three have been hunted to the extent that they are feared to be down to just three hundred in each case.

Despite a vociferous denial by John Gummer, I personally believe that the decision to withdraw the resolution was an attempt to appease the whaling nations. I think I said last year that it is high time that the commission did something about small cetaceans before there aren't any left. I make no apologies for stating it again, with knobs on!

Incidentally, at around about the same time as all this, there was a statement from Cornish fishermen that they were proposing to start using five kilometre long driftnets!

SNIPPETS

Now, before we get too heavy, let's get into some **Snippets.**

1 The spines of the Long-Spined Sea Urchin are covered with poison. Despite this, they are home to many tiny fishes, who enjoy the protection they afford. Sometimes, the urchin's spines can become overcrowded with literally hundreds of tiny Cardinalfishes.

2 Triggerfish species have a unique method of catching their dinner, which is usually shellfish, hidden in the sand of the seabed. They set up a current of water, using their front fins, and use their mouths to form a sort of 'water pistol'. All this is used as a way of exposing their quarry. When the sand settles again, the poor shellfish is left exposed and ready to be picked off by the Trigger.

CORAL WORLD - ELAT

Long-spined Sea Urchins — despite their poison — shelter large numbers of small fish between the spines.

Goatfishes follow the Triggers about, while all this is going on. They are opportunist feeders which grab the Triggers' leftovers — usually small shrimps which have been stirred up with the sand and are too small for the Trigger to be bothered about.

3 Also down on the sea floor, the Watchman Goby and the Snapping Shrimp live together in burrows. The shrimp maintains the burrow, while the goby stands guard at its entrance. The goby has much sharper eyesight than its partner and is more likely to spot any predators.

The shrimp works non-stop to keep their mutual home clear and free from detritus. The goby hardly ever moves though, except for a quick dash out to grab some dinner. This is usually microscopic animal life which live in the sand.

It does have to work a little sometimes, however. It has to sift the sand through its gills to extract his dinner and it has to act as a 'guide dog' for the shrimp when it (the shrimp) goes out to dine.

4 The Red Sea was formed when a huge fault first split the African continent and, in so doing, created the African Rift Valley, before extending northwards to produce the Red Sea and the gulfs of Aqaba and Suez. Fringing reefs in the area are generally narrow and situated on the edge of a huge chasm, which is often thousands of metres deep.

Much of shallow southern coastline is fringed with mangroves, while — further north — the edge of the Arabian landmass falls steeply away underwater. The edges of the Red Sea are still moving apart — by about three inches (c6.6 cm) every year — as the rift between Africa and Arabia gets wider.

5 Still in the Red Sea (I speak metaphorically, you understand), some corals are known to live one thousand feet (305 m) down. Most marine life, however, is concentrated around the top of the reef wall, and this is where the sharks congregate. As regular divers in the area can testify, they are seldom aggressive.

Sharks perform an essential role within their eco-system, and their presence is a sure sign of a healthy coral reef.

6 There are thousands of miles of coral wall around the Red Sea, and vast shoals of *Anthias squamipinnis* have made their homes along most of it. Living in such huge shoals affords them a great degree of protection from predators.

Females are small and orange, the males being much larger and a wonderful pink colour. They also have an extended dorsal spine.

This species is a hermaphrodite, with all young being born female and turning to males when the need arises. The dominant male is outnumbered by females by around 100 to 1 (what a life!) and when he dies, or is removed from the shoal, the largest female takes his place — becoming a fully-fledged male in next to no time.

7 Sometimes living in association with *A. squamipinnis* is an imposter, in the form of the Midas Blenny. This little devil, unlike other blennies, ventures out into the water column, but only in the company of *A. squamipinnis*.

It looks and acts every bit like its 'disguise' and, so successful has the deception been, that the blenny was only discovered about ten years ago!

I shall be undisguised when I'm with you next time . . . I hope!

CORAL WORLD - ELAT

Vast shoals of *Anthias* are found in the Red Sea, where they are often referred to as 'Golden Perches'.

PRODUCT ROUND-UP

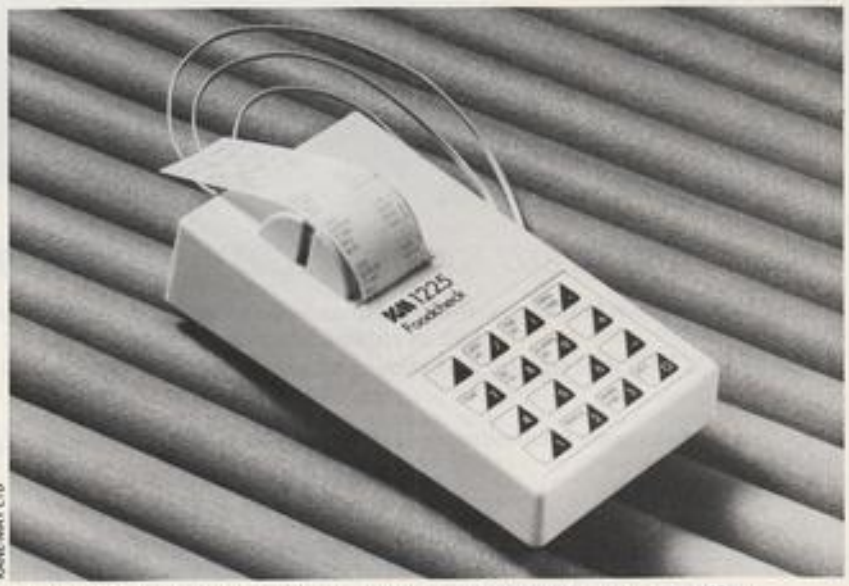
BY DICK MILLS

Kane-May Ltd

Having a deep-freeze full of frozen food is becoming relatively commonplace, but often the idea of freezer failure can send shivers down the spine. With more frozen foods becoming available for fishes, as opposed to human consumption, the up-to-date shopkeeper may well fight shy of stocking up to full capacity.

Add to this the legal requirements of temperature tolerance demanded by food storage legislation, and the need for an automatic record of temperature fluctuations within the food cabinet become more necessary.

The KM1225 TEMPERATURE RECORDER/PRINTER from **KANE-MAY** provides a clear solution to all such problems and worries. The instrument has five channels, so that the temperatures of up to five different areas, products or samples can be monitored simultaneously. Temperatures are logged every minute and a summary printed out every 24 hours or on demand. The time and dated summary show the length of time the maximum or minimum temperatures were exceeded. An audible alarm sounds if limits (set by the operator) are exceeded.



KANE-MAY LTD

Accurate monitoring of deep-frozen foods is now possible with the KM1225 from Kane-May.

The portable, battery-powered unit can also be mains-operated for permanent installations. Temperature range is −40 to +110°C with a system accuracy better than plus or minus 0.5°C throughout the critical food temperature range of −20 to +70°C.

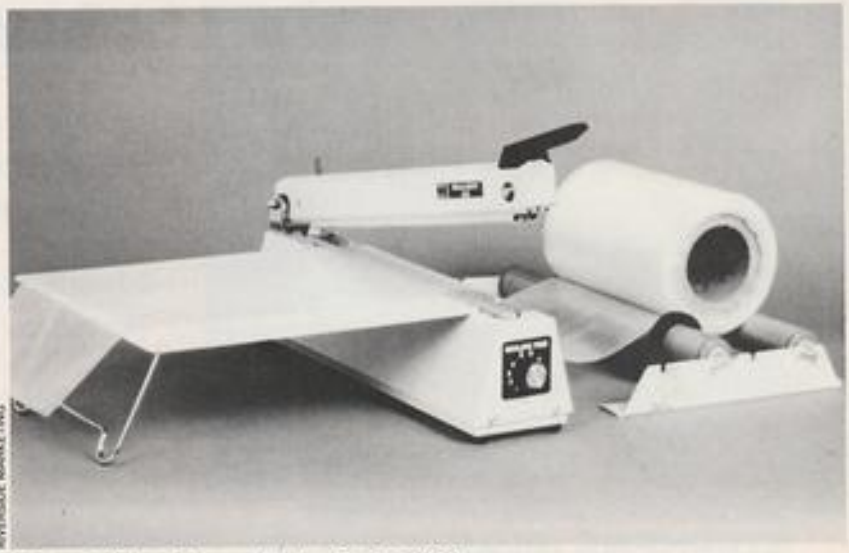
Details from: **KANE-MAY LTD., Swallowfield, Welwyn Garden City, Herts AL7 1JP (Tel: 0707 331051; Fax: 0707 331202).**

Swissvac (GB) Ltd

Still with food storage, many enterprising societies buy fish food in bulk and divide it into smaller, resaleable, portions for their members. A very convenient way of doing so is by using self-seal bags, and the latest SEALBOY 320 machine from **SWISSVAC** is ideal for small-volume amounts. The machine comes complete with cutter and timer.

Swissvac are the UK agents for AUDION and offer complete after-sales services (including spares) from their Slough and Edinburgh offices.

Details from: **RIVERSIDE MARKETING, Croft House, Northcroft Lane, Newbury, Berks RG13 1BU (Tel: 0635 521971/550058; Fax: 0635 521859).**


RIVERSIDE MARKETING

Quick and efficient poly-bag sealing from Swissvac (GB).

Forget-me-not

Losing any pet is a traumatic experience, even with something theoretically emotionally cold-blooded as a fish. Yet, how many times have you come across an aquarist who admits to having his/her dearly-departed, often prize-winning specimen buried at the bottom of the garden, or in the foundations of his/her best pond?

Should you wish to have a permanent memorial to your pets, then a suitably-worded, engraved MEMORIAL STONE from **FORGET - ME - NOT PET MEMORIALS** will mark their final resting place with dignity. Made from precast stone with 1in (2.5cm) inset lettering, each mould is used only once. Square or rounded designs are available and you may have up to 4 lines on each 18 x 14in (45 x 35cm) stone.

Details from: **FORGET-ME-NOT PET MEMORIALS, Unit 10, Ridgeview, Hergest Camp, Kington, Herefordshire HR5 3EQ.**

PRODUCT NEWS

King British

If you're not one of those hobbyists who get *A&P* every month on subscription you could be missing out. **KING BRITISH** are making early readers a special FREE offer to enable them to sample two of their latest 'care products'.

SAFE-GUARD and SAFE-WATER, the company claim, are *the* products, not only to get your fish off to the safest of starts in our pre-chlorinated water, but only to dispose of natural pollution and keep the water sparkling clean thereafter. Safe-Guard should be used to dechlorinate water during the initial setting up and, subsequently, at each partial water change; it thus reduces the risk of stress to fish. Safe-water, used regularly, encourages rapid breakdown of waste products and assists filtration.

You may be confused with the amount of products on the market, feeling unsure about their use or effectiveness. King British now bring you the opportunity to see for yourself (at no charge) the benefits of regularly using these increasingly-essential treatments.

All you have to do, to receive a sample pack of both Safe-Guard and Safe-Water, is be one of the first 500 to reply to the offer.

Write to: **AQUARIST & PONDKEEPER OFFER, KING BRITISH, HAYCLIFFE LANE, BRADFORD BD5 9ET** but remember it's only the first 500 out of the postbag who will benefit (apart from your fishes, that is!).

Details of all King British products can be obtained from the same address.

Remanoid

PHOENIX 2000 fish food, launched last year, has now come under control of **REMANOID** who also offer a complete range of ornamental fish care products, including foods and pond treatments.

The high performance diet provided by Phoenix 2000 is, it is claimed, designed to feed more fish per kilo than any other fish food, containing, as it does, vital ingredients in the correct balance. It has excellent flotation properties (up to five days!) without breaking up or clouding the water and its low ash context ensures residual wastes are kept to a minimum. Two types are available — Quality Pond Food (for all fish) and Quality Koi Food specially formulated for carp.

PREMIUM FISH FOOD is suitable for all coldwater fish, kept either indoors in aquariums or outside in ponds. Goldfish Flakefood comes in 28g, 50g and 150g drums, while Pond Pellets are available in 200g or 400g sizes. Remanoid's floating pond sticks, PREMIUM POND STICKS and KOI STICKS come in 200g and 1,200g sizes.

In 250ml and 100ml bottle sizes, Remanoid's pond treatments include AQUASURE (for removing chlorine and other halogens, heavy metals and toxins), AQUACLEAR (to restrict the growth of undesirable weeds and algae), ERADICK (a five-day treatment to eradicate fungal and free-swimming parasites) and BACT-ERAD (a single-dose remedy for bacteria and flukes). Both the last two treatments are harmless to plant life.

Away from direct, fish-care products, Remanoid also manufactures semi-rigid pools and High-Lastic pond liners, and supplies pumps and a selection of garden lighting and ornamental products.

Details from: **OSBORNE PUBLICITY SERVICES LTD., Hardwick Mount, Buxton, Derbyshire SK17 6PR (Tel: 0298 26224; Fax: 0298 24870).**