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AQUARIST AND PONDKEEPER

JULY 1989
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COMPETITION

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COVER STORY

(Photograph: Jane Burton/
Bruce Coleman Ltd.)

Pomacanthus semicirculatus
is usually referred to as the
Koran Angel, although the
names Blue Koran and Semi-
circle Angel are also some-
times used. The specimen
depicted on our cover is a
juvenile, easily distinguished
from an adult by its striking
deep blue (almost black in
places) coloration, specta-
cularly marked with white
semicircles — hence its sci-
entific name. The "Koran"
name tag was created
because the pattern of marks
on the caudal fin of adults is
thought, by some, to resem-
ble Arabic script.

GUEST EDITORIAL



Dr David Ford is a lifelong aquarist who has turned his hobby into his job. He developed the 'Aquarian' range of Fish Foods and Remedies for Thomas's (a division of Mars Ltd) and carried out research for the Atlantic range of aquatic equipment. He has run

the 'Aquarian' Advisory Service for over a decade. This free international help-line for fishkeepers handles over 5,000 queries a year. David lectures on fishkeeping throughout the world and has written many articles and books about the hobby.

Spread the Word!

As a lifelong aquarist I have always been quick to defend our hobby from the sometimes snide remarks it receives. How often have we heard "the only fish I'd have is with chips", followed by roars of laughter at such an original (!?) joke.

Those unfamiliar with what is a very complex, and therefore absorbing, study are amazed as I reveal the facts — the Fancy Goldfish varieties, the community species, the Cichlids, Killies by post, coralfish beauty, UK's 400+ clubs, the national — even international — shows, not to mention the chemistry and physics of aquariology.

The jokes stop and interest develops, because I have always found that everybody is a potential aquarist. The advertising agencies in the pet trade proudly proclaim that, now, over 14% of British households (around 2.8 million) own ornamental fish, but I see this as 86% who don't!

In my job as Head of the 'Aquarian' Advisory Service, one of my objectives is to popularise the hobby. I am doing this by advertising in local newspapers and national magazines such as *Bella*, *Best Woman's Own*, *Readers Digest*, etc. I am at all the usual fish shows, of course, but also attend more general pet shows, such as the *Town & Country* at Stoneleigh, the *Festival of Pets* at Birmingham, etc. and place aquariums in the Garden Festivals and *Ideal Homes Exhibitions*. You will even see aquariums I have installed in *Channel 4's Brookside* and *ITV's Children's Ward*.

Some of us are doing everything we can, but we need even more help. So, what are you doing to promote the hobby?

Do not wait for beginners to approach you or your club. Let that 86% know what they are missing. Fishkeeping is fun; indeed it can be a way of life (as so many of us know only too well)! After all, every garden must have a pond, and no home is complete without its aquarium. . . .

Good fishkeeping.
Dr David Ford

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IF AT FIRST YOU DON'T SUCCEED . . .

Few aquarists can have started off in the hobby by attempting to keep land snails underwater in a milk bottle!

But then, not all budding aquarists are like

Jason Endfield . . .

I believe that one is either born a fishkeeper . . . or not, as the case may be. I can qualify this to some extent with a vague memory, as a three or four year old, of keeping snails in a milk bottle full of water.

I was learning then, as I am now, because the snails were not, in fact, of the sub-aqua variety, but something in my young, inquisitive mind told me that snails and water should go together. Well, I was right in a way, though my success at keeping land snails underwater cannot have been lengthy.

But the intrigue of aquatic life didn't leave me. My next attempt at maintaining something alive was one or two years later, when I sustained a single mosquito larva in a yoghurt carton for several days. I didn't know what it was at the time, but it moved and therefore provided much excitement until nature took its course and my "pet" disappeared overnight, leaving its discarded case behind as a keepsake.

First success

I wasn't having much luck, but the urge was too strong to ignore. One holiday in Wales, a short time later, we came across a stream teeming with fish fry — now those were fish! An unfortunate half dozen of them ended up as my charges. They were transported home in a large margarine tub, and it was then that my first success at fishkeeping ensued.

I kept my fish (I never found out exactly what species they were) in a small tank for several months and my obsession with the hobby took firm root. There was no stopping me now — Goldfish joined my collection, and when the fry passed on (probably owing to lack of growing space) I tried my hand at terrapins.

At last I was finding my feet, but terrapins, I decided, weren't as good as fish, and Goldfish . . . well, they were just Goldfish! In an attempt to keep me quiet, I was dragged down to the Public Aquarium at the Merseyside County Museum, but this had the reverse effect and only heightened my appetite — here were real fish . . . and I wanted some just like them!

On my return home, I boldly set about constructing my own tank — it was going to be bigger and better than any I had seen: But there was a small snag — I only had a few



pieces of chipboard . . . and no glass. It didn't take me very long to realise that my idea didn't hold water (pardon the pun).

I surrendered temporarily, but wouldn't let the matter rest. In the end, my parents gave up — I was presented with a three-foot aquarium for my birthday, complete with all the "trimmings": heater, lights and all! Wow!

A fishkeeping friend of my father's set it all up for me, and escorted me to dozens of fish shops to marvel at (and buy) some "real" fish. I remember the look on my dad's face when I told him how much (of his money) I had spent on fish! But it was an incentive to look after them.

I had several species from Glass Catfish to Tiger Barbs, and even my two long suffering Goldfish joined the clan. I soon became the envy of my friends, at least two of whom caught "the bug" and established their own tanks.

So confident was I of my ability, that I entered one of my fish — a very ordinary Red Tailed Black Shark (*Labeo bicolor*) — for a local fish show. Needless to say, it was unplaced, but it gave me the opportunity to see a selection of the finest fish that the area had to offer, and I had something to aim for.

Proud moment

I must have been doing something right, because my fish started to reproduce, and I became overrun with fry. I remember very clearly one supremely proud day when I marched into the same Museum Aquarium that started me off, together with my equally proud grandparents, and presented the slightly bemused keepers there with a few surplus Kribensis young in a bucketful of water. Golly, was I proud! I even managed to sell a few from a little advert in the window of the local Post Office, and with the proceeds (and a little bit more financial help from my parents!), established another tank.

And I've never looked back since. The fact is, however, that I'm still learning, and I expect that I always will be, although I can say with some certainty that fish have less to fear on entering one of my tanks these days than those poor land snails did when I took them into my good intentioned, though inexperienced, care all those years ago. That old adage "trial and error" will never apply to anything more than this hobby of ours.



WILLIAM ROYSS

A pair of Golden Mossambique Mouthbrooders (the female has a brood pouch, indicating that she has a mouthful of eggs). This species can provide excellent fostering for the young of other mouthbrooders.

FOSTER CICHLIDS

THE AFRICAN WAY

Following his successful attempts at "fostering" South American cichlid fry as a means of rearing otherwise doomed broods, Jeff Challands tried a similar approach with African species . . . again with considerable success.

I had never seriously thought of cross-fostering experiments with mouthbrooding African species. I had, however, on occasion, put the fry from a female mouthbrooding cichlid in with another female that was also brooding, once the fry had been evicted from the female's mouth.

On one occasion I had a female *Pseudotropheus zebra* that began eating her fry just after she had released them. I immediately removed her to another tank thinking that the fry were big enough to fend for themselves, which they usually can at this stage of their development. I then noticed a female *Labotropheus fuelleborni* pop her head out of her cave in a community tank. She had a very distended buccal pouch, indicating that she was near to the point of releasing her fry. These would not survive long with the other occupants of the tank so removal was a must

if I wanted to save the young. The only tank available was the one in which the *P. zebra* fry were.

At the same time I had a small *Oreochromis mossambicus* female that had a brood of fry which she had released for the first time the previous day. So, I considered moving her back in with the male and putting her fry and the *P. zebra* fry in together. This would give me a free tank for the brooding female *L. fuelleborni*.

I duly caught the young *P. zebra* and put them into a small container with the idea of putting them into the other tank once I had caught the *L. fuelleborni* from the community tank. Once this had been carried out I tried to net the *O. mossambicus* female but she decided to take her offspring back into her mouth as soon as she sensed the danger. I waited for her to release them again, which she very soon did, and tried once more to

catch her, with the same results.

On the third attempt, and just as she was taking up her fry into her mouth, I introduced the young *P. zebra* into her home. In the confusion she also took them up into her mouth without seeming to realise that they were a completely different species. She consequently continued to care for them and her own young until she no longer took any of them back into the safety of her buccal cavity.

Texan/African success

On another occasion, a pair of Texas Cichlids (*Cichlasoma cyanoguttatum*) had bred in the usual manner, but two weeks after the fry became free-swimming, the male began to eat them. Therefore, he was duly removed and the fry were left with the female.

In the aquarium above the Texas' home was a community of large African cichlids which included a pair of *Tilapia burtikoferi* — the male was about ten inches (c 25cm) overall length, some four inches (10cm) bigger than the female.

These fish are out-and-out killers, even among their own kind, and this pair was the last of 17 that I had started out with as small specimens. They had systematically killed each other off despite being split up into several smaller groups as they grew up.

Anyway, a pair formed and, being one of the substrate-spawning species of *Tilapia*, they duly bred, unknown to me, in their community tank. One night, the male killed his mate, which the day previous he had been very compatible with. About three days later, close to his territory, there appeared about five hundred, free-swimming, baby *T. burtikoferi* from underneath a large flat rock that was no more than two inches above the gravel. How the parents had spawned under these defeats one's imagination, but they had, without me observing them.

Immediately, the male began to eat his family and, as I wanted to save some, drastic action was called for. I could not dismantle the tank without losing the fry to the other large occupants. The removal of the male, the more dominant fish in the tank, would have ended up with the same results.

In desperation I siphoned about 25% of the water from the aquarium containing the female Texas and her family, and immediately followed this by siphoning about 150 of

the *Tilapia* fry from their tank straight into the tank below. They were about the same size as the Texas fry, which were getting on for three weeks of age at this stage.

The colour pattern of the *Tilapia* fry was that of their parents, and totally different to that of the Texas fry. I therefore expected the female Texas cichlid to be able to spot the differences and to eat the intruders once the confusion had settled. Much to my amazement she took no notice and just carried on as though nothing had occurred.

While this cross-fostering was a success, I did notice that, within a few days of their introduction into the Texas family group, and by which time the female had been removed, the *T. burtikoferi* were growing at an alarming rate and were very greedy when it came to feeding the group as a whole. Even at this tender age they were showing some aggressive tendencies towards the Texas fry.

After a couple of weeks they were decidedly bigger than their counterparts and the weaker and smaller of the Texas fry began turning up dead. At this point I split the two different species into quarters of their own, as I could envisage the Texas all being killed off as the two species grew up.

Mossambicus trick

The only other experiment that I carried out with success with the cross-fostering of species was with two brooding female mouthbrooders. I had a female *L. fuelleborni* which bred regularly but which would always spit out her eggs after a few days.

Every time I caught her before she could spit out the eggs into the community tank, she would spit them out into the net, or the brooding tank, if I could keep her mouth closed long enough. The trouble was that she would never pick them up again.

I had, on many previous occasions, moved a female mouthbrooder into a brooding tank and, often as not, they would spit out the eggs into the net during the transfer. Most of the time, however, they would again pick up their eggs from the floor of the brooding tank, and carry on with their normal maternal procedure. On the odd occasion when this did not happen, I would hatch the eggs artificially.

As luck would have it the female *O. mossambicus* previously mentioned was brooding a clutch of eggs at the same time as the *L. fuelleborni* which, true to form, spat the eggs into the net as soon as I caught her. I suspended the net in the tank in which the female *O. mossambicus* was brooding, caught her in another net and gently forced open her mouth, upon which, she spat out her eggs onto the base of the tank.

At this point, I immediately emptied the net of eggs from the *L. fuelleborni* among the *mossambicus* eggs, and released the female. She immediately took up her own eggs, along with the introduced ones. From then on nature took its course and she eventually released a mixed batch containing both species. Her own young far outnumbered the ones fostered on her, but they all survived.

Just about the only cross-fostering that I have never tried, and which, I believe, would not work, is to persuade a female mouthbrooding African species to incubate the eggs from a substrate-spawning South American species. I don't think this would work because of the time differences in hatching the eggs.

Should a mouthbrooder be coaxed to take the eggs from an American species and were they to hatch out in her mouth, then they would likely be dead by the time it came to the female releasing her own brood.

Rationale

What is the point of these experiments, and where does it all lead? Well, in my opinion, it is preferable if species can care for their offspring the way nature intended. But, if this fails, then fostering provides a good alternative "natural" way of going about things.

Natural brood care is far superior to the artificial rearing of the fry, especially during the first few days following hatching. It is during this stage that losses are likely to be highest.

In addition, when fry are artificially hatched, especially those of the dwarf varieties, a great deal of care and attention by the aquarist is needed to get them over the first few days. If the owner is working and just cannot spend the time needed for the regular feeding that the fry require, then losses are inevitable.

It is not everyone who is able to leave this task to someone else, so, my advice to those who find themselves in this position, is to do it "the fostering way".



Above, I have successfully managed to have fry of this species. *Pseudotropheus zebra*, fostered by *Oreochromis mossambicus*. Left, my only "intercontinental" success to date, involved the rearing of *Tilapia burtikoferi* by a female Texas Cichlid.

News from the societies

IGL — 10th Anniversary Conference By Stephen Clark

On the weekend of 1 and 2 April 1989, I had the pleasure of attending the 10th Anniversary celebrations of the International Anabantoid Association, held in the ancient romantic town of Kaiseraugst in Switzerland.

After a brief tour of the local tropical fish shops, I settled down on Friday evening to an informative lecture delivered by Karl Lung on the search for the fish of Ko Samui, Thailand with slides of the wild, short-finned fighting fish, *Betta splendens*.

A dull rainy Saturday morning gave a perfect backdrop for a visit to the compact zoo, set in the heart of Basle. The modern aquarium has its large, extensively planted fish tanks, carefully arranged through a dimly lit, slightly inclined, passage. Various healthy tropical freshwater and marine fish, from the

small Long-finned Zebra Danios to the six large Silver Arowanas can all be viewed with ease.

Under large leaves are the "young" Leopard Bushfish (*Ctenopoma acatirostre*), the product of the first and only captive breeding of this fish accomplished in a 7500 litre tank in 1982. Further notable anabantoids were the wild form of the Three-spot Gourami (*Trichogaster trichopterus*) and the Paradise fish (*Macropodus opercularis*).

On my return to the meeting, the editor of the Swiss aquarium magazine "Aquarium" gave an interesting and highly entertaining talk on the several years spent in the jungles within the islands of the Indo-Australian Archipelago. He recalled that, on his return to Europe, his jungle body aroma, "in-built" from successive fish collecting trips, had an airport taxi driver ventilating the car and his faithful dog attacking his unrecognisable owner!

The day was concluded with a lecture on the air breathing

African Snakeheads by Bernd Schmidt from Hamburg, West Germany.

Fish sold at the auction of anabantoids, were the bubble-nesting fighting fish, *Betta imbellis*, *B. coccinea* and the mouthbrooding *B. pugnax*. Schaller's Gourami (*Trichoptis schalleri*); a species of Licorice Gourami (*parosphromenus nagsi*) and the Small Snakehead, *Channa gachua* were a sample of the overall representation.

Viviparous news

Viviparous — The Livebearer Information Service held a most successful livebearer auction on 2 April. Over 100 people attended and over 500 lots of fish were sold. Eighty different wild livebearer species were on offer, including the newly-described *Heterophallus milleri* and the, as yet, undescribed *Zacapu Sawfin* — a new *Skiffia* species.

Cultivated livebearers were

in good evidence as well, with over a dozen different types on sale. The newly-formed Fancy Guppy Section came up with a number of new strains, including the rare German Yellow Guppy.

The membership are now all looking forward to the 1st International Livebearer Convention to be held in the UK. This is to be held on 21 and 22 October at the Midland Hotel in Derby. The full list of speakers is as follows:

James K Langhammer
Pat Hartman
Dr David Ford
Derek Lambert

As usual, this is an open event, with non-members welcome to attend. Sunday afternoon will be taken up with what we hope will be another record-breaking auction. Fish have already been promised from the USA, Germany, Denmark and Holland. For further information about this event please contact Nigel Hunter, 60 Barry Way, Brighton Hill, Basingstoke, Hants.

Diary dates



Midland Koi Association

The M.K.A. 14th National Open Show will be held at Baginton Village Hall, Baginton, Coventry, on Sunday 9 July. Benching: 9.30 am onwards. Judging and Public Admission: 12.00 noon. Martial Arts Display: 3.00 pm. Prize Presentation: Approx. 5.30 pm. Guest of Honour will be M.K.A. President, Dr David Ford (Head of the "Aquarian" Advisory Service). There will also be three Koi dealers in attendance as well as (hopefully) a garden ornaments stand. Entry forms, show rules and further information available from David Twigg (Show Secretary), 24

Cocksparrow Street, Warwick, CV34 4ED. Tel. 0926 495213.

South East London Catfish Group

The third S.E.L.C.G. Open Show will be held at the Community Centre, Stopford Road (off Walworth Road), East Dulwich, on Sunday 30 July. For further details, ring C. Osborne on 01-858 9681.

Sandgrounders' Aquatic Society

The Sandgrounders' Aquatic Society's 19th annual Open Show and Grand Auction will be held on Sunday 30 July at Meols Cop High School, Meols Cop Road, Southport. Benching: 11 am to 1.15 pm. Open to the public from 1.30 pm. Auction starts at 1.30 pm. (F.N.A.S. rules apply.)

Schedules available, on receipt of a 10 in x 7 in sae, from B. Baldwin, 10 Olive Grove, Southport. Tel. 0704 43384.

International Cichlid Conference News

With the I.C.C. now just round the corner (10-13 August in Orlando, Florida) we've just received the following — almost complete — list of illustrious speakers and their topics:

Rainer Stawikowski — "An Aquarist's View of South African Cichlids".

Dr Guenther Ritter — "A Comparison Between the Aquarium Hobby in the United States and Germany".

Dr Anthony Ribbink — "Evolution of Parental Tactics in Lake Malawi Cichlids".

Marshall Meyers — "Regulatory Threats to the Aquarium Hobby".

John Farrel Kuhns — "Aquarium Water Chemistry".

Dr Ad Konigs — "The Amazing Cichlids of Lake Tan-

ganyika".

Dr George Klontz — "Cichlids as Food".

Dr John B Gratzek — "Angelfish Disease".

Dr David Ford — "Cichlid and Other Fish Nutrition".

Dr Ruth Francis-Floyd — "Angelfish Disease".

Heiko Bleher — "Collecting Fishes on Five Continents".

Last minute update — Heiko will give a second presentation on some new cichlid genera from several previously uncollected lakes in Central Africa.

George Barlow will take the place of a speaker who had to cancel, speaking on Central American cichlids. He is from the University of California at Berkeley.

Further details from Maggi Mahoney, ACA Public Relations Committee, 12094 Stallion Ct, Woodbridge, VA 22192, USA.



AREND VAN DEN HELWENHUIZEN



ANDREAS SPREINAT



ANDREAS SPREINAT



ANDREAS SPREINAT

Top left, aquarium-reared specimens like this one are often very difficult to identify. This fish — originally thought to be, *A. nyassae* — is probably a rather well fed, *A. hoeseri* "White Top". Above left, *A. ethelwynnae* is one of the yellower species of *Aulonocara*. Above, this striking fish is an *A. "Uuisya"*. Top right, *Aulonocara hansbaenschii* photographed in the wild near Masinje.

PEACOCK CICHLIDS

THE AULONOCARA REVIEW

Part 2

In the concluding instalment of their two-part review of these cichlids, John Ferguson and Dr Ethelwyn Trewavas link up scientific and trade names in the most complete and easy-to-follow summary ever published in the aquarium press.

Notes on species of *Aulonocara*

A Some aquarists will be surprised to see only one scientific name, *Aulonocara hansbaenschii*, for four of our hobby names. The authors of the name considered them to be just four populations of one species. One of us (J.F.) notes that each has its own characteristics and is not satisfied with this decision. It is, however, an example of a problem facing all students of the rock-fishes (not least mbuna).

B A similar problem arose with *Aulonocara maylandi*. The "Blue Orchid" is very much like the "Sulphurhead", but has a white blaze where the latter is sulphur-yellow. It also has a stronger pharyngeal dentition.

Meyer, Riehl & Zetzsche called it the Kande island population of *Aulonocara maylandi*, but Tawil & Allgayer, without seeing the other paper, gave it a subspecific name,

Aulonocara maylandi kandeensis.

This is an example of two ways of saying the same thing, namely that *Aulonocara maylandi* is found in places as far apart as Eccles Reef and Kande Island, but there are differences between these two extreme



A "Black Top Chisumulu" (seen here photographed in the wild at Chiteko — Chisumulu) is a beautiful species that has not yet been exported from Lake Malawi.

populations.

C *Aulonocara nyassae* Regan, 1922. This was the first name given to any *Aulonocara*. In fact, the generic name was invented for it, and so it is the type species (reference species) for the genus. It was based on three preserved fishes about 9.5-13cm (3.7-5.1in) in total length, collected by Mr Rodney C. Wood in 1921. He gave no exact locality, but as he lived at the South end of the lake, we may assume that it was not far north of Fort Maguire on the East coast or Chipoka in the West. It is difficult to match these now colourless fishes with any living ones.

A species was imported under the name *Aulonocara nyassae* during the 1970s and was illustrated in Staek's second volume (1977, fig. 112, 113). At that time Peter and Henny Davies were exporting fish from Lake Malawi, including the Mozambique coast, but in recent years the state of the country has made collecting there too hazardous. The last

Herpetology matters



By Julian Sims

Raining frogs

At some time during the period from early May until the end of the summer, newly metamorphosed Common Frogs (*Rana temporaria*) leave the water in which they lived as tadpoles to feed on land.

Exodus from the water tends to be "en masse" and groups of froglets can be of such a high density that many of these tiny dark brown amphibians get squashed underfoot, especially on paths around ponds in town and city parks. At field ponds, froglets have the opportunity to hide in the surrounding grass, revealing their presence only when they are disturbed by footsteps.

Due to their small size and very thin skin, newly metamorphosed amphibians are at particular risk of being desiccated by the heat of the summer sun. Thus the mass migration from water is usually synchronised by heavy rainfall — perhaps a thunderstorm. Not surprisingly, this sudden appearance of hundreds of tiny, hopping amphibians, has led people to believe that it was literally "raining frogs".

Fanciful perhaps, but another explanation of this phrase has been given some scientific credibility by the Tornado and Storm Research Organisation (TORRO) at their 1988 conference held at Oxford Polytechnic. Natural phe-

nomena called WATER-SPOUTS (vortices of swirling wind touching the surface of lakes and ponds) are thought to lift water, amphibians, fish and invertebrates, upwards into the sky. These items are then "whisked off" to fall back to earth some distance (even miles) away.

Herpetological societies continued

Last month, *Herpetology Matters* started to survey the British societies which specialise in reptiles and amphibians. Two more societies are outlined in this edition.

The British Herpetological Society

This Society was founded in 1947 by a group of enthusiasts including their first President, Dr Malcolm Smith — author of the classic book *The British Amphibians and Reptiles*, published by Collins (New Naturalist Series).

Meetings are held in London and number approximately ten per year.

Publications have altered their name and format through the society's 40-year history but currently the BHS publishes *The Herpetological Journal* twice a year and *The British Herpetological Society Bulletin* on a quarterly basis. The Society has separate Captive Breeding, Conservation and Education Committees.

Further details can be obtained from:

The Membership Secretary,
The British Herpetological Society,
c/o Zoological Society of London,
Regent's Park,
London, NW1 4RY.

The International Herpetological Society

Formed in 1973, the I.H.S. is based in the West Midlands, although it also holds regional meetings at various locations in the United Kingdom.

Publications include a monthly newsletter and a journal, *The Herpale*, which is

published quarterly. This journal sometimes contains colour photographs of reptiles and amphibians.

The I.H.S. Secretary can be contacted at:

65 Broadstone Avenue,
Walsall,
West Midlands, WS3 1JA.

All five Societies outlined in the last two editions of *Herpetology Matters* have overseas members and have contacts (including literature exchange) with Herpetological Societies in other countries.

Mediterranean re-visited

Many species of reptiles and amphibians from southern Europe are endangered. Turtles which inhabit the Mediterranean Sea are at particular risk.

Turkey has cancelled the proposed development of tourist facilities at Dalyan Beach and has officially designated areas of Gökova, Fethiye and Koycegiz as "specially protected sites". These are important nesting beaches for Green Turtles (*Chelonia mydas*) and Loggerheads (*Caretta caretta*).

Unfortunately, the Loggerhead nesting beaches in Greece are far less secure. At Laganas Bay on the island of Zakynthos, mopeds and 4-wheel drive vehicles are deliberately driven over nesting sites. The noise and lights from tourist facilities distract female turtles which nest at night and disorientate hatchlings which emerge under cover of darkness.

The Akamas Peninsula in Cyprus is also being developed as a centre for tourists. The beaches of the peninsula are a traditional nesting site for the Green Turtle.

Even in the open sea, turtles are not safe because Spanish and Maltese fishermen catch them "by accident" on their baited long-lines or in trawler nets.

In the Caribbean Sea, the shrimp fishermen of Guadeloupe and Martinique use Turtle Excluder Devices (TEDs) on their nets. If adopted in the Mediterranean, this prac-

tice would certainly prevent some turtles from being needlessly drowned.

The beaches of the Mediterranean are very popular with tourists, especially the "sun-seekers" from more northerly European countries. Sheer numbers of visitors inevitably cause problems, but these are exaggerated by thoughtless activities. In particular, the use of speed-boats and water skiing in the vicinity of turtle beaches could so easily be prevented. The propellers of boats damage the carapace (upper shell) of turtles and lacerate their flippers.

If you are visiting the Mediterranean this summer, have a pleasant break, but please have a thought for these vulnerable Chelonians.

Heloderms — venomous lizards

The Gila Monster (*Heloderma suspectum*) from Sonora, Mexico, and the south-western United States, and the Mexican Beaded Lizard (*H. horridum*) are, at present, the only two species of lizard in the world known to produce venom.

The venom is produced by glands in the lower jaw and released into the mouth along grooves in the teeth. It is "injected" by chewing and is probably used for defence and to start the digestion of food, rather than just for immobilising prey. These lizards feed on small mammals such as mice, fledgling birds and the eggs of birds and reptiles.

Heloderm venom is usually fatal to small mammals, but laboratory experiments have indicated that if these lizards are injected with their own venom, they appear unaffected. This phenomenon is known as "auto-immunity".

Specific globulins (a type of protein) present in the blood plasma and in the liver of these lizards confer this immunity. If purified extracts from *Heloderma* blood or liver are mixed with venom and injected into mice, then these animals also become immune and show no ill effects.

PRODUCT ROUND-UP BY DICK MILLS

POND FILTERS

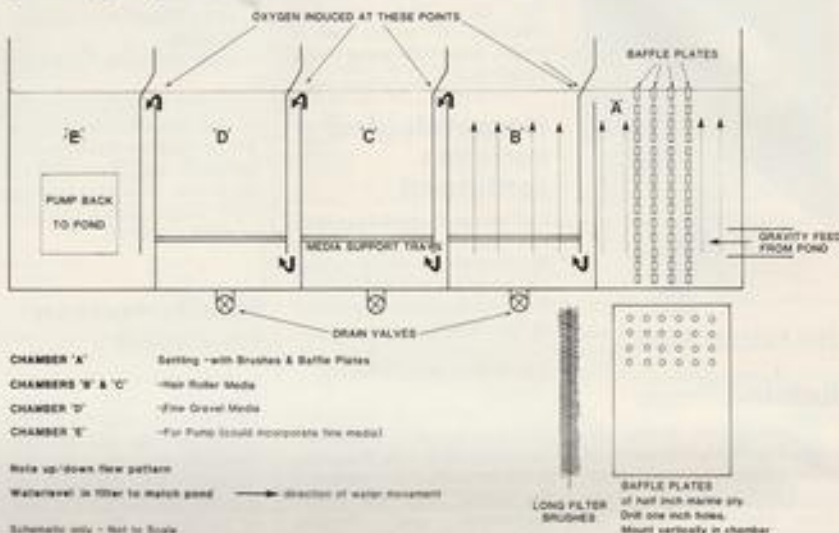
A pond filter is something many pond-owners only wish they'd thought of when preparing the pond in the first place, or when a suddenly mild winter and unaccustomed early British sunshine brings more than just a touch of green to the water.

Pond filters are closely allied to the pond's pump and it may be that a little "updating" may be required in this department too, especially if an "out-of-pond" filtration system is to be used where water has to be lifted some distance above the pond.

Of course, the simplest pond filter of all is good pond management in association with correct levels of stocking and planting, but here we will discuss the more-expected mechanical "add-on" types.

Many pond fountain/waterfall pumps can be turned into effective "in-pond" filters simply by the addition of extra filter-cartridge units; usually up to four or eight can be accommodated per pump depending on output power. Alternatively, the waterfall outlet can be utilised to lift water out of the pond into a separate filter unit where filtration occurs. A submersible pump can also be used to operate a sub-gravel biological filter bed, but such a system is best installed during the pond's original construction. Incidentally, a biological filter should have a minimum size of one-third of the area of the pond.

External filters range from the modestly-sized single, trickle chamber unit, to the very large multi-chamber devices. The latter designs split the water flow into separate flow rates according to the type



of filter medium used in each chamber.

The latest circular types have conical bases for easy drain-off of settled detritus, and have the water flow injected tangentially to assist settlement even further. In recent years, research has also shown that mechanical filtration (provided by foam) coupled with ultra violet light treatment is effective against algae, a combination of the most modern with a longer established form of suspended material removal.

One further complication for the pond owner, is the problem of hiding these external filter

units — especially if they have been added to an existing pond. Such is the state of the art, that it is not uncommon to see that the size of "built-alongside" filters (particularly those associated with Koi-keeping) almost match that of the ponds they are designed to service.

Here it may be more normal practice for the filter to be gravity-fed through built-in pipework, with the pump (located exteriorly) pulling the water through the filter back to the pond. Water fed to the filter may be taken from midwater or bottom drain levels, but the latter course should be used

Schematic view of a multi-chambered pond filtration system. Many Koi pools are fitted out with this type of set-up. More modest designs will also do a good job, of course — if properly managed.

with caution as clogging will occur much more rapidly when much dirtier water is taken from the bottom level.

Failing the installation of a filter, the next best thing is a bottom drain so that detritus may be drawn off periodically; any replacement water will help to maintain lower dissolved waste levels too.

AQUAMETRICS

AQUAMETRICS Ltd are sole importers/distributors in the UK for PLASTICALL, DRAKA, HEISSNER and UBBINK products. Five new products have now been added to the already comprehensive range.

PLASTICALL MARSH ZONE CONTAINERS are a novel way to ensure that the margin around your pond is correctly "moisturised" at all

NEW PRODUCTS

times. The clip-on container has a built-in capillary-action system for this purpose and fits all rigid pond rims.

If anyone has invited you to go and take a jump in the pond recently, then if your pond is a UBBINK you can do just that! A new range of eight smaller garden ponds has been released: made from black polystyrene, all are frost-proof, carry

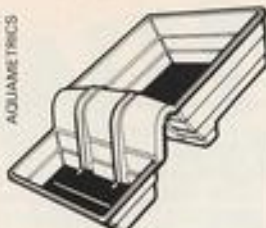
a 15 year guarantee and some have a built-in marsh zone all round. The range retails from £18.65 for the smallest (somewhat unfortunately named PO1!) — a modest 23 gallon size.

The DRAKATECHNA-FOLIE Pond Liners' guarantee has been upgraded from 10 to 12 years; they can be supplied (custom welded into any shape

within two weeks) in sizes up to 70,000 sq ft. Available pre-packed or on rolls, with built-in measure tapes, they come supplied on a sturdy galvanised stand.

At a more modest level, SUPRALENE 35 PVC Liner is a high quality economy pre-packed black PVC liner in seven standard sizes from 8ft x 6 ft to 15ft x 12 ft; it carries a 6 year guarantee.

If it's a reliable and economical pump you're looking for



Ubbink's marsh zone container — the easy way to keep marginals moist.

then think HEISSNER. The extended range now includes high-volume submerged pumps (1,100 to 10,500 gph), ideal for filters, streams and waterfalls. All have ceramic bearings and come complete with 30 ft cable. Details of these products from: **AQUAMETRIC LTD**, Stow-upland Road, Stowmarket, Suffolk IP4 5AN (Tel 0449 674999).

MMR

Those clever people at MMR (Modular Metal Redemption Ltd) have recently rescued the V & A from a green slimy menace.

The Pirelli Garden Fountain at the Victoria & Albert Museum has been fitted with an ALGARID 40 unit; this magnetic algae-remover (capable of treating up to 1200 litres/hour) deterred the algae far longer after cleaning than previously and no chemical treatment is involved whatsoever.

Just in case you think Algarid is for big boys only, MMR have units which are effective from 10 l/h right up to well over 500,000 l/h. Details from:

MMR Ltd, 39 Marsden Street, London NW5 3HE (Tel 01-284 0553. Fax 01-847 4857).

INTERPET

If you're one of those fortunate aquarists whose need to use water test kits is few and far between, then the chances are that when you do drag your test kit from the back of the shelf, the reagents may be well past their best and thus more than likely to give a misleading result.

INTERPET'S new **EASY TEST** range of kits eliminate this risk, the reagents are foil-packed tablets, ensuring an almost indefinite shelf life. In addition to the associated test vials, colour comparison cards and full instructions, each kit has an easy to understand

"Guide to Aquarium Water Quality".

Seven Easy Test kits are available, retailing from £3.73: Ammonia, Copper, Nitrate, Nitrite, pH (Low range), pH (Upper range) and pH (Broad range). Keeping a regular check on water conditions couldn't be easier (or more reliable).

Developing this range a little, Interpet have also produced **POND CHECK**. This is a two-test package, containing pH and Nitrite test kits. Again, the necessary test reagents are clean, easy-to-use tablets and, once more, Interpet have included an informative booklet which not only explains



Easy-to-use and long-lasting test kits from Interpet.

why you're doing the tests but also helps with any problems that the test results indicate. Retail price of **POND CHECK** is £4.97. Details of **INTERPET** products from:

INTERPET LTD, Vincent Lane, Dorking, Surrey RH4 3YX (Tel 0306 881033. Fax 0306 885009).

CRYSTAL CLEAR PRODUCTS

If you're fed up with having hands like a chimney-sweep's after changing the activated carbon in your aquarium filter, **CRYSTAL CLEAR PRODUCTS** have just the thing. They've come up with a filter mat which has Super Activated Carbon bonded onto each fibre; this means the mat has a very large effective surface area capable of a great rate of absorption with the resultant pH stabilisation. In addition, nitrifying bacteria will also find the cellular construction easy to colonise.

As well as removing dissolved wastes (urine, organic impurities and other toxins) the Activated Filter Mat can also be used to remove chlorine from tapwater; in the event of over-feeding (in fry tanks) accumulating organic waste is also kept to a minimum.

Easily cut to suit all types of filters (internal, external, air-operated or power), the Filter Mat will work effectively for up to 10 weeks: it may be rinsed to remove debris and replaced in the filter.

Although it is quite safe to use for all aquarium and pond applications, the Filter Mat should be removed during periods of medication — it'll remove them just as effectively! Details from:

CRYSTAL CLEAR PRODUCTS, Regan Street Works, Halliwell Road, Bolton, Lancashire.

BETTER WATER GARDEN PRODUCTS

Readers of an earlier issue of *A&P* (May 1989) will already be familiar with the **MINNOW** starter pool from **BETTER WATER GARDEN PRODUCTS**.

The almost double-sized (60 gallon) **BROOK** pool is again aimed at encouraging children to take up water gardening in a safe manner. Again, a marsh area and amphibian escape ladder is featured in the pool's excellently-finished, clever des-



BWG's Minnow — part of the company's safe-for-children range.

ign. The **BROOK** retails at £25.95. Details of all **BWG** products from: **BETTER WATER GARDEN PRODUCTS**, Blagdon Water Garden Centre, Bath Road, Upper Langford, Avon BS18 7DN (Tel 0934 852973. Fax 0934 852998).

KING BRITISH

One problem of keeping live animals in water is that they will pollute it by their very physical presence and bodily functions. They need a most effective "room service" if they are to thrive; just ask yourself how long you would be prepared to live accompanied by your own daily wastes! This essential sanitation process is

carried out by **SAFE-WATER**, a totally new product from **KING BRITISH**.

SAFE-WATER contains micro-organisms which accelerate the two very important sub-processes of denitrification and nitrification in the aquarium. The result is that fish wastes and ammonia-based compounds are broken down very efficiently and the water remains sweet.

Designed for weekly, regular use in both freshwater and marine aquariums, **SAFE-WATER** will also help to mature biological filter beds much faster and, when used in association with **SAFE-GUARD DECHLORINATOR** (also from King British), it is particularly useful in preparing new water for aquarium use. Details from:

KING BRITISH, Haycliffe Lane, Bradford, West Yorkshire BD5 9ET (Tel 0274 573551).

STAPELEY WATER GARDENS

Water lilies and other aquatic plants have huge appetites, and require regular feeding in order to flourish. This they do — in profusion — at **STAPELEY**; a factor that has made this Cheshire site (the world's largest water garden centre) one of the most beautiful centres in Britain.

Stapeley's continued success has earned them Gold Medal Awards at Chelsea and many other RHS Shows and now, for the first time, one of their secrets is for sale... **THE STAPELEY AQUA-BLOOM FERTILIZER** — an organic and perfectly balanced professional grade feed which Stapeley's have developed, and which they use to encourage maximum bloom production and plant health for all their water lilies and other flowering aquatic plants. **AQUA-BLOOM** comes with advice on "dosages".

6 tablets... £2.00 (plus p&p)

12 tablets... £3.60 (plus p&p)

24 tablets... £6.50 (plus p&p)

Only available from **STAPELEY**, Nantwich, Cheshire CW5 7LH (Tel: 0270 623868 Fax: 0270 624919).

Letters

New society for Characin fans

The International Characin Association, of which I proudly hold the positions of President and General Secretary, has taken approximately 12 months of practically every spare minute available to put together.

The name states "International" and we fully intend this to be correct. We intend to concentrate primarily on Characins but will devote a section of our literature to all aspects of the hobby, including conservation issues and the remaining families of fish not covered by other specialist societies.

To this end we intend to start off by producing a quarterly newsletter and, as the membership and demand swells, issue it more frequently. The information for the newsletter is being collected from all over the world, as will become more apparent when the first one is done and issued.

We were hoping to have a complete list of all the Vice-Presidents available by now, but will have to submit this at a later date. Suffice to say that several prominent people in the aquarium world have been approached, and that the initial reactions have been very favourable. So, from this, I hope that it can be seen that the ICA is in no way meant to be a here-today-gone-tomorrow-flash-in-the-pan, but a permanent addition to the already running specialist societies.

We intend to run alongside the other specialist societies, not in competition with them. Any specific information that is requested will be passed on: we only ask for the same courtesy in return.

This shot of *Tilapia butikoferi* won the runner-up prize for Thomas Durose in our National Pet Week competition featured in the April issue of *AGP*.



The launch date we have aimed for is **Saturday 1 July 1989** when the first newsletter should/will be available.

Requests for full details, membership application forms and all enquiries should be addressed to me at the address below. The other three founder members of the ICA are: Alan Darby, Vice-President / Chairman; Arnie Chadwick, Treasurer; and Brian Walsh, Identification Officer (other posts will be filled after the launch).

Dave Sidebottom
18 Harry Street
Werneth
Oldham
Lancs OL9 7TA
Tel: 061 626 9128
Editor's note

We wish you all the best with the Association, Dave, and will support you in any way we can.

John Dawes

Out-of-date BCA details

Shortly after Dick Mills' review of *An Interpet Guide to African Cichlids* by Paul Loisselle (*Books February's AGP*), I obtained a copy of this book and was disturbed to find that the British Cichlid Association

membership details it contained were about seven years out of date! In addition, some of the photographs (mostly of a good standard) were inaccurately labelled, while Dick's last-but-one review paragraph should have read: "recent name changes have been included . . ." not "have not".

John Ferguson
Halifax

. . . Dick Mills replies

Still flushed from the thrill of having a book review getting rave notices, I do have some sympathy for the up-to-date reader when rather-less-contemporary information is included in a new book.

It is unlikely (except in the case of solely aquatic publishers) that every Specialist Society's address change finds its way to a publisher immediately it occurs; usually it surfaces just after a reprint has gone to press! New secretaries (of any hobby organisation) are probably too busy writing to other, more intimate, contacts to ever consider book publishers as needing their address — and publishers don't necessarily read the hobby magazines as avidly as we might want them to.

Again, Paul Loisselle is not exactly a "local lad", and how many of us writing for a "foreign" publisher might well commit the same mistake over an address in an unfamiliar area?

Regarding species name changes, I understand that the most recent changes were deliberately not included until all the suggested taxonomic reclassifications had been ratified

or accepted; the author gives his reasons on page 65 in the introduction to the Species Section of the book, hence prompting the relevant reference in my penultimate paragraph.

Rounding off this reply (which I sincerely hope will find equal favour) I am very happy to notify one and all that the correct contact address for the Membership Secretary of the British Cichlid Association is: Membership Secretary

B.C.A., Howard Barnfather,
100 Keighley Road,
Skipton,
North Yorkshire, BD23 2RA.
Dick Mills

Thanks from "Norman Elf"

May I, through your publication, express my sincere thanks to all members of the trade, trade press, suppliers and staff and directors of Interpet Ltd who so generously supported and sponsored "Norman Elf's" efforts in aid of Childline at the recent Pet '89 Exhibition?

As at today's date, if all promises of sponsorship are received, over £1,000 will have been raised in aid of Childline.

I hope that all those people who were so generous will accept this as a deeply felt personal thank you on behalf of "Norman" and those unfortunate children who need to contact Childline.

Mike Clarke
Sales Promotion Manager.
(Interpet)

Pet Week thanks

I have just opened my letter saying I have a runner-up prize in your competition. First off, all thank you for thinking of a great way of showing it was National Pet Week. Secondly, thank you for your prompt letter and last, but not least, keep up the good work in *Aquarist & Pondkeeper*.

Thomas Durose
Stoke-on-Trent
Editor's note

One satisfied customer! Thomas' runner-up photograph is printed on this page. For some of the other winners, turn to page 23.

John Dawes



OUT AND ABOUT KENCHESTER WATER GARDENS

by John Cuvellier

Kenchester Water Gardens is situated a couple of miles north of Hereford on the A49, close enough to Hereford for visitors from afar to have a look around that charming city too, provided they can tear themselves away from the site!

The centre is totally orientated towards water gardening and aquaria, with the owners, Malcolm and Margaret Edwards, quite determined to make it the best centre of its kind in the country. They have been in the business for a number of years at Kenchester itself before moving to their present premises, and were one of the first retail outlets for Koi in this part of the country.

The statistics of the centre are very impressive. The site covers some six acres and contains, among its many attractions, an 85,000 gallon puddled clay lake with many assorted fish which the customers can watch rising to feed on pellets. Some rather nice Koi, in addition to Rudd, Orfe, Mirror and Crucian Carp, can all be seen feeding.

The lake is also heavily planted with many of the 160 different varieties of water and marginal plants available at the centre (quite the most comprehensive selection I have come across). There are also some 30 different varieties of water lily on offer, enough to satisfy the most particular purchaser.

To obtain the best possible water quality for servicing the fish holding tanks, etc, Malcolm sank his own borehole, passing through no less than three aquifers to reach a fourth at 135 feet! From this source Malcolm is able to extract a million gallons per annum of the purest water imaginable.

There are also numerous landscaped pools dotted around from which the novice and experienced alike can obtain ideas and inspiration for their own pools, including some splendid examples of structural

stonework pools and fountains for the stately home.

One feature which really attracted me was the provision of what Malcolm calls his Fish Packaging House, a custom-built structure where customers' fish purchases are examined, packed and oxygenated. Now that is an innovation.

Coldwater fish for sale are housed in a series of outside, fully filtered tanks and how nice it is to be able to see clearly what you are buying.

The "dry goods" section of the centre is a real Aladdin's cave where one is able to browse among the pumps, pipe fittings, liners, test equipment, etc. The centre specialises and recommends the Robfil modular filter systems which, of course, can be expanded as the need arises, all components being available "off the shelf". For those who wish to plunge, there is even a range of sand pressure filters on display.

The devotees of tropical fish have not been forgotten as there are two fish houses containing 120 tanks and 150 different varieties of fish, as well as a large selection of aquaria to suit all pockets. All the usual types of food, medicaments and advice (freely given) are available.

In addition, there is a full pool building and landscaping consultancy service for those who wish to avail themselves of this facility. Should you begin to feel a little jaded during your visit, you can retire to the very attractive tea rooms for refreshments and gaze at a beautiful example of hexagonal aquaria, or sit out on the patio overlooking the lake while you imbibe and prepare for another sortie around these most interesting premises.

There is still a great deal of work in progress on the site and I understand that many more delights are planned for the visiting water gardener, including another large lake and a number of additional smaller



Some of the ornamental stonework on display.



Part of the extensive dry goods display.

display pools. Access for the disabled and wheelchair bound visitor is good, with ramps strategically placed where necessary. This is one place which really must go down in your

diary for an early visit. The full address is, Kenchester Water Gardens, Church Road, Lyde, Hereford. Tel (0432) 270981 and the site is open seven days a week from 9 am to 6 pm.

Scottish Aquarist

The 17th Scottish Aquarist Festival was held at the usual venue — The Leisure Centre, Motherwell, on 13 and 14 May. For once, the show did not coincide with the English or Scottish football finals and the weather was warm and sunny, but, despite this, the number of visitors was disappointingly low.

This trend has continued for several years, and, as a consequence, the number of major traders and manufacturers that used to attend have dwindled. The only big names at the show were 'Aquarian' and Hagen.

At least, there was a good choice of live fish, with Belton Fish Farm, Northern Discus and a local trader, T. Brown & Son of Arbroath. Another new face was Empire Aquarium Designs who gave an exhibition

of tank building every hour throughout the weekend.

A wide range of books and magazines was for sale from the *Aquarist & Pondkeeper* stand and Tropicure Ltd. Cactus plants were also available, plus the Tombola and Cancer Relief assorted goods. In fact, with 10 traders and 18 tableaux, plus the specialist stands of SLAG, Viviparous, BCA, Anabantoid Association and BKA, the show had something for everyone.

The 'Aquarian' Advisory Service stand was kept busy answering Scottish aquarists' problems. This year they were offering audio tapes on fish-keeping as well as the usual Beginner's Guides and Information Bulletins. SLAG had an automatic slide show of Live-bearers, and BCA had a television with a video film of Cichlids.

The winning tableau was

English Water Gardens

John Dawes

Like so many other pond owners, I'm a bit of a gardening nut. So, when I learned that English Water Gardens form a part of a larger whole, Gardener's World (owned by the same people), I just had to pay them a visit.

I have to say straightaway, that I was delighted I did. The place is huge and, although quantity does not necessarily mean quality, in this case it does!

One of the great advantages of having a garden centre and an aquatic one both owned by the same team, is that you are free to set the place out just the way you want it. This is precisely what **Keith Quick** and his son **Graham** have done.

The result pays off in numerous ways. For example, it's difficult (no, impossible) to know exactly where English Water Gardens ends and Gardener's World begins. Therefore, as you walk around between the various Koi-holding areas, complete pond displays, etc, you'll pass through attractively laid out bits of "normal" garden centre.

Whether this is fully intended or has evolved by accident is difficult to say, but



Right, quality Japanese Koi at keen prices at English Water Gardens.

Left, Koi-keepers admiring a small selection of English Water Gardens' extensive stocks.

there's no doubting its effect. If you are a gardener of any sort, you are bound to see something worth buying en route to the Koi ponds, or on the way back to the till... all good for business.

A similar approach to part of the pond plant display (this time having to go through a large glasshouse) can also lead to unplanned purchases of exotics, from Oleanders to Mimosa... and loads in between.

The large covered area has a tropical and coldwater aquatic

section where everything and anything from a bottom drain to a book, and a Goldfish to a Guppy can be bought — to go along with your bedding plants, prefabricated pool (English Water Gardens have a great new range out this season — see our exciting competition elsewhere in this issue), garden furniture, canary, parrot, guinea pig, slug pellets, Koi pellets... and fully quarantined high-quality Japanese Koi at about the most competitive prices I've seen.

Then before you leave, you

can have a delicious buffet or sandwich (a better-than-average range is available) in English Water Gardens' spotlessly-clean, attractive cafeteria.

I found English Water Gardens to be an excellent centre, excellently run, and well worth a visit. Opening hours: 9.00 am to 5.30 pm (seven days a week). Further details from: **English Water Gardens, Rock Lane** (just off the A24 — 1½ miles north of Ashington), **Washing-ton, Surrey RH20 3BL. Tel 0903 892006.**

Festival '89

Hobbies Centre Aquarist Group's Gingerbread House, fresh from its similar triumph at the Yorkshire Aquarist Festival.

Builders **Jenny and Bob Lack** said they had high hopes of the Grand Slam (winning at YAF, SAF, BAF and AFE!). Second was **Scorpion's** wildlife pond and third was a box designed by **Dunfermline AS** to be a movie film spool with tanks as each frame. **Rainbow AS** built a bar with Betta Beer on tap and a juke box that belted out pop music.

There were some interesting fish, such as the large Snakehead adorning the furnished aquaria on **Wansbeck ADAS's** tableau. Northern Discus were offering some colourful Jack Watley Turquoise Discus at £425 a breeding pair. The catfish fancier appreciated the giant *Platydonot conatus* on the **DHSS**

tableau; this fish won the Best Catfish award. Best Anabantoid was a huge *Betta pugnax* on the **St Andrews AS** tableau. **Viviparous** were very pleased with the success of Livebearers, with many of their members getting prizes, including the Best Fish in Show, a *Brachyraphis* "cardinal" by **D. Silk** on

Scorpion's tableau. The Scottish Supreme Champion was also a Livebearer, the Black Prince, *Characodon audax* owned by **Jake Milligan**, chairman of **SLAG**. Past President **Dave Wilson** handed out the prizes at the end of the show.

Congratulations to the SAF committee on yet another

friendly and interesting show that has become a traditional part of the Scottish scene. This sub-committee of the Federation of Scottish Aquarist Societies must now plan SAF '90 to attract more visitors, however, if traders are to be persuaded to make the trip North of the border.

FRED THE PIRANHA.

THE TROUBLE WITH OWNING A PET BOOT, IS THAT YOU HAVE TO TAKE THEM FOR WALKS!



OR IN THIS CASE...



HOPS!



©88 PETER McGERGON.

COME ON, BOY... HEEL! HEEL!



Seaview



by Gordon Kay

National Fishkeeping Week?

May saw "National Pet Week" in Britain. This jolly good idea was set up to promote pet keeping in general and educate people of their responsibilities towards the animals they keep.

A certain amiable Irishman had a whole programme devoted to National Pet Week and all manner of pets were displayed and the point made that, although we consider ourselves to be "animal lovers", we are very irresponsible towards our pets and, indeed, hundreds of cats and dogs are destroyed every day because no-one wants them. There are also, of course, many, many animals ill-treated — sometimes even unwittingly.

I am 100% behind ideas like National Pet Week and think it's high time we started to talk openly on these subjects, but why can't we have a National Fishkeeping Week? This, too, would be aimed at promotion and education (which can NEVER be overdone — how many fish die each year because of ignorance?)

The possibilities are endless: exhibitions, film shows, competitions, lectures and even one/two-day courses could be staged all over the UK. Manufacturers, importers, specialist societies, even publishers would benefit from the promotion that all of this would bring. I would be glad to hear people's comments on the subject — particularly from the trade.

Y A F support

Speaking of promotion, I was at the Yorkshire Aquarists Festival in Doncaster and I couldn't help feeling somewhat disappointed. I can remember — not long ago — when the Doncaster show was THE show in the fishkeeping calendar and exhibitors would fight for floor space. This year, though, some of the companies which are always at this kind of event gave the show a miss.

My wife says that I felt this way because I have been to so many shows in the past and have become too demanding — I don't know.

Some people merely seemed (to me) to be going through the motions, which is a great shame in view of all the organisation behind these shows. What's gone wrong? Is the trade doing so well these days that it's not worth anyone's while to attend? Is there nothing new? I think not. What I am certain of, however, is that this sort of disinterest rubs off onto the punters, the very people who keep the trade (and the hobby) alive.

MCS in action

Some exciting stuff in the Marine Conservation Society's first journal of '89. The MCS are running a quartet of major campaigns for this year, namely "Keep Beaches Beautiful", "Protecting Britain's Sharks", "Let Coral Live" and "The North Sea."

MCS have been active in campaigning for cleaner beaches for quite a while but now there is a new edition of the "Good Beach Guide" and a new major project, "Sandcastle 1989", to keep up the momentum.

Two Basking Shark tagging expeditions are planned for 1989 which will help with the discovery of more information of their lifestyle.

Coral reefs are some of the World's richest marine habitats and yet, they are under increasing threat from man's activities. MCS are particularly concerned about the curio trade which takes thousands of tons of choice coral every year. Their main campaign involves the collection of data, which will help them to bring pressure to bear on countries that supply and import coral to regulate their activities.

If you are concerned about the sea, joining the Marine Conservation Society will enable you to find out how you can help. Please do it.

Snippets

- 1: 90% of the World's fishes live in 10% of its oceans.
- 2: There's forty times more nitrate in the deep oceans than in the surface layers.
- 3: A Seasnake's venom is ten times more lethal than that of a Cobra.
- 4: Frogfish species look so like the reefs in which they hide that coral polyps settle on them.

Derek



"If you think you are going to pinch the caravan periscope for checking the plant life in the pond — think again!"



Odontodactylus scyllarus — a Mantis Shrimp that packs a real punch.



Sea Squirts such as *Halocynthia papillosa* may hold some of the keys to solving the problems of tissue rejection following surgery.

5: The eggs of some Sea Slugs have been shown to contain a substance effective in the fight against some cancers, while investigations into Sea Squirts have resulted in the testing of a potent drug to prevent tissue rejection in transplant patients.

6: The large Mantis Shrimp species are called "Smashers", and are armed with a pair of club-like appendages, as well as a pair of spears for impaling prey. The speed of their "punch" is something like 1000cms per second and it has almost as much force as a 22 calibre bullet. They even scare off Octopuses.

7: The aquarium trade is worth more than £6 million to the Philippine economy and four of every six Coral Fishes (66.66%) imported into America come from the Philippines.

Until the next time ...

Koi Talk



by John Cuvelier

The importance of air

Much of this month's offering is devoted to water quality and how it can be improved for the benefit of your pool and its contents.

Let there be no doubt about it, the most important constituent of a good pool ecosystem is a plentiful supply of air! Note, I mentioned air, not oxygen. The reason for this apparent error is the fact that oxygen, as such, only forms approximately 20% of the gas we know of as air, along with various other gases with which we need not concern ourselves at the moment.

Without wishing to teach anyone to suck eggs, all friendly pool life, without exception, is oxygen-dependent, so the more oxygen we can inject or assist to enter the pool, the better it is for all concerned.

Possibly the best known device for encouraging the entry of air to our pools is the venturi, an already well-documented piece of equipment which relies upon an in-line restriction to build up pressure in a pipe, at which point air is sucked in and then propelled as entrained air in the water entering the pool.

While these devices are very effective, bear in mind that there is still only a 20% solution of oxygen being injected, a lot of which will be dissipated back into the atmosphere as the bubbles burst. However, those same bubbles, by breaking the surface tension (the "skin") on the water, will allow more air

absorption at the air/water interface at the point of entry. Any surface turbulence on water will promote increased air absorption, a point worth remembering.

The venturi itself can either be purchased ready-made, or constructed from ordinary domestic plumbing fittings, a much cheaper option for the average enthusiast.

Should you decide to fit a venturi, there is a price to pay (so what's new?). The increase of pressure needed to make your venturi work, results in a quite dramatic reduction in pumped flow through the pipework which should be allowed for in calculating pump size.

Filter bacteria

The bacteria in a filter busily consuming all those "nasties", also require a plentiful supply of air if they are to work at their best.

There has been quite a lot of written matter regarding the fitting of "blowers", the output of which is led to the underside of filters, thus providing a generous supply of air for the bacteria. I've no argument at all with the theory, but there is such a thing as the depth of one's purse, a matter which many writers seem to forget! The capital cost of some of these machines, plus the running expenses, would cripple me and, I suggest, many others.

I appear to manage quite well with an ordinary aquarium air pump and large airstone fitted to each of my filter tanks, cer-

tainly a much cheaper alternative.

Please don't think I'm having a go at you writers, it's just that we lesser mortals need to look for affordable technology. As an example, a pump going down in our household represents a domestic crisis and budget juggling, something which many of our readers must be familiar with.

Tumbling water

A favourite topic of mine relating to water quality is that of providing a stream somewhere in a system. Not only can this be visually delightful, but the plant life goes a tremendous way to removing the nitrates from filtered water, a prime cause of the dreaded green water syndrome.

If a stream can be arranged in such a way as to create a bit of tumbling water, so much the better as this increases the air absorption as mentioned earlier. The strategy needed to obtain tumbling is quite simple, merely requiring the outlet from a filter to be 6 in (15 cm) higher than the pool. Carefully positioned lumps of rock or large pebbles will create a pleasing and effective tumbling, very pleasant to look at.

That old standby, the waterfall, is also a most effective aid to aeration of a pool but can be more effective if built as a series of "steps", or cascade, rather than a simple, single "drop", giving even more turbulence which is the object of the exercise.

If a waterfall can be fed via a header pool, it's a good idea to plant this with watercress, both as a nitrate-removal medium, and as a good source of live food for the Koi in the form of all the insect life which will eventually be washed down into the pool.

Nitrate problems

The past few years have seen the emergence of a major problem for Koi-keepers to wrestle with. The question of nitrates is one which I fear will be with us forever. Not only do our filters deliver water rich in the stuff, but every time we top up our pools from the taps, we add to the problem!

It is a fact that parts of the country, like East Anglia, now have nitrate levels of well over 100 ppm. Here in Herefordshire we are rapidly approaching the same situation, and all my watercress and stream plant life is only just holding its own and, I'm having to net large quantities of nasty green muck daily from the floor of my pool, something which only a couple of years ago simply did not exist.

It is, of course, nitrate which is mainly responsible for the annual bloom of Blanket Weed in our pools. Some Koi-keepers have resorted to the introduction of a couple of Grass Carp in the mistaken belief that the reputation these fish have for consuming anything green would pay off. In actual fact, Grass Carp would seem to favour ordinary Koi food in preference to their supposedly natural diet!

I, myself, have a Chinese Grass Carp which was purchased more as a curiosity than anything else as it is an Albino. Its pale lemon colour and bright ruby eyes are certainly attractive, but it, too, appears to spurn the attractions of Blanket Weed.

Baby news

My 21 assorted "babes" have now joined their parents in the main pool and are thriving, merely reinforcing my determination to go through it all again this year.



View of my "stream" in early spring. Plants help remove nitrates while turbulence aids aeration.

THE SEASIDE AQUARIOLOGIST

A month by month survey of the Sussex coast seashore fauna, from our native marines expert, **Andy Horton**
(Photographs by the author)

One of the attractions of keeping British marine life found on the coast and in the shallow seas surrounding these isles, is that the aquarist can obtain firsthand knowledge of the conditions in which the fish and invertebrates live. I spent over two years fossicking on the seashore, exploring and studying wildlife, before I embarked on my first aquarium in which I endeavoured to provide conditions as near as possible to those found in the wild.

Rocky shores are the most interesting in terms of the variety of creatures suitable to keep for more than one year. Fish found on sandy shores rarely make good long-term tank inhabitants in the smaller home aquariums. The Flatfish quickly grow too large, and the small sandy coloured Gobies have a short natural lifespan of less than 18 months.

In Sussex, where the chalk cliffs have eroded over the centuries, the sea has channelled deep gullies in the soft rock, and broken large pieces of chalk into smaller fragments, providing numerous moveable hiding places.

SUSSEX COAST REPORT (MONTH BY MONTH)

Shoreline: Rottingdean (Brighton) to Worthing.

JANUARY

This is a barren and unproductive month. The regular sessile inhabitants, the molluscs, mussels and winkles, are often covered in silt. Chitons are more noticeable on the underside of rocks. Even the Beadlet Anemones, *Actinia equina*, will have dwindled in size because of food shortages. Most fish and crabs will be found in the warmer offshore waters.

FEBRUARY

In February, the sea temperature falls to 9°C (48°F), the lowest of the year. Nudibranchs, the orange and white *Onchidoris bilamellata*, and the white or black *Acanthodoris pilosa*, will migrate inshore and lay white coils of spawn on the underside of small rocks near the low water mark. These Sea Slugs will die shortly afterwards. Look for the cream caviar-like eggs of the Lump-sucker Fish, *Cyclopterus lumpus*, on undisturbed shores. If you have waders, and

can brave the cold, February is the best month for shrimping.

MARCH

20 March was the date of the Vernal Equinox for 1989, when the alignment of the earth, sun and moon produce the highest and lowest tides of the first half of the year. This enables the terrestrial aquarist to reach rock pools that are only uncovered at the equinoctial lows.

The Grey Sea Slug, *Aeolidia papillosa*, lays white spirals of spawn and then dies. In very small pools under rocks, the first fish begin to stay inshore. Butterfish, *Pholis gunnellus*, and the 5-Bearded Rockling, *Ciutatia mustela*, are the most common, but juveniles of the Rock Goby, *Gobius paganelus*, are present in some localities.

In areas with sand, the two species of Porcelain Crabs, *Porcellana* sp., tiny filter-feeding anomurans, cling tightly to the underside of boulders. The Common Starfish, *Asterias rubens*, and the attractive purple-tipped green Shore Urchin, *Psammechinus miliaris*, are colourful additions. They are not always to be found.

APRIL

Early April is noted for the presence of the typical rock pool fish of British shores. The Blenny, *Lipophrys pholis*, will breed in the deeper intertidal pools. Congregations of this fish are likely to be present throughout the summer. The Common Goby, *Pomatoschistus microps*, abound in their thousands in shallow sandy-bottomed pools, in a frantic breeding season that continues until June.

All March visitors will remain. The Hairy Crab, *Pilumnus hirtellus*, and undersize Edible Crabs, *Cancer pagurus*, will wedge themselves in piddock holes and bury themselves in soft sand under rocks.

MAY

This month is characterised by the first extensive growths of weed in the pools. Large brown wracks drape themselves over chalk outcrops making the passage slippery and dangerous.

A veritable predator, the voracious smallish fish known as the Bullhead or Sea Scorpion, *Taurulus bubalis*, will be increasingly found preying upon young Gobies and Blennies, crabs and prawns. It hides in

ambush for its prey, and is easy to catch in a small net.

JUNE

This is not a particularly good month. Blennies and Bullhead should be present, but fish like the Rockling, may have moved into cooler waters just offshore.

A dramatic increase in the Shore Crab, *Carcinus maenas*, population is most noticeable. This abundant crustacean has a natural lifespan of about two years, but most of the young will perish before the end of the summer.

Prawns, *Palaemon serranus*, of edible size, will migrate inshore. Thousands will hide among the weed in the rock pools.

JULY

July heralds the first indications of an explosion of life. Under rocks the Squat Lobster, *Galathea squamifera*, can be present in tens of thousands. Sharing their living space will be starfish, urchins, numerous crabs, other crustaceans, anemones and small fish.

In pools and shallow water at the margins of sea and shore, four species are specially noticeable. The Bullhead will prey upon the ample prawns. A large pond or prawn net will also catch the fry of the Corkwing Wrasse, *Ctenilabrus melops*, averaging 3cm (1.2in) in length. Fish of 5cm (2in) plus are the most successful in aquaria.

If you search carefully you are likely to discover the Long-legged Spider Crab, *Macropodia rostrata*, its long legs tangled in a mass, and resembling a clump of weed. It must be kept apart from aggressive predators, Blennies, Wrasse, and other crabs.

Flounders and Common Gobies will enter estuaries and swim into areas of low salinity.

AUGUST

The sea temperature rises to 17°C (62.5°F) during this month, the highest of the year. It is the most prolific month for the seaside aquarist. Almost all the fish have completed their breeding season and the pools abound with the young of Wrasse, Gobies, Blennies, Bullheads, and Rockling piscine fauna.

Invertebrates include small Hermit Crabs, *Pagurus bernhardus*, and other anomurans, the ubiquitous prawns and Shore Crabs, five

other species of "true" crabs (brachyurans), eight species of anemones, and the sessile Sponges and Sea Squirrels.

Temperatures in the pools can reach 24°C (75°F). Blennies and Gobies are the only species that regularly inhabit the pools. Other species are trapped by the receding tides, and the young of almost any of the larger fish can be caught in this way.

Swimming near the surface in estuaries will be juvenile Sand Smelt, *Atherina presbyter*, and the post-larvae, or fry, of the Bass, *Dicentrarchus labrax*. Bass in the second year of their life will be found in mid-water.

SEPTEMBER

September is another fine month. Pools at the extreme low tide mark are accessible around the time of the Equinox. Most of the August visitors will still be present.

Adult fish are common in the shallow seas that adjoin the coastal zone. A comprehensive sublittoral survey at Shoreham-by-Sea during September, revealed the following species in order of prevalence: Corkwing Wrasse, Bullhead, Black Goby *Gobius niger*, Butterfish, and Dragonet *Callionymus lyra*. This list excludes the fish in rock pools, notably the Blennies.

High tides funnel considerable amounts of the sea into estuaries. Many of the fish are found offshore; Pout Whiting (Bib) *Trisopterus luscus*, and shoals of young Grey Mullet are found on the lower reaches of rivers. Hundreds of thousands of Mullet could be present in one shoal, as I recorded on one occasion. More often they are present in shoals of one hundred.

Scores of the aggressive Sea Stickleback, *Spinachia spinachia*, attack the young Bass. These strange pencil-shaped fish can be found in pools. Sand Gobies, *Pomatoschistus minutus*, are very common.

Suddenly, in the last weeks of the month, the mobile fish and invertebrates move into deeper waters offshore.

OCTOBER

By now, only a few stragglers are left behind — an occasional Blenny may remain. There are often surprises like young Ballan Wrasse, *Labrus bergyllus*, and Cuckoo Wrasse, *Labrus mixtus*.

Certainly not worth a long trip, as the weather is more often decidedly inclement and the rock pools muddy and uninspiring.

NOVEMBER

This trend is confirmed by November, with the mobile shore fauna almost totally absent. Hermit Crabs, fully grown in their large Whelk shells, can be found in some localities, but their frequency is erratic.

Even the sea anemone *Sagartia elegans* appears in lesser numbers.

DECEMBER

Only in exceptionally warm winters will any mobile invertebrates be found during this month.

In estuarine areas there might be a few Shore Crabs, and the Prawn, *Palaemon longi-*



Above, Rock Goby, *Gobius paganelus*. Fish living in rock pools are able to withstand temperature changes better than the open water species. Top, *Sagartia elegans* (yellow) sea anemone is to be found in many different colour forms on the shore, in all months of the year. Right, juvenile Hermit Crab, *Pagurus bernhardus*, occupying an empty Sting Winkle shell.

Summing up

Even in the featured 10-mile stretch of coast covered by this brief report, there is a rapid change in the appearance of the shoreline from a chalk rock coast with sand, east of Brighton marina, moving westwards to a predominantly shingle and sand beach with patches of rough ground and rock and piers, at Worthing.

Different rocks produce different shore topography. The action of the sea is stronger on exposed coasts where granite outcrops have withstood the battering of the waves. Elsewhere, limestone cliffs are worn away to form decorative caves. Other shores are noted for their Devonian slates, sandstone reefs and mixtures of differing rocks.

This is not an exercise in geology but a pointer to the varied nature of Britain's coast. It also shows that different rock formations provide different habitats, which in turn, support different communities of animals (although sea temperatures and the

factors).

The seasonal survey of species in Sussex is a brief summary of the more noticeable fish and invertebrates compiled over a 10-year period from 1978 to 1988. Not all species, especially the Nudibranchs, are suitable for aquaria.

In other areas the fauna is likely to be appreciably different. For example, at Kimmeridge Bay, in Dorset, the sheltered cove and small fetch mean that the mussel is absent. There is no sand, so the small Common and Sand Gobies are not to be found. Limpets are attached to the rocks more tightly than in Sussex. The green Beadlet Anemone lacks the yellow stripes, while the Short-legged Spider Crab, *Pisa armata*, moves into intertidal pools on frequent occasions, and the weed fauna is rich and varied.

If anybody has compiled a month by month survey of their favourite coastline, I would be pleased to hear from them c/o

Spotlight on

Reptiles

THE MARINE IGUANA

David Alderton focusses on one of the most remarkable — and protected — large lizards in the world.

(Photograph by David Allison)

Found only on the Galápagos Islands, off the coast of Ecuador in South America, the Marine Iguana (*Amblyrhynchus cristatus*) is a truly unique lizard. It is claimed as living proof of the theory of evolution, which the great Victorian naturalist Charles Darwin formulated in part when he visited here during the voyage of H.M.S. Beagle in 1890.

The islands themselves are volcanic, and arose from the ocean less than five million years ago. At this stage, they were bare outcrops of rock, supporting no vegetation. Only gradually did this develop as seeds were brought to the island by the sea, wind and animals. It appears that, among the early visitors were iguanid lizards. These may have been washed out to sea on flood waters in Central America, and drifted southwards to the Galápagos Islands.

"Common" beginnings

The Common Green Iguana (*Iguana iguana*) is primarily a herbivore, although young iguanas need animal protein in their diet. Arriving on the shore of the volcanic Galápagos, there was probably little accessible vegetation. Yet there was seaweed growing on the rocks around the shore. So began the amazing evolutionary process which has led today to the development of this species. In theory, only one gravid female need have made the crossing initially, since her offspring could have started the colonisation of the islands.

Marine Iguanas now feed almost exclusively on seaweed, which they obtain at low tide, following the retreating waves out to sea. Their claws are especially sharp, enabling them to grip on to slippery rocks, while the seaweed itself is wrenched off in their powerful jaws.

On occasions, they will venture further into the sea, diving down as far as 9.3 m (30 ft), although they usually reach an average depth of about 4.7 m (15 ft). Marine Iguanas may stay submerged for up to twenty minutes, with a noticeable fall in heart rate, which helps to ensure that their oxygen supply lasts longer. They are very agile swimmers, using their long tails to provide propulsion in the strong current. Excess salt from the seawater can be expelled through special nasal glands, as well as via their kidneys.

For the remainder of the time, the iguanas rest on the rocky shores, where their generally black coloration may assist them to retain the sun's heat. They may retreat from the bleak lava coastline during the hottest part of the day, seeking shelter in mangroves or under rocks. Marine Iguanas control their body temperature very precisely to within the range of 35-37°C (95-99°F). The sea, in contrast, is much cooler, so that the lizards are sometimes reluctant to plunge in, unless they are already warm.

Normally, large groups live peacefully together, and even when conflict does arise between two males, this is usually settled by their display, rather than outright physical confrontation. Males raise themselves up on their front legs, and bob up and down, showing the red tongue in their mouth. If this does not resolve the conflict, combat involves a head-on clash between the combatants, until the weaker individual backs off. They fight by butting their heads together.

Breeding

Males establish their own groups of females. Mating occurs with few preliminaries, and is followed by the females seeking out the nesting beaches, where the sand is

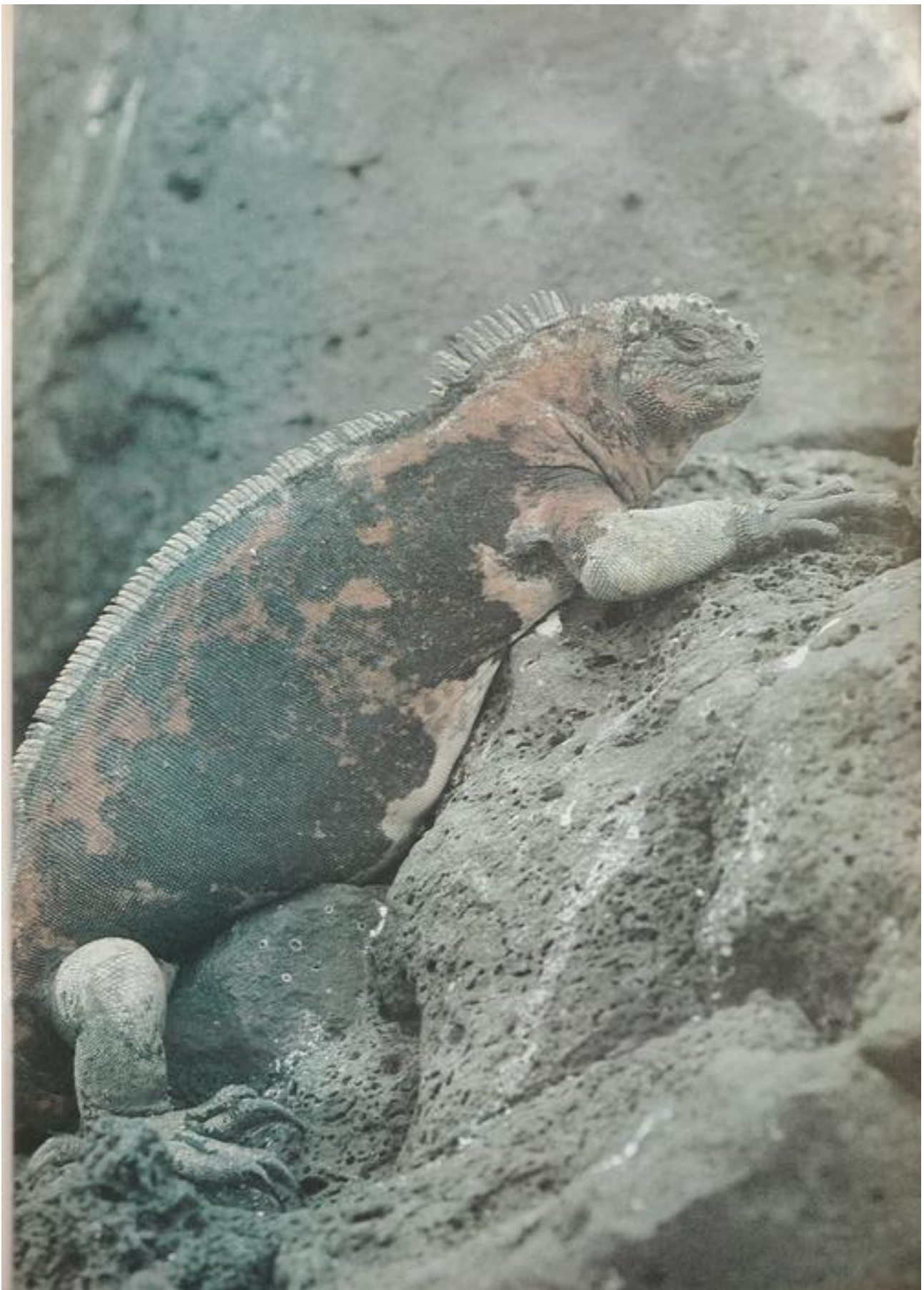
sufficiently soft to enable them to dig nesting tunnels for their eggs. These excavations can be up to 60 cm (2 ft) in depth, with the burrow being scraped out using all feet. Sometimes, the sand collapses, trapping a female below ground.

The clutch size is surprisingly small. Only two or three eggs are laid in a single clutch by a female during the year. These measure about 8 x 4.5 cm (3¼ x 1¾ in), and are carefully concealed by the female. They should hatch after a period of 110 days, with the young iguanas then tunnelling their way to the surface. At this stage, they are about 22.9 cm (9 in) long, and vulnerable to various predators, such as gulls and Galápagos Hawks, not to mention the cats which have been introduced to the islands.

Assuming they survive this stage however, the young iguanas may live for a decade or more, growing to a length of as much as 1.75 m (5¾). Once adult, they face few enemies, apart from sharks, although they are reasonably safe provided that they do not venture out far from the shallows.

These unique lizards are not kept by herpetologists. They are strictly protected in the Galápagos, while of course, their very specific requirements mean that they would be unsuitable for display, except in large, purpose-built enclosures at zoos. But they remain a fascinating extreme example of how species can adapt to harsh, unfamiliar surroundings... and thrive.

David Alderton has kept and bred a variety of reptile and amphibian species. In addition, he is the author of *A Petkeeper's Guide to Reptiles & Amphibians (Salamanders)* (Interpet, £4.95) and *Turtles & Tortoises of the World* (Blandford, £14.95).



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In estuarine areas there might be a few Shore Crabs, and the Prawn, *Palaemon longi-*

coast. It also shows that different rock formations provide different habitats, which in turn, support different communities of animals (although sea temperatures and the range of tides are also important distribution

and varied.

If anybody has compiled a month by month survey of their favourite coastline, I would be pleased to hear from them c/o *Amaris for PondBoater*

Spotlight on Reptiles

GREEN IS BEAUTIFUL

Day Geckoes are hard to beat for colour, ease of maintenance, willingness to breed and sheer overall desirability, as **Robert and Valerie Davies** explain.

We have been made aware over the years that many people hold the opinion that a reptile cannot be beautiful, but as the old saying goes 'Beauty is in the eye of the beholder'.

One lizard which we think qualifies for that term and is a firm favourite in our collection is *Phelsuma madagascariensis grandis* or the Madagascar Giant Day Gecko. As its name implies this gecko (which can grow to 26cm — 10.2in) inhabits Madagascar and its surrounding islands and, unlike many other geckoes, is active during the day.

Description

The main appeal of *P.m. grandis* is its attractive coloration. Adults are a beautiful bright green above and whitish below. The green coloration provides excellent camouflage among foliage.

There is a reddish stripe on each side of the snout from just behind the nostril to the eye. There is also a reddish mark which is sometimes V-shaped on the head. Small red/pink blotches on the back vary from creature to creature, some having several, others none at all. A few specimens may also have a turquoise coloration along the upper lip.

The tail and sides are covered with rather granular scales, while the top of the head and the back have tiny scales which give a smooth appearance.

The toes show the typical widening which is common among climbing geckoes. These adhesive toes enable them to climb and run along the sides of the vivarium and even the glass front, which is where they spend most of their time.

The eyes are fairly large, round and dark, and, since they do not possess eyelids, the tongue is often used to clear them.

Hatchlings are about 6cm (2.4in) long and

very attractive. The green and red is apparent but they have, in addition, darker, transverse markings and a bright orange underside to the tail. The darker markings and some of the red tends to fade as they develop.

Hatchlings grow quickly and can be sexually mature at 11 to 12 months. Young females may often produce soft, infertile eggs when barely half-grown.

Housing

This species should not be housed in a small vivarium. Length and height are crucial as they seem to feel more secure if they have room to retreat. At a minimum we would recommend quarters 46cm (18in) high, 76cm (30in) long for a pair, but bigger would be better.

We keep our main breeding trio in a vivarium which is about 174cm (68in) long, 56cm (22in) high, and 38cm (15in) deep. This is made of wood, has glass sliding doors,

The sleek colourful features of a male Day Gecko are well illustrated in this photograph



URAHAM ANGE

a ventilation panel at each end and has the floor covered with self-adhesive lino tiles to facilitate cleaning.

Phelsumas appear not to like walking on media such as sand, peat, chipped bark, etc. Newspaper can be used on the floor but live foods tend to disappear underneath it.

As a lot of time is spent on the cage walls and glass these tend to become soiled and need regular cleaning. A few clumps of sphagnum moss placed along the base of the cage walls collect quite a lot of the droppings and can be changed periodically.

Furnishing the vivarium

If a glass vivarium is used it can be kept slightly moist and contain living plants such as *Scindopus aeneus*, *Monstera deliciosa*, *Ficus decora*, *Syngonium* spp. according to size. However, Phelsumas do just as well and reproduce in a dry set-up.

Our vivaria are furnished with pieces of cork bark leaning against the walls as well as various dried and plastic plants. Some of the 'plants' hang down from the top of the cage providing shade and refuge. A daily spray is the only moisture it receives.

The temperature is maintained at 28°C (82°F) in the day, reducing to 20°C (68°F) at night. Lighting is provided for 12-14 hours daily. We have raised and bred this species to the third generation, both with and without UV tubes, as we ensure the geckos get plenty of vitamins and calcium. The main breeding vivarium receives some direct sunlight through the room window in the summer.

Feeding

P. m. grandis will feed readily on the usual insect fare such as crickets, locusts, waxworms and the adult moths, bluebottles and mealworms (the last on an occasional basis). All these foods can be dusted with multi-vitamin powder, but since Day Geckos appear to enjoy sweet substances, we provide a small container which holds a mixture of honey, raw brown sugar, multi-vitamin powder and powdered cuttlebone.

This is stirred up, kept in a warm place until it sets hard and Crystalline, like toffee. It is then placed in the vivarium and the geckos will avidly lick large holes in it over a period of time. The 'sugar lump' lasts quite a long time and, apparently, they prefer the hard crystalline mixture to the original soft, sticky consistency.

In addition, a container of small pieces of cuttlebone is provided which is readily consumed, especially by the females. A water dish completes the set-up, although they will lap droplets if the cage is sprayed. Some specimens will also lick sweet fruits such as grapes. As with most reptiles, variation in the diet is desirable.

Breeding

Properly catered for *P. m. grandis* is reasonably easy to breed. Adults can be easily sexed since the females, with an adequate supply of calcium, develop large lumps called otoliths at each side of the neck. These are where the calcium is stored until needed for egg production. Otoliths often become apparent in



Geckos have wide "adhesive" toes which allow them to secure a grip on even the smoothest surfaces. The specimen shown is a female possessing bulging Otoliths (visible behind the eye — in the neck region).



Eggs are usually laid in pairs and are often placed in cracks on cork bark.



A brand-new hatching. Note the two batches of paired eggs — each marked with a cross to allow for correct orientation during incubation.

quite young females. Males lack the otoliths and develop a row of prominent fringed femoral pores along the inside of each hind leg. These can be seen when the gecko clings to the glass.

The male makes his overtures by crawling slowly towards the female, moving his head from side to side. He will then seize the nape of the female's neck and climb onto her back and manoeuvre until one of the hemi-penes can be inserted in the female's cloaca. During this process scales may be torn from the female's neck.

Eggs are usually, but not always, laid in pairs. We have had single eggs on occasions. As the two eggs are laid, the female manipulates them with her hind feet until they are side by side. At this stage the eggs are soft, adhere to each other and then harden.

Otoliths in the female will now reduce. If reduction of otoliths is noticed it pays to search the vivarium for eggs. Usually, little effort is made to hide the eggs, being mostly laid at the base of the vivarium walls, or in a space behind cork bark.

Keeping them upright, the eggs are

removed to plastic tubs with clear, perforated lids and containing 2cm (0.8in) of coarse sand. Incubation at 28°C (82°F) takes approximately 60 days, although our records show that the process can take from 54 to 66 days. Paired eggs usually hatch within minutes or hours of each other, but we have found, on one occasion, a difference of seven days.

After hatching, the babies are kept in food jars or similar small containers with adequate ventilation and basic decoration for refuge. Water is supplied by a gentle daily spray for the first few days and, thereafter, in a very small container.

The first foods are small insects, especially waxworms, which are soft and highly nutritious. After 2-3 weeks a small honey, sugar, vitamin mixture is supplied. As they grow, they are moved to larger units, kept in their pairs, and the food size increased. If, however, one of a pair is not growing, or seems reluctant to feed, they are separated.

All of our eggs have hatched successfully in dry sand, although some breeders keep the sand moist. It is worth noting that at 28°C (82°F) a large number of females have been produced. We are still correlating statistics on incubation temperature and sex ratio with other breeders to see if a pattern emerges. For certain reptiles, e.g. *Tetradon graca* and *Eublepharis macularius*, there is a well documented correlation between incubation temperature and sex ratio.

At least one of our females produces eggs (usually doubles) at fortnightly intervals from mid-March to mid-August. Egg laying seems to cease over our winter.

Paired, adult females may occasionally produce 'soft' eggs which will not hatch. This may be caused by a lack of vitamin D3 which hampers the metabolism of calcium and can be overcome by orally administering vitamin D3, but adequate calcium must also be available in the form of cuttlebone. Another theory about 'soft' eggs, which we hope to test this season, is that a dominant female may prevent other females from mating.

A final point about breeding is that Phelsumas can be territorial, so it is wiser to keep only one male in each set-up. Females occasionally squabble, but in a spacious vivarium with adequate hiding places, this seldom causes problems.

When introducing a new specimen, cage furnishings can be rearranged to confuse the territorial instincts. A small, young specimen should not be placed with large adults — better to wait until it has grown.

Conclusion

To sum up, *P. m. grandis* is a beautiful lizard which, if properly catered for, is quite easy to maintain and breed. Individuals can become tame enough to accept food from one's fingers and, in a furnished vivarium, their diurnal habits will give the keeper many hours of interest and pleasure.

Since much of Madagascar's wildlife is under threat from deforestation, herpetologists could play an important role in propagating this species, and, as someone once remarked, "a thing of beauty is a joy forever".

ROBERT AND VALERIE DAVIES

GRAHAM ANGE

GRAHAM ANGE

Spotlight on Reptiles



DAVID ALBERTSON

The red eye identifies this specimen as an adult male Box Turtle.

A BOX FOR ALL SEASONS

Jim Wright, Fellow of the Zoological Society and keen herpetologist, provides a comprehensive guide to the care of Box Turtles in captivity.

Although small numbers of Box Turtles had been imported into Great Britain for many years, as an "extra" type of pet, it was not until 1984 that they were imported in large numbers. This followed the ban on the importation of European species of tortoises, because the Box Turtles, being about 95% terrestrial, and being able to spend most of the summer months outdoors, were considered ideal replacements for the tortoise.

Much suffering was caused, at least at first, because they were imported in such large numbers from North America to fill the gap left by the tortoise trade; that many were dying, or were suffering from infections, both internal and external. The death rate was heavy.

But batches which came over in 1985 were somewhat better; improvements followed, and, today, conditions are much better.

Unfortunately, in many cases turtles still were referred to as Box TORTOISES. This misled some importers and pet shop owners, so that people who bought them were told to treat them as ordinary tortoises. This resulted in a large number of Box Turtles being given the wrong diet, etc., many of them being offered a vegetarian diet, which, naturally, they refused (they are omnivores). This resulted in starvation, while those that were deprived of drink, died of thirst.

However, again following education by people who understood Box Turtles, most are cared for properly now.

Many years ago Box Turtles were aquatic, like the terrapins. However, over time they

have adapted to a mainly terrestrial life. Although they must still have access to fresh water, they cannot swim.

They are interesting creatures, alert and lively and make good pets.

TURTLES V TORTOISES

Turtles can be distinguished from tortoises by their appearance, the shell of the tortoise being much heavier and thicker than that of the turtle, the former also having so-called growth rings on the shields.

There are also differences in the head, feet and legs. The front legs of the tortoise are slightly flattened, and are heavily scaled at the front for protection. The hind limbs are cylindrical in shape, and do, in fact, resemble those of the elephant. The feet of the tortoise are not webbed, as are those of some species of turtles, the Box Turtle being an exception. The feet of the Box Turtle are smooth, and have claws, but are not webbed like those of the terrapins. The head of the tortoise is also scaled at the top, again offering protection.

Although the shell of the Box Turtle is similar to that of the tortoise, it is much thinner and lighter, and smaller in size. Both have an under-shell (plastron) and an upper-shell (carapace) joined at the sides by the bridges.

Boxed up

The under-shell of the Box Turtle is rather interesting, and it is, in fact, this which gives it the name "box". This under-shell is divided into three parts. The front and rear sections are hinged to the middle section in such a way, and with so much freedom, that the turtle can bring the edges of the two sections upwards to meet the edges of the upper-shell to form a complete box. At the same time the head and legs are withdrawn, and these now have full protection.

The sex of a Box Turtle can also be told by the under-shell. In the male the rear section is flat, or concave, while in the female it is convex.

Most common species

Box Turtles are found in different parts of the world, but those from tropical countries require a lot of attention, and special care, and are best left to the experts.

The ones which come into Great Britain for the pet trade come from North America. Three sub species are normally imported — all mainly hardy.

The most common is the so-called Three Toed Box Turtle (*Terrapene carolina triunguis*) which gets its name from the fact that some have only three toes on each hind foot. This can, however, be misleading, because some specimens have four toes on each foot! In colour, the shell of this turtle is olive green with few or no markings, and there are yellow or orange spots on the fore-legs and around the neck. The top of the shell is flat.

The second sub species imported is the

Florida Box Turtle (*Terrepen carolina bauri*) which has a brownish, flattish shell with yellow lines on it. This sub species also has yellow or orange spots on the fore-legs and on the neck.

The third type, which perhaps is not quite so common, is the Carolina Box Turtle (*Terrepen carolina carolina*). This sub species has a domed shell, mostly brown in colour with yellow radiating lines on it. The under-shell is horn colour or brown. There are yellow or orange lines running up each side of the turtle's neck. All three kinds are about 4 1/2 in (11 cm) in length, and, generally, the males have red eyes, while those of the female are of a brownish colour.

FEEDING

As I mentioned earlier, Box Turtles are omnivorous, and will eat squashed snails, slugs, worms, insects, raw meat, offal, and tinned pet food, but they also like fruit and berries, and some will also eat lettuce and mushrooms. However, the bulk of the diet must be flesh-based.

A few words of warning: do not give too much tinned pet food, as this can make the turtle too fat, and may cause ill-health. A few worms will be welcomed, but as these contain very little calcium, I only give them as tit-bits. NEVER give worms from compost heaps, etc., as these can be toxic, and could kill your turtle. Always give earthworms, and always make sure that slugs and snails have not had access to slug bait, etc., as again your turtle would be poisoned if it ate slugs or snails which had eaten the bait.

It is essential to ensure that a turtle feeds well, whether it has the freedom of the garden or is in an enclosure. I always offer mine food every day, just in case they have not been able to find sufficient for themselves.

Box Turtles drink a lot so fresh, clean water must always be available for these purposes. The container must be sunk into the ground so that its edge is level with the surface of the ground. This allows the turtle to climb in and out of the container easily, and, also, as a turtle has to lower its head into the water in order to drink, it will be able to do so.

A container about a foot square (30 x 30 cm), or a similar size round one, and about 2 1/2 in (6 cm) deep will be ideal, with about 1 1/2 in (3 1/2 cm) of water in it. It must be placed where the turtle can easily find it.

LIVING QUARTERS

Box Turtles love to wander, so if yours can have the freedom of an enclosed and escape-proof garden, it will be quite happy. Failing this, it should be kept in an open-top enclosure at least 12 ft square (4 m), with solid sides about a foot (30 cm) high. If netting or similar material is used the turtle may be able to climb up it and escape.

Netting will also allow cold winds to get to the turtle, something that these creatures must be protected from (they also need protection from too hot a sun). Normally, in a garden, turtles can hide under bushes, etc., but, nevertheless, a little weather-proof house will give them much more protection, and is advisable.



While it is possible to identify this specimen as a Box Turtle (*Terrepen carolina*), close examination would be necessary to know which of the three subspecies it belongs to.

Cruel practices

A turtle (or tortoise) must never be tied, either by its leg, or by a hole bored in its shell. This is not only cruel and must be condemned outright, but it can also cause injury to the creature.

The shell of a turtle or tortoise is sensitive and contains blood vessels and nerves, so it would obviously feel a great deal of pain as the hole is being bored. Also, as the animal wanders around bushes and other objects, any string attached to its legs or hole will become tangled, gradually limiting its length until the turtle is brought to a standstill.

But, more serious still, where a leg is tied, the string will cut into the flesh causing a nasty painful wound, which could, in fact, result in the limb becoming gangrenous, and eventually dropping off. Further, wherever the string is tied, it could loop around the turtle's neck causing a painful death by strangulation.

No paint, varnish, etc., must be applied to the shells of any of these creatures, for not only is this unsightly, but it can dry the shields which protect the shell, causing them to flake off, allowing harmful bacteria to attack the shell.

Also, the shell collects heat rays from the sun, or from warm surroundings, helping the creature to digest its food, and to grow, so covering the shell with paint, etc., could prevent these things from happening.

Grass and concrete

But wherever you keep your turtle, make sure that most of the area, especially in an enclosure, is of grass so that it can find at least some of its natural food (it will also like to hide in the grass to sleep on a fine day).

A part of the living area must be of rough textured, such as paving stone or bits of concrete, though, and this must be located where the turtle will have to walk over it. This will prevent claws from over-growing. If this should happen, however, the claws will have to be trimmed by a vet.

HIBERNATION

It is not advisable to hibernate Box Turtles in Great Britain, as, quite often, the collectors put the three subspecies in together. In addition, some territories overlap geographically, so it is possible that a single collection will include representatives of

more than one subspecies. As a result, those which come from warmer areas and would not normally hibernate, or if so, only for a short period, could well be mixed with those which hibernate for the full period of some months.

Further, most Box Turtles are quite often, simply sold as "Box Turtles" without reference to the subspecies. So you could end up with a non-hibernator, which, if hibernated, could die during the winter.

Even experienced people sometimes have difficulty in identifying a specimen. Therefore it is advisable to keep a Box Turtle awake throughout the winter months to be on the safe side (in a temperature of about 75°F - 24°C).

This can be done by keeping them in a glass or perspex-front house measuring about 3 ft x 2 ft (c. 1 m x 60 cm), or a longish fish tank. Heating can be provided by means of light bulbs or small electric heaters or, better still, a ceramic herpetological heater, placed out of reach of the turtles. A thermostat, set at 75°F (24°C) must be incorporated into the system and must be kept in the house or tank at all times. A thermometer is also essential to make sure that the correct temperature is kept.

Feeding need create no problems. Minced beef and offal can be given about twice a week - as much as the turtle will eat - but a little vitamin/mineral powder must be added to each feed, to make sure that the necessary vitamins and minerals are provided. Vionate or SA 37 are both ideal for this.

Every other day the turtle must be placed in an inch (2.5 cm) of tepid water, to allow it to drink and to soak, for about twenty minutes.

If the turtle appears unwell or is injured, it should be seen by a vet as soon as possible. A sick turtle can always be recognised by its reluctance to feed, and by lethargy when in warm conditions.

Box Turtles, like all our other pets, rely on us for their health and happiness. If we care for them properly they will give us many years of pleasure and interest.

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USEFUL ADDRESSES

- BRITISH CHELONIA GROUP, General Secretary, Mrs Diana Desmond, 29 Victoria Street, Staple Hill, Bristol, Avon, BS16 5JP.
- BRITISH HERPETOLOGICAL SOCIETY, c/o Zoological Society of London, Regent's Park, London, NW1 4RY.
- ASSOCIATION FOR STUDY OF REPTILIA AND AMPHIBIA, c/o Cotswold Park, Wildlife Park, Burford, Oxfordshire.

Spotlight on Reptiles

CONSTRUCTIVE PRACTICES

Python, Boa or Anaconda? Dr Gareth Evans untangles the coils and reveals a surprisingly simple answer.
(Photographs by the author)

EVER since early explorers reported encountering huge snakes in far flung lands, of all of the 2,700 or so species of serpent, those of the family Boidae, have occupied a special place in popular imaginings. Few indeed are those who have never heard of the pythons and boas.

Even among those with little or no interest in herpetology, the giant size of some members of the clan make them a subject of both fear and fascination, in roughly equal proportions. The huge, recumbent constrictor, so frequently an almost inevitable necessity for any public reptile house, becomes the focus for the collection, and also, in many ways, for the obsession/repulsion syndrome of so many.

Boid history and features

The Boidae are a family of some antiquity (particularly in ophidian [serpent] terms), the first definite fossil dating from the early Cretaceous period, around 100 million years ago. As might reasonably be expected from so ancient a group, present-day boids exhibit a number of primitive features, indicative of the lesser degree of modification from a lizard-like body design.

Remaining with skeletal structures, there is a small bone (the coronoid) in the lower jaw — a feature shared with primitive burrowing snakes. This bone contributes to jaw rigidity in lizards, but is absent from most snakes. Additionally, whereas most serpents have only one lung, the boas and pythons have two, clearly a less advanced arrangement.

Pythons v Boas

The 'pythons' may be separated from the 'boas' on a number of counts; differing in details of their skulls, their reproduction

(pythons lay eggs, while boas retain and incubate them internally) and their geographical distribution.

Pythons are the more restricted of the two groups, their range being limited to Africa, Asia and Australasia — none being found in the Americas. Boas are found throughout the Americas, the West Indies, Pacific islands, southern Europe, and even well within the python home territory of Afro-Asia. The boas are, however, absent from Australia. Small wonder, then, that of the seven genera of subfamily pythoninae, no less than five are Australian, with one (*Calabaria*) being exclusively African. The 'type' pythons, inhabiting Asia and Africa, belong to the remaining genus, *Python*, consisting of seven species. These are the snakes most frequently encountered on dealers' lists, and thus, most likely to be kept in private collections.

Captive care

A remarkably conservative group of reptiles, these animals require substantially similar care in captivity. Their quarters should be suitably spacious, and heated to around 24°-30°C (75°-86°F), preferably by means of a ceramic-type heater element (thus keeping heat and light independent of each other).

A sturdy water bowl large enough for the occupant to immerse itself will prove of benefit, as will an equally robust and well anchored climbing branch. Other than these and suitable hiding places, furnishings for that 'natural look' are largely a waste of time; pythons do very passable bull-dozer impressions on neat bits of vivarium decor!

Feeding generally presents few problems, most species, with one notable exception, readily taking whatever they are offered in the way of furred or feathered prey. Dependent on size, dead day-old chicks, mice or

rats are suitable. Although snakes feeding on whole carcasses should not, in theory, suffer from vitamin deficiencies, particularly in the case of young, fast-growing pythons, there is a case for lightly dusting their food with a good supplement powder.

Selected species

As for the animals themselves, among the Asian species ranks the potentially longest of all snakes, the **Reticulated Python**, *Python reticulatus*. This is a most striking and attractive creature, particularly when young, with yellow, blackish purple and white reticulations against a grey/brown background. The temperament of this animal is, perhaps, best described as variable — though with a possible maximum length in excess of 9m (30ft), even the most docile can hardly be considered a long-term domestic pet.

Indigenous to much of southern Asia, the **Indian Python** is one of the most commonly kept of all snakes. The 'type' sub-species, *P. molurus molurus* (light phase) is very seldom seen for sale these days — the Burmese, *P. molurus bivinnatus* (dark phase) being the animal with which the majority of people are familiar. Although they, too, are of potentially large size, up to 6m (20ft), these snakes are generally quiet tempered, and remain attractively patterned even when larger.

Malaysia and the Malay archipelago are home to the smaller, 2.3m (9ft) **Blood Python**, *P. curus* — a name which relates to its appearance rather than to its chosen diet! With their brick-red markings against whitish grey, these are most striking reptiles. However, they can be problem feeders and are, almost without exception, of irritable and pugnacious disposition.

Moving away from the Asian species, indigenous to West Africa is the smallest of the genus, and one of the most familiar, the **Royal, or Ball Python**, *P. regalis*. A shy and secretive snake, growing to around 1.5m (5ft), and marked with black swirls and spots on light brown, this is a most docile animal. This feature, and its relatively modest proportions, would seem to mark it out as the ideal candidate for the home vivarium. However, this beautiful little snake is the one exception to the earlier statement on easy feeding. Notorious throughout snake keeping circles for its proneness to anorexia, the Royal can pursue its hunger strike with stubborn determination.

In order to set this problem to rights, there are a number of remedies which the Royal owner can try, ranging from trying a variety of foodstuffs, to attempting to reduce the animal's stresses to an absolute minimum. Some of these snakes can be very fussy feeders, refusing white mice, or any except a specific colour (commonly brown). For such fussy feeders, gerbils often prove too good to refuse, and frequently break the starvation habit.

Such naturally timid snakes can also be



Right, the Royal Python's effective body patterns can be clearly appreciated in this top view of an adult specimen.

Top, this spectacular head shot of a Reticulated Python shows three labial pits (just above the lip) located within their respective scales. In Boas, their pits are found between the scales.

Above, "glistening" close-up of an Indian Python (dark, or Burmese, phase).



put off feeding by feelings of insecurity. Hiding places in, and a degree of quiet circumspection around, the vivarium can often work wonders in this direction. Handling is an often overlooked source of stress. Despite the obvious temptation, an anorexic Royal should not be messed about any more than is entirely necessary — time enough when it's feeding normally.

These animals do fast in the wild at certain times of the year, however, and periods of 4-6 months before eating are by no means rare. Although it sounds a horrendously long time, generally an otherwise healthy animal with access to fresh water should feed sooner or later, but be prepared for something of a wait!

Also out of Africa, comes the Rock Python, *P. sebae*, a reptile closely resembling its Indian relative in size and appearance. Occasionally to be seen on dealers' lists, although some individuals are of excellent temperament, they generally tend to have

rather irritable natures. With a size approaching 6m (20ft), an irascible specimen is a rather dodgy proposition for the private keeper.

The two remaining species of the genus Python, *P. anchietae* of Angola and *P. moorei* from the island of Timor are included for the sake of completeness only. They are, sadly, too rare for appearances in livestock suppliers' lists.

The Long and the Short of it

Simply to talk of 'pythons' and 'boas' is, to most people, to delve straight into a realm of truly giant proportions. However, although the world's largest snakes do feature among their ranks, by no means all members of the clan are enormous. Moreover, there is great confusion among people who have no special interest in these animals as to which really is the bigger. Hopefully, the following will help clarify the issue.

The Reticulated Python is, potentially, the world's longest, at a length approaching 10m (33ft).

The legendary Anaconda, *Eunectes murinus*, (a boa) although less lengthy, at around the 9m (30ft) mark, is much bulkier. On average, one of these animals weighs about twice as much as a Reticulated Python of equal length — with a suitably impressive girth!

The Boa Constrictor, known scientifically by the same name *Boa constrictor*, to many the largest snake, ranks only fifth (at best) in size, the largest recorded being some 5.3m (18ft), and the majority being a good one and a half metres or so shorter.

To look at the other end of the scale, while most of the pythons are of respectable proportions, the Royal *P. regina*, and the Calabar Ground Python, *Calabaria reishardi*, both with lengths around 1 — 1.5m (c3-5ft), are good examples of the smaller brethren.

Compared with the pythons, the boas, aside from the Anaconda, are generally of more modest dimensions, with a number of species at around the 2m (6½ft) mark, and the Rubber Boa, *Charina bonas*, from the western United States and south west Canada, growing to a mere 45cm (18in). So much for all those giants!

The names 'python' and 'boa' are often used to describe almost any large snake. More correctly, they refer to two different, though closely related, groups of serpents. The table shows the main differences between them.

PYTHONS	BOAS
Lay eggs	Give birth to live young
Heat sensitive labial pits within each scale	Labial pits between each scale
Teeth on the premaxilla	No teeth on the premaxilla
Extra pair of bones in the skull roof (the supraorbitals)	No supraorbitals



Above, a short-polyp *Goniopora* just beginning to open, signalling the start of another day. Top, long-polyp *Goniopora* — a strong favourite with marine hobbyists.

THE LIVING ROOM REEF

Part 2

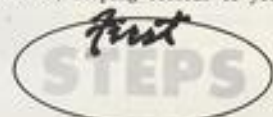
(CAPTIVE CORALS)

Peter Bienias
and Jane Tabern of Aquatic
Design continue
their series with a detailed
look at selected corals and
their behaviour.

(Photographs by Peter Bienias)

As we have discussed in Part 1, (The Basics — *A&P*, June '89) miniature reef systems are assisting hobbyists in maintaining the more delicate species of marine life with a greater degree of success. The fascination and bewilderment of the hobbyist towards the never-ending variety of the coral kingdom is compulsive, but trying to understand the environmental needs of these incredible "alien" life-forms is a different matter. It's all well and good reading information concerning your newly-acquired specimen, for example, concerning its identification (if possible), natural habitat, depth range, construction and constructing abilities, etc., but is this information adequate when a coral is placed in an artificial home?

Sometimes the most important information is what happens in your aquarium. Therefore, keeping records of your own



aquarium is very important. Using the information gathered, you are able to determine an accurate outline of the environmental factors which affect "your" inhabitants. Fig. 1 shows a simple chart that enables the hobbyist to plot the progress of every coral. We use the chart system extensively and it has enabled us to note the interesting phases that our corals go through in captivity. We have been trying to understand the cycle that a piece of coral goes through and, with information gathered over a period of time, have been able to appreciate some of the factors involved.

To offer a close look at a "typical" sequence we have selected a few individuals and plotted their progress from their initial introduction to the aquarium, to the present

Figure 1: SIMPLE PROGRESS CHART FOR CORALS

SPECIES	PERIOD IN DAY									
	1	2	3	4	5	6	7	8	9	10- and so on
Xenia ¹	O	O	O	O	O	O	O	O	O	O
Euphyllia ¹	O	O	O	O	O	O	O	O	O	O
Goniopora ¹	O	O	1/2	1/2	1/2 WP	O	O	O	O	O
Goniopora ²	O	X	X	O	O	O	O	O	O	X

Key = O = Open 1/2 = "Half" Open
 X = Closed WP = Waste Product

day. This selection was formulated on the basis of coral popularity from a hobbyist's point of view.

BUBBLE CORAL (*Plerogyra* species)

There are two varieties under observation, *P. simplex* x 2, introduced on 3 Oct. '88 and *P. moosa* x 3, introduced on 31 Oct. '88.

These corals were placed at different depths ranging from 4 to 14 inches (10-35.5cm) from the surface and with varying degrees of water turbulence. They took several days to open up fully and a week or so to settle down. Normally, after this period, a decision can be made concerning the location and whether the coral is "happy" or not.

It was found that the biggest influence on these corals was the turbulence of water, rather than light intensity. This water movement is best around the coral head — and should be strong enough to give a rippling effect on the coral surface. Our Bubble Corals have a very irregular behavioural pattern regarding the expansion and contraction cycle of the head or heads (if it is a large piece). "Irregular" means the coral head sometimes remains "full" for several weeks and then collapses to rid itself of waste products, only to repeat the process again a few days later. This ejection of waste products occurs when the coral head has totally collapsed and looks virtually dead. This can also occur at any time, and at any interval.

GONIOPORA (Short and long polyp varieties)

These two corals are discussed separately because we found they behave differently.

Short Polyp (x 2)

This particular type of specimen opened up after a very short time — in fact, within the first few hours some sort of expansion was seen and, by the next day, they were looking like small domed-shaped cacti, but it was several days before they resembled the accompanying photograph.

Good flow and good light were found to be the most favourable conditions. Our two specimens were positioned about 6 to 8 inches (15-20cm) from the surface and provided with good water movement. The expansion and contraction of the polyps

occurs in a more regular cycle than is the case with Bubble Corals. Total expansion occurs for approximately 8-10 days, followed by total contraction lasting 2-4 days when a brown cast is expelled.

One of the problems that can occur with this species is the choking of the polyps with unwanted algae. It has been said that the early introduction of macro-algae can combat this by consuming the food source that the micro-algae would use, thus sustaining their own growth while preventing other growths. We have found that this is a necessary part of a balanced environment.

Long Polyp (x 2)

This variety has a very similar behavioural pattern to the short polyp type on introduction to the aquarium. Our two specimens were positioned about 14 inches (35.5cm) from the surface. The flow around the coral head was strong enough to make the coral polyps sway back and forth.

We found the polyps of this coral very rarely contracted. In fact, over a period of 30 days, total contraction occurred only once (during the daytime) lasting 2 days. — although the polyps can also contract at night time, as in the majority of corals. This type of coral also has the ability to alter its external appearance, by occasionally changing from the shape portrayed in the accompanying picture, to a large dome shape, with the polyps retracted into this.

Our specimens have not, at any time during the daylight period, expelled a mucus cast. One problem that can occur with this species is that, although it may have a small rock base, the colony can expand and take up a great deal of room!

EUPHYLLIA DIVISA (x 2)

Our specimens were introduced on 3 Oct. '88, in the same manner as the other corals. It took them approximately 10 days to expand and then a further 7 days to "fill out".

This is another species that requires plenty of room, since it will expand to something in the region of triple the size of its rock base.

The expansion and contraction cycle is very similar to the long-polyped *Goniopora*, having no real contraction during the day but closing up at night time. However,

unlike *Goniopora* this coral does "eject" brownish mucus when it is in a collapsed state.

Positioning of these corals was at contrasting levels and flow influence. Coral "A" was sited about 6in (15cm) from the surface with a good turbulence around the coral head, while coral "B" was sited lower, at about 14 inches (35.5cm), with a low turbulence factor. Coral "A" expanded to a slightly bigger size than coral "B" but that was the only noticeable difference between them; they both go through the same cycles and look as "healthy" as each other.

GROWTH OF CORAL ON LIVING ROCK

The explosive growth of good-quality living rock is absolutely amazing.

As the chemical warfare (high concentrations of ammonia and nitrites) that rages for several days in a new aquarium begins to fade into a more tranquil and inviting scene, the rockwork almost immediately responds to the change of climate.

We have witnessed, time and time again, corals "growing" quite readily from the rockwork and, once they are established, they very rarely die and, even in these cases, the reason is normally of an aquatic nature and normally has fins!

If this is the case, then why do so many aquarists discover that "introduced" corals live weeks, maybe a few months, instead of a year or two? The larger public aquaria boast the maintaining of corals and, even, the growth of captive corals. So what are they doing that we aren't?

Everything is on a bigger scale admittedly, reducing environmental errors, but we can still virtually reproduce their systems. So where is the key that unlocks these mystical powers? We have reason to believe that the living rock offers some sort of natural union or relationship with the corals and environment, but whether this is in the form of nutrients or stabilisers, we can not say. We have also noticed in our aquaria that some introduced corals have adhered themselves to the rockwork.

An interesting point is that the corals and invertebrates that arrive "on" the living rock survive with very few problems.

Although we can't specifically pinpoint the factors involved, we feel that there might well be a link here between introduced corals and the rich environment created by living rock.

The majority of corals that we have observed go through some sort of cycle during the daylight period, and we feel that if they are given the correct surroundings, they will survive much better than the hobbyist is sometimes led to believe. Our experience is that the provision of an environment as close to nature as possible would appear to promote the captive lifespan of corals.

Part 3 of the series will concentrate on invertebrates, fish introductions and the overall development of the system.

News

AQUATIC TRADE CONFERENCE AT SPARSHOLT

(17-18 July)

Sparsholt College, with the aid of a steering committee which includes representatives of the aquatic trade, are organising the first-ever two-day conference for people specifically involved with the aquatic trade.

The major aims of this conference are:

- to provide a forum for the presentation of good-quality papers covering current topics which are of significant importance to the aquatic trade;

- to establish a meeting place for members of the aquatic trade to discuss common areas affecting the industry.

There will be ten oral presentations at the conference, covering a wide range of topics including fish health, filtration systems, creative accounting, computers, aquatic plants and other pertinent topics.

Sparsholt College hosts many conferences every year and is well equipped to cater for national events of this nature. Included in the full conference package is a formal conference dinner which will provide ample opportunity to talk to other members of this growing industry.

During the packed conference programme there will be an opportunity to visit the National Aquatic Training Centre towards which so many members of the industry have so generously donated. This Centre is now the "home" for the one-year Certificate in Aquatics & Ornamental Fish Management that the industry wanted the College to organise.

For a full conference programme and booking form, please contact: Fiona Fielder (Short Course Secretary), Sparsholt College Hampshire, Sparsholt, Nr Winchester, Hants SO21 2NF. Telephone 0962 72441.

AQUARIUM DAY OUT

Following on from last year's hugely successful public events at London Zoo, the Aquarium is running a packed Open Day on Saturday 15 July.

Tickets for "Aquarium Day" are available from the Press Office, London Zoo, Regent's Park, London, NW1 4RY (Tel 01-722 3333). The cost is £5.00 for adults and £3.00 for children under 16 (includes admission to the Zoo, via the Main Office, for the whole day). Please make cheques payable to "London Zoo" and enclose a stamped addressed envelope.

Other attractions include:

- Free raffle — with the latest aquarium books as prizes
- Poster displays
- Free fishkeeping leaflets

The Zoo can be reached via a five minute walk from Camden Town tube station (Northern Line) or on a number 74 bus to Gloucester Gate at Regent's Park. Parking is available (normal Zoo visitor price applies) in the Gloucester Slips car park, adjacent to Gloucester Gate and the Zoo.

Further information:

Dr Chris Andrews, 01-722 3333, extension 480. Julie Fitzherbert-Brockholes, 01-722 3333, extension 233.



Black-finned Reef Sharks — just one of the many attractions awaiting visitors to London Zoo Aquarium on 15 July.

Programme

13.30 hrs.	Arrive at Meeting Rooms (next to the Main Office of the Zoological Society)
14.00 hrs.	"Sharks, Shams and Seabase Alpha" — a talk by Dr Chris Andrews, London Zoo
14.45 hrs.	Surprise "fishy" film
15.30 hrs.	Coffee and raffle
16.00 hrs.	"There's more to water than H ₂ O" — a talk by Dr David Pool, Tetra
16.45 hrs.	"Fish, flakes and feeding" — a talk by Dr David Ford, Aquarian
17.30 hrs.	Open forum — questions to speakers
17.50 hrs.	Draw for raffle
18.00 hrs.	Aquarium tour, including behind-the-scenes
19.00 hrs.	Leave Zoo

National Water Lily Collection plants first lilies

The official planting of the first water lilies in the National Water Lily Collection at Wycliffe Hall Botanical Gardens, Yorkshire, took place on

Wednesday 3 May during Garden Heritage Week.

The water lilies were planted using Aqua-Soil, a product supplied to the collection by Mr

Barry Read, managing director of Aqua-Soil Products Ltd. The National Water Lily Collection seeks to help the trade by providing opportunities to develop new varieties, and, hopefully, enable some long forgotten water lilies to be reintroduced. Aqua-Soil Products Ltd intend to assist in this aim wherever possible.

For further information contact: Barry Read, 054 882 592 for AQUA-SOIL PRODUCTS LTD. Mrs C Kirby-Welch, 0433 771026 for WYCLIFFE HALL BOTANICAL GARDENS.

Barry Read with a bag of his AQUA-SOIL as used in the planting at Wycliffe Hall Botanical Gardens.



Helpful hints with 'Aquarian'

To help take some of the mysteries out of fishkeeping, Thomas's, manufacturers of 'Aquarian' Flaked Fish Foods, have launched an exclusive series of audio cassette tapes on the fishkeeping hobby.

With only three proofs of purchase from the range of 'Aquarian' Flaked Fish Foods, fishkeepers can send away for any one of the three cassettes, written and presented by Dr David Ford, Head of the 'Aquarian' Advisory Service.

The tapes cover a variety of different fishkeeping topics and should appeal to the cross section of aquarists, be they novices or more experienced fishkeepers. Each cassette lasts for 20 minutes, with the complete set forming an entertaining and informative audio library for any fishkeeping enthusiast.

Fishkeeping Made Easy is the first title in the series and is aimed at newcomers to the hobby. With his well-known enthusiasm and commonsense approach Dr Ford gives hints on how to go about setting up and looking after an aquarium from day one. He explains in

clear and simple terms the importance of water quality including the functions of filtration and aeration.

Tips from Top Aquarists, the second tape, covers numerous fishkeeping hints, suggestions and short cuts collected from top aquarists. The tape answers many queries frequently received by Dr Ford at the 'Aquarian' Advisory Service.

Fish care, disease and treatments, the third tape in the series, offers useful advice on maintaining water quality and prevention of fish stress, plus points on preventing disease, and outlines ways of treating common fish diseases including Fungus, White Spot and Fin Rot.

Special promotional leaflets are available at local 'Aquarian' stockists.

The closing date for this special fishkeeping promotion is 30 September 1989.

For further information please contact: Caroline Franklin, Gwynne Hart & Associates, 4 Bedford Square, London WC1B 3RA. Telephone 01-255 2424.

Stapeley's latest releases

With years of experience as the world's largest Water Garden Centre, Stapeley have just launched their new and exclusive range of low-voltage submersible pumps — NEPTUNE.

The result of extensive research, the 3 Neptune Models give a safe and efficient service incorporating a self-resetting thermal trip transformer reducing the working voltage to 24 volts. This means that work can be safely carried out around the garden pond, without the use of a circuit breaker. Additionally, the neat design and compact size of all three Neptune models makes this new pump unobtrusive when installed (an easy task) and submerged in the pond.

Neptune is offered in kits for

fountains, waterfalls and combined fountain and waterfall kit. Each pump has a two-year guarantee, requires minimal maintenance and offers maximum strength and reliability.

If anything should go wrong, every part is replaceable and parts are readily available from Stapeley's own workshops, where Neptune was developed and is now being manufactured.

The full Neptune Range is on sale at the garden centre at Stapeley. Complete kit prices range from £49.95 for a fountain kit, £62.75 for a fountain and waterfall kit, to £75.75 for a top of the range waterfall kit.

Stapeley Water Gardens, Nantwich, Cheshire. Tel. 0270 623868. Fax 0270 624919.

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Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope the name of the experts to whom your query should be directed. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.



TROPICAL
Dr David Ford



COLDWATER
Pauline Hodgkinson



PLANTS
Barry James



KOI
Roger Cleaver



DISCUS
Eberhard Schulze



MARINE
Graham Cox



HERPETOLGY
Julian Sims

Coldwater Ulcer problem

My male Calico Fantail developed a small, grey "woxy" pimple which has now grown into a bloody hole edged in white and what looks like bruising around it.

My female had a large white lump (on her tail) with "strings" coming from the bottom of it. The fin tore off where the lump was, leaving a blood-stained area. Since then other lumps and holes have appeared... and cleared up. She is very active and feeding, and none of her other fins are affected.

The condition you describe concerning your male Fantail does, I am afraid, appear to be Ulcer Disease. Depending on the severity of the condition it is difficult if not impossible to cure.

Very often septicaemia occurs and the disease becomes fatal, but in less chronic cases, antibiotics, either in food or in the water, may be successful. Your vet will be only too happy to help and can supply the anti-

biotics or antibiotic-containing food (available from King British).

In fact, I think your female may also make a complete recovery from a course of antibiotics.

My own experience of a similar fin condition in a recently-imported fish was successfully cured, when all else failed, by Chloramphenicol

at 50 mg/litre. The fish remained in this medication for 5 days. Half the water was then changed and the fish was left for a further 5 days.

Herpetology Candle with care...

Is it possible to tell if a tortoise egg is fertile early on in the incubation process or must one wait right to the end to find out?

When first laid, tortoise eggs are a bright white and gradually darken as an embryo-

Tortoses (this is *Geochelone gigantea* - the Giant Aldabra Tortoise) lay eggs which must not be rotated during incubation.



JOHN DAVIES

mic tortoise develops inside. Infertile eggs become partially transparent with time, especially when carefully held in front of a 60 Watt light bulb (a practical form of "candling").

Sometimes infertile tortoise eggs develop a pinkish or pale purple coloration.

Other infertile eggs develop dark mottled patches with translucent areas (which appear almost "stain-like").

Occasionally infertile tortoise eggs decay by bacterial action relatively quickly. Gases build up inside the egg which then cracks, allowing some of the albumen to ooze out. (After 80 or 90 days of incubation, decaying eggs can explode filling the room with a very noxious smell!)

I must admit that I err very much on the side of caution and do not discard any reptile egg unless I am absolutely certain that it is infertile - hence - the occasional explosion after two or three months. However, I am very careful that no two eggs touch one another in the VERMICULITE incubating medium. Thus, infection cannot spread from an infertile egg to a healthy one.

One other word of caution. Reptile eggs differ in internal structure compared with the eggs of birds. Bird eggs are frequently turned in the nest by the parents during incubation. Reptilian eggs are undisturbed during their incubation - once laid, there is seldom any parental involvement, with the notable exception of "guard duty" by female Nile Crocodiles (*Crocodilus niloticus*).

Thus, reptilian eggs have not evolved a tolerance to rotation or movement during incubation. The reptilian embryo is held in place by a complex series of membranes and these will tear if rotation does occur. If you do "candle" tortoise eggs to check on fertility, be very careful to hold the egg in the same plane all the time and handle the eggs without any sudden movement or rotation.

Marine Algal blues

I have recently encountered several algal problems in my marine tank which is about 8 months old. The front glass needs scraping almost daily, but, more importantly, an algal "slime" of a reddish-brown colour has developed and has quickly spread over a large proportion of the rockwork and substrate. I managed to siphon most of it out, but within two days, it was developing again (and also in different areas) and, within five days, it was reaching epidemic proportions.

I initially tried reducing the amount of light (I have two "North-light" tubes and one domestic tube covering the length of the tank), but this had no effect.

Are there any proprietary cures for this problem or will I have to carry out a complete "clean-down"?

The appearance of red "slime-algae" in a marine aquarium is, fortunately, a rare occurrence and nearly always occurs in the early (ie first year) period in the system's life. I do not believe that stripping down the entire aquarium is necessary, or even helpful, since you would be unlikely to be able to remove every single trace of this plant from your equipment; so it would only reappear at a later date.

Red algae appear in the natural marine environment usually at considerable depths — rather than the shallow and medium depth areas which are normally colonised by green and brown species of algae respectively. At these greater depths, most of the red, orange and yellow component wavelengths of white sunlight have been filtered out by the seawater, leaving only the blue wavelengths. It is the light energy of these blue wavelengths which the photosynthesising pigments are utilising to "manufacture" the algae's foodstuff from dissolved carbon dioxide and water.

At these greater depths the red algae have found an unexploited (by other plants) ecological niche, where conditions are characterised by the presence of predominantly blue light and generally lower water temperatures than in the shallows.

It therefore follows that, to suppress these red algae, it would be desirable to raise the water temperature slightly to a maximum of 80°F (27°C) (but first remembering to increase



Mandarin fishes (this is *Synchiropus ocellatus*) are suitable candidates for invertebrate-containing marine aquaria.

the water aeration using a wooden microdiffuser) and to increase the red component of the tank's lighting system by substituting a "GRO-LUX" tube for the domestic white tube which you are presently using.

Mixed community

I will shortly be setting up a 72 x 18 x 18 in (c. 180 x 45 x 45 cm) adequately filtered tank containing living rock, anemones and, perhaps, a few shrimps.

I would also like to keep Tomato Clowns. How many could my tank hold? Also, what other fish can I keep without upsetting the invertebrates? (I was thinking of buying a Royal Gramma, or one or two Mandarins or, perhaps, one or two Dwarf Angels of the genus *Centropyge*).

I would avoid Tomato Clowns if I were you, unless you are lucky enough to purchase a mated pair. This species is extremely aggressive towards other same-sex fishes of the same species. You would do much better to buy a male-female pair of Common Clowns which most retailers can sex these days.

I would only buy one Mandarin Dragonet since they tend to accept livefoods only, such as the small harpacticid copepods which they find naturally within the tank and newly-hatched Brine Shrimps.

If you are wise you will stick to the rule of 1 in of fish to each 4 gals of seawater for U/G filtered tanks. This gives you a total potential stocking level of 19 in (48 cm) of fish, of which the pair of Clownfish, a Royal Gramma and Mandarin Dragonet would use up some 8 in (20 cm) leaving room for three 3 in (1.6 cm)

Dwarf Angels, say a Coral Beauty, Lemonpeel and Rainbow Dwarf Angel ie *Centropyge rubri* and a Saffron-blue or Electric Blue Damselfish.

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Koi Skimming Koi

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I introduced some new fish into my pool and within one hour, they appeared to be following the others. I would appreciate your views.

The "problem" of your fish skimming on the edge of the shelf may be nothing more than high spirits.

You do not say how often they are doing it. If it is only occasionally, and is not done constantly, then the above is probably the case, especially if you can see no signs of gill or body parasites.

Fish will often play "follow-my-leader" and skim one after another. If in doubt, ask if your local dealer could call and see your Koi or else, ask one of your local BKKS members. He/she should be able to set your mind at ease.

Tropical Marbled mix-up

I have just purchased two Dwarf Marbled catfish *Microglanis poecilus*, but can't find anything on this species. Can you help?

Microglanis poecilus, is really the Harlequin Catfish... the Dwarf Marbled Catfish is *Microglanis paralybae*. Whichever one you own, the conditions need to be similar. The fishes are Pimelodid Catfish from Southern America, and so are crepuscular and nocturnal. Therefore, they need a shaded aquarium with hollow wood or roots in soft soil where the fish can spend daylight hours.

Water chemistry is not critical but some reports say fresh, hard water is not well tolerated. Omnivorous in diet, the fish eat anything, but do show a preference for small, live worms.

Water temperatures around 25°C (77°F) are ideal. Growth can be rapid and it is usually recommended that only young specimens are kept for a while. The fish grow quite large and become aggressive to other species.

To my knowledge, there is no record of either species being bred in captivity.

Piranha-sized problem

I have six Piranha but have, unfortunately, not been able to get them to breed. I would be very grateful if you could help.

Piranha will breed in the wild almost monthly, but spawning in the aquarium is very rare. It has been known in large tanks such as those of public aquaria and from these spawnings we know that the fish is an egg scatterer.

The eggs are yellow and about 2 mm in size. The female release several thousand eggs among

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roots of dense vegetation. The male fertilises them and then drives the female away and stands guard until they hatch; then he loses interest too.

The fry are large enough to accept newly-hatched Brine Shrimp and crumbled flake. They grow rapidly and soon need fish and meat flesh.

What to do with several thousand hungry Piranha then becomes the next problem!

Discus Strong (filtered) views

I am planning to install an under-ground filter to help my power filter along in my Discus tank. What is your opinion of such a set-up?

It is surprising how many hobbyists keep their Discus in an aquarium with a layer of gravel, yet without any real plants. It is also surprising that many of these hobbyists use an external power filter in conjunction with an air-operated, or even powerhead-operated, under-gravel filter. I have never quite



LONDON ZOO AQUARIUM

Piranha generally require (among other things) very large aquaria if they are to spawn in captivity.

been able to understand the logic behind using this combination in any aquarium and, especially, in a Discus aquarium.

An external power filter, of the right size, turnover and capacity, is all that is needed to keep the water in any Discus aquarium in perfect condition. These filters can be installed in such a way that only a gentle current is created; they are virtually silent and, with the various filtering materials available, any hobbyist is able to create a water condition to suit his/her needs.

Having installed such an effi-

cient external power filter which collects all the dirt particles away from the water, which is then easily cleaned, serviced, etc, why should it be necessary to install an undergravel filter as well? The efficiency of the power filter, in my opinion, is completely nullified by the running of the undergravel filter in the aquarium.

Theoretically, undergravel filters are meant to be highly efficient biological filters. The water passes through the gravel bed and any particles of either uneaten food or waste matter are retained. The aerobic bacteria in the top few millimetres of the gravel bed are then meant to convert all the uneaten food and

waste matter into harmless substances.

However, in continuous use, an undergravel filter will only operate for a very short time like this and then only when the layer of gravel covering the filter plate is absolutely even. Water has the habit of finding a way through the gravel bed where there is least resistance and, in time, only a very small part of the total area will be used. The larger part, which might have collected more waste matter, or have a slightly thicker layer of gravel is likely not to be used at all.

Because of the lack of oxygen-rich water passing through these parts of the gravel, the waste matters may not be oxidised and, if so, anaerobic bacteria will form. Many of their metabolic products are very toxic, and the stagnant substrate becomes black with a very putrid smell. The external power filter will then have to cope with additional biological purification of the water.

The best biological filtration system would therefore (under such circumstances) be ruined by poor biological purification, usually resulting in ailing fish. WHY?

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PL2 25cms long

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Coldwater jottings



Stephen J. Smith

Diamond Jubilee could lead to common standard

Bristol Aquarists' Society holds its Diamond Jubilee cold-water fish show in September and, to mark the event, the society has instigated moves which could result in a common standard for coldwater fishkeeping throughout the UK.

According to the society, the three members, Tommy Thomas, Vic Capaldi, and Doug Paul, "will be approaching the other main societies, Northern, Midlands, and the Goldfish Society . . ." to bring together their views.

I am delighted that Bristol AS has resurrected an initiative which has laid low for far too many years, and I offer my wholehearted support to their efforts. The difference in show standards throughout the cold-water scene has been a puzzle to many hobbyists, some of whose fish have achieved top prizes at a particular show, yet have been "also-rans" at others.

However, interest in cold-water fishkeeping is not confined solely to four specialist societies covering a few hundred members. Thousands of aquarists throughout the UK keep coldwater fish. For a truly common UK standard, consideration should also be given to the views of other major

societies with coldwater interests such as South Park Aquatic (Study) Society, Association of Aquarists, Federation of British Aquatic Societies, for example, and not forgetting the significant number of societies in Scotland.

The Bristol Aquarists' Society Diamond Jubilee cold-water fish show will be held on **Saturday 9 September** at St Ambrose Church Hall, Stretford Road, Whitehall, Bristol. For further information and show schedules, contact show secretary Vic Capaldi at 2 Mackey Avenue, Filton, Bristol BS12 7ND, or telephone him on 0272 798374.

Hot air . . .

There can be little doubt that, for many pondkeepers, the warm weather of recent months has been a boon, enabling the enjoyment of the hobby to its fullest.

What better pastime than sitting on the edge of the pond in the warmth of the sun, calmly perusing one's favourite Koi, Shubunkin or shoal of Orfe patrolling the cool waters?

But hidden dangers lurk beneath these very waters in such apparent paradise — more, I hasten to add, to the fish than to the pondkeeper.

The inevitable result of

strong sunlight on water is an algae explosion. And algae are a first-class diet for coldwater fish . . . aren't they? However, in order to see the fish we have to clean the water from time to time, and therein lies the danger.

Seasoned aquarists will be aware that young fish, which have not yet developed metallic scales, have transparent bodies. When transferred to clear water, any living algae in the intestines of the fish will produce oxygen as part of the process of photosynthesis. This oxygen, trapped within the body of the fish, causes the fish to swell and, tragically, can result in the fry literally becoming "unzipped" along the ventral line.

Such a phenomenon can also arise in the case of matt, or "scaleless" fish. A colleague of mine had retained a handful of matt Shubunkins which, although nowhere near "standard" quality, were pretty-pink and almost mother-of-pearl and, thus, most attractive to his daughter.

Unfortunately, these fish all suffered a similar fate soon after a pondwater change during bright weather, despite their being some three years old.

The solution? Algae are, and always have been, one of the

most consistent problems for the pondkeeper, and there can be no hard and fast solution. Even the most elaborate filter systems will not guarantee an eradication of algae (although many are almost 100% effective).

The method which I find favourite is to undertake regular partial water changes, even if the water appears to be clear. Even lowering the level of the pond water a couple of inches or so and topping up with tapwater every few days can make all the difference; and the fish appear to enjoy swimming among the fresh stream of water from the hose!

In addition, the use of marginal and floating plants will provide not only an attractive feature to your pond, but will also serve as shade for the fish and will help to keep algae at bay.

. . . gas bubbles

Excess algae in the pond can also cause high oxygen levels, especially during hot and sunny months. This can give rise to a similar condition in pond fish which can be recognised by bubbles in the finnage.

Called "embolism", and known commonly as "Gas Bubble Disease", this is caused by oxygen saturation in the bloodstream of the fish, which manifests itself in the weaker membranes, normally the caudal finnage, and is especially common in the fancier varieties of Goldfish, such as the Veiltail types.

Such a condition eventually leads to splits in the fins which could give rise to the possibility of infection through the resultant open wounds.

Again, prevention is far better than any cure, and keeping the water clean is the golden rule. Should you find any fish which have developed this condition, do move them into clear water (of equal temperature) and undertake an overhaul of the offending pond by changing at least 50% of the water.

In addition, shading the pond with plants, or even polystyrene tiles, should prove an effective precaution.



Long-finned fish, such as this Calico Fantail, can be prone to "gas bubble disease" which is caused by excess oxygen in the water and is recognised by bubbles in the finnage, usually the caudal fin.



A magical, but soon-to-be-destroyed, scene at Cypress Creek — the price of "progress".

FLORIDA '89

PART TWO

A&P editor John Dawes fulfils the ambition of a lifetime and picks up some fantastic "bonuses" along the way.

(Photographs by the author)

The first fish I ever kept were Mosquito Fish (*Gambusia affinis*). I was seven years old at the time and thought they were Guppies with a mean streak!

I very soon learned otherwise — but have always retained a big soft spot for this sleek, cannibalistic, but beautifully-put-together predator. I also learned at the time that the

subspecies in question, *Gambusia affinis holbrooki*, often produced black and mottled males in the wild.

Burning ambition fulfilled

That was 37 years ago (how time flies when you're enjoying yourself!). Ever since then, I've harboured this burning ambition to see melanic Mosquito males in the wild

... and collect some. Not a world-shattering ambition, one might say ... perhaps even only a "lukeworm" one. To me, though, it's always been something rather special.

Last year I came very pretty close to achieving my goal — I actually saw some true, wild, mottled "holbrookis" during my Florida trip to judge at the 1988 FTFFA show. Having had more than my share of good fortune by being invited back to judge at this year's event (to get my scoring right, this time!), I was determined to have another go.

Thanks — as so often in the past — to my friend and "provider-of-everything-and-anything-remotely-aquatic", Rick Gibson, a potentially suitable section of the Hillsborough River in River Hills Park, Temple Terrace, Florida, had been scouted and earmarked for the great adventure. Granted, not the heart of the Amazonian rainforest, or the Congo Basin, but I was just as loaded with anticipation as if it had been.

Rick was right. Four net scoops into the "expedition" and there it was! A young, as yet undifferentiated, mottled *Gambusia affinis holbrooki* male.

Some people experience a deep feeling of anti-climax when they fulfil a longstanding ambition. There must be something very wrong with me — perhaps all those who have been telling me so for years are right! — but I was elated. I really was! The little male was gorgeous. It can't have even been 1 in long (2.5 cm). The gonopodium was not yet formed, but the anal fin rays that would eventually go to form it, were already beginning to thicken.

Captured on film

Out came the camera, specially constructed photographic tank, suitable background and all the rest, and before long, he had been captured on celluloid (not brilliantly, as it eventually turned out), and released to complete his adolescence in peace and then do his bit in spreading his mottled genes through the population.

For the record, the temperature of the water was 70°F (21°C), the pH 6.8-7.0, the ammonia level was 0.1 ppm, nitrite was 0 and hardness c. 225 ppm.

Other fish that we saw or caught in this stretch of water included the "other" Mosquito Fish (*Heterandria formosa*), the Killifish *Lucania goodea*, a very young Sunfish, larger Sunfish, and what looked like a Bass (we didn't catch the last two).

Among the invertebrates, we caught Ghost Shrimp (freshwater shrimps — most of the females carrying eggs), *Gammarus* shrimps, Water Scorpions, Whirligig Beetles, and Dragonfly and Mayfly nymphs.

Plantwise, I saw, at least, *Hydrilla*, *Hygrophila polysperma*, *Ceratophyllum* (I was unable to determine the species), *Salvinia* and Water Hyacinth (*Eichhornia crassipes*).

All in all, this small section of the Hillsborough River, right next to roads, houses and a local school, was pretty productive.

I often get the impression that many people believe that you can only collect exciting fish and plants way out in the wilds, far from civilisation, having to put up with

all sorts of hardships in the process.

Certainly, this often applies. Equally, though, there are many places the whole world over (but they are getting fewer) where fish and plants are almost within arm's length of a busy highway or built-up area. Florida — at least, at the moment — is a fantastic place to visit if you want to collect at some of these "easy" sites.

At Double Branch Creek, on Hillsborough Avenue, along State Road 580, for example, you can see giant Sailfin Mollies (but try catching one!) from the road itself.

This truly brackish habitat, with a pH of 8.0, a Specific Gravity of 1.012 and water hardness of 200+ ppm, yields not just Mollies, but a whole host of other brackish/marine organisms, from Tree Oysters (*Ostrea virginiana*) and Marsh Periwinkles (*Limorina angulifera*), to Red and Black Mangroves, Fiddler Crabs and the majestic, and highly pugnacious Blue Crab.

If anyone has any doubts concerning the truly brackish nature of Sailfin Mollies, I would strongly advise a visit to Double Branch Creek — there can be few better ways of learning just how important salt is in the lives of these often-abused fish.

Cypress Creek is not far off, along Bruce B. Downs Boulevard on State Road South 581. Stop at the bridge that crosses the creek which, at this point, widens out into a shallow "mini-lake", and you can see Yellow Water Lilies (*Nuphar lutea*), *Myriophyllum* (Parrot's Feather), *Hygrophila polysperma*, *Potamogeton nodosus* (Pickering Weed) and even *Ludwigia repens*, from the side of the road.

Magical world

You'll also be able to see the impressive cypress swamps, consisting largely of Bald Cypress (*Taxodium*), no more than a stone's throw away. Walk into the swamps and you are immediately transported into a totally different, magical world within the first few yards.

The trees are smothered in air plants (bromeliads) and orchids, and the silence and smell are overwhelmingly captivating. The creek water is stained clear brown, its pH is 6.5, the ammonia 0.25 ppm, nitrites < 0.1 ppm, the temperature 68°F (20°C) — at least that's what it was during our visit — and the hardness around 150 ppm.

Plantwise, this is a very rich place, harbouring the species already mentioned in relation to the open stretches and numerous others including a 12 foot-long *Myriophyllum* with red tips, lots and lots of *Hygrophila* and *Ludwigia*, plus *Riccia fluitans* (my first-ever experience of this species in the wild) and *Sagittaria platyphylla* (?) at all stages from the terrestrial flowering form to the totally submerged Vallis-looking type.

The fish are equally impressive and include Mollies, Killies (including one of the Sheepshead Minnows, *Cyprinodon* sp.), *Heterandria formosa*, *Gambusia affinis holbrooki*, a charming Darter (*Etheostoma* — but which one?) and several others.

On the invertebrate side, we found Ghost Shrimps and Crayfish ... while the mosquitoes found us!

This is, indeed, an exciting place. I was therefore very disturbed to learn from Rick that the whole area is earmarked for development within the next few years, to be replaced by residential blocks.

We've heard and seen it before ... and we'll hear and see it many times again — but isn't it sad to see how destructive a species we are? Florida, like so many other regions, has precious few truly wild places left. Yet, irreplaceable bits of those that are left, are constantly being gobbled up by the remorseless surge of so-called progress.

It's devastating to realise that if you want to catch a glimpse of native wildlife "au naturel" these days, you often have to dash in quick before it disappears under the bulldozer and the piles of concrete.

Makes you want to cry. . . .

Latest Florida innovations

On a brighter note, one of the things I always look forward to when I go to Florida is visiting some of the farms to have a look at "what's brewing".

Two of the places which are "musts" for me are 5-D Tropicals and Ekkwill Tropical Fish Farm because there's always something new to see there. This year was no exception.

At 5-D, work is at a very advanced stage in establishing a commercially viable population of very striking Albino Cherry Barbs (*Barbus nanyu*). They got close to it about two years ago, but something happened every time they thought they'd cracked the problem. Now everything is running smoothly, so this fish will soon be coming on line, if it hasn't already done so.

At Ekkwill, they are virtually "home" with a Golden Rosy Barb (*B. conchostius*) in which the males are deep orange and the females golden yellow. Some of these very attractive fish are already trickling into the UK from India, but the scale of the operation at Ekkwill is such that the trickle could easily become a substantial flow. A really

Bottom, my first, and only (to date) melanic Mosquito Fish male — the fulfillment of a 37-year ambition. Below, Albino Cherry Barbs bred at 5-D Tropicals should soon be making their appearance in the hobby. Right, what's so special about this Pleco shot? See next month's *A&P* when all will be revealed.

spectacular fish this one.

Also due to make a real splash(!) is a fantastic fish which, in my opinion, could well end up giving Giant Danios a really good run for their money. It is *Inleocypris anopurpureus*, which could do extremely well under the trade name of Burmese Banded Danio ... or something similar. It, too, is being bred in commercial quantities at Ekkwill (the fish was originally collected by Heiko Bleher).

Perhaps these fish will make the show bench at next year's Florida Tropical Fish Farms Association Professional Show at Tampa, and win. Who knows? Who knows, too, that other surprises won't be waiting, ready (and admirably able) to stretch the abilities of next year's judges.

One thing is absolutely certain — the quality will be, at least, as high as ever ... and that's saying something.

Finally, here's a teaser. What's special about the Pleco photograph in this article? Here's a clue: Discuss and Urus do this. See next month's *A&P* for the answer.





Top, *H. petersius* male with full fin extensions and adult coloration. Above, females are considerably stouter than males and possess shorter fins.

KEEPING AND BREEDING THE

YELLOW CONGO SALMON

Dutch aquarist **Peer Koppelaar** reports on his success with this active, attractive and interesting African characin.

(Translated from German by Cichlid Data)
(Photographs by Arend van den Nieuwenhuizen)

One of the best known and most beautiful fish which has come to us from Africa and is now, after a long period, being imported once again is the Yellow Congo Characin or

Salmon — *Hemigrammopetersius caudalis*. Previously it was better known under the name *Alestopetersius* or *Petersius caudalis*, but also, in many regions, as *Micralestes acutidens*. The Yellow Congo Characin, like for example *Ditrichodus affinis*, comes from the

lower reaches of the Zaire and its tributaries.

The name "Yellow" Congo Salmon is misleading, since the males of this species display the yellow colour only in their tail — neither are they Salmon in the true sense of the word. Their bodies gleam, under direct light, a brilliant silver blue. They also have white lines along the ventral (pelvic) and anal fins, and white rays on the elongated dorsal fin. On the other hand, the female's body looks more golden yellow; her fins are transparent and she lacks the white colourings.

Basic requirements

Yellow Congo Characin typically swim together in groups and are especially suited to a roomy and moderately populated community aquarium, in which they remain principally in the middle waters. They like their swimming area to be well, but not too strongly, illuminated, with dark and shadowy places between the plants.

In a well prepared and situated tank, they behave in a playful and lively manner, and if the tank suits them, they form pairs. This happened in one of my aquaria which was subjected to daylight from overhead. These Congo Characins were the most beautiful I have ever seen, probably because a part of the tank was lit up by the sun.

Although Yellow Congo Characin prefer flaked food, we must not make things too easy for them. In order to get them into breeding condition, they must have live food. They particularly like black midge larvae and the larvae of common flies, with conventional food such as water fleas and similar small crustaceans definitely coming second to these. Red and white midge larvae, along with Tubifex and frozen food, complete their diet. If these live foods are in short supply, then Brine Shrimps are acceptable.

In keeping these fish, the composition of the water is of no significance. You can keep them extremely well in hard water with a neutral pH value.

Spawning

In order to breed wild-caught fish, generally speaking, softer and slightly acid water is recommended. A sudden change of pH value with freshly hardened and slightly acidic water, frequently results in a spontaneous spawning. I noticed this when I once changed the aquarium water of the fish I was keeping in this way. The average temperature of the water was around 25°C (77°F).

As my aquarium obviously had different amounts of light penetration in different places, I was able to ascertain accurately where the Yellow Congo Characin mostly preferred to swim. There were various places; at one point, they stayed near the *Echinodorus tenellus* and, on another occasion, they stayed near a clump of upright bogwood. The wood allowed only diffused light in and never direct sunlight, as was the case with the *Echinodorus tenellus*.

During spawning, the fish did not move from one place to another but paired either close by the *E. tenellus* or between and near the bogwood. I have never seen them lay eggs

on fine, feathery plants, though they have done so between the widely spread out leaves of a broad-leaved Amazon Swordplant in the upper layers of water.

As is often the case, the initiative comes from the female who swims near to the male. Mating takes place quickly. The fish swim close to each other and press their bodies together. At the same time, the male pushes his large anal fin under the stomach of the female. This mating behaviour matches that of *Oryzias* (the Medaka), although, with them, it happens more sedately. Although I have never seen it precisely, it seems to me that a pocket was formed in which the eggs were fertilised. Immediately afterwards, the fish swim away from each other with a jolt and the rather large and clear eggs sink to the bottom.

Fascinated by these observations in my "general" tank I decided to undertake a serious attempt at breeding this fish. That was not exactly easy, for a formed pair do not remain together for very long to take care of their young. I found this out after I had tried to breed with various combinations of fish.

I used a 60 x 30 x 30cm. (24 x 12 x 12in.) tank in which I created an area of diffused light. I filled it with hardened water, topped up with tapwater — the hardness was about 2°dH and the pH value was 6.8. I covered the bottom of the tank with small pieces of peat, which I reduced to a size sufficient to "disinfect" the tank and sink to the bottom. I hung an external filter on the tank, filled partially with cotton wool and partly with

the same pieces of peat. Then I brought the water temperature up to 25°C (77°F).

The tank remained like this for four days by which time the pH value had reached a level of 6.3. I used pieces of peat, since peat extracts hinder the development of micro-organisms, and thus the eggs falling to the bottom would take longer before they were damaged or infected by bacteria.

As spawning medium I used a few different-sized clumps of Java Fern of which the largest were placed along the rear of the tank and a couple of smaller ones in the middle of the breeding tank, thus allowing in only diffused light.

On the fifth day after setting up the tank, I put the fish in it, having accustomed them to the water by the drip method. On the following morning I noticed that the fish were disturbed by my presence. Therefore I placed a piece of cardboard, with an observation hole, in front of the tank. It helped enormously, and in the course of the morning the fish spawned for around two hours.

Hatching and rearing

The pair dispersed — perhaps due to the limited space available — in a different manner from which they separated in the large aquarium. Typical matings lasted only a very short time. The fish swam together, pushed themselves against each other and immediately parted from each other again. Each mating resulted in three to ten eggs.

When the fish had finished spawning, I carefully fished them out, although I could not establish any egg eating tendencies. To

be on the safe side, I covered the tank with newspaper and, after 24 hours, switched on the filter. That way I introduced a slight "breeze" so that the water remained in motion.

The embryonic development lasted for an unusually long time, for it was only after a week that the glass-clear larvae became free-swimming. They were rather large, so I fed them with Brine Shrimp nauplii. This however was a mistake, for their mouths were too small for this food.

Fortunately, I knew a source which traded with rotifers which you could identify by their orange colour when you had them in the net and out of the water. This food was clearly more appropriate. After a week the young fish managed the Brine Shrimp nauplii too, and from this point on, caring for them was no longer a problem. Growth progressed more slowly than I would have expected from characins, though by the age of six months, the young measured two to three centimetres (0.8-1.2in.).

For good, continual growth, it is necessary to change the water regularly in the breeding tank as well as, later, in the growth tank. The fish quickly react to water which has been infected with dead food and its resulting increasing acidity.

I bred the Yellow Congo Characin several times. The results varied between 175 and about 300 young fish, which were mature by the age of nine or ten months. I had the best breeding results with fish that were twelve to eighteen months old.

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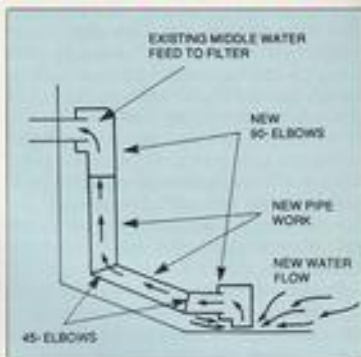
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KOI POOL FILTRATION

THE SYSTEMS APPROACH *Part 2*

In the second instalment of his eye-opening mini-series, Nigel Caddock delves into the murky depths of filter media, drains and pumps . . . and raises some interesting discussion points in the process.



Filter media

There is an abundant selection of filter media available nowadays. In theory, all a medium needs to be able to do is sustain the development of bacteria.

In practice, like in so many things, making a choice is far from simple. In general terms, the larger the surface area, the larger the potential population of bacteria that will eventually develop. So, in theory, one should select those media that offer the largest surface area. Therefore, a round medium such as Caterbury Spar is more efficient than a smoother one such as pea gravel.

However, there are a number of additional factors which need to be considered, such as blockability and weight. In order to help compare alternatives and make a judgement I have formulated an evaluation table of the main types of available media (operating in a system with average pre-filtration):—

Foam, a popular "biological" medium, will become clogged up very quickly indeed, requiring very frequent washing unless extremely efficient pre-filtration/settlement

is also provided.

I am sure this table will cause total uproar as I am accused of favouring filter mat. I stand guilty as charged. In my opinion, it is the best filter medium available today. Although horrendously expensive, it is, in my view, worth every exorbitant penny because it works! I have no axes to grind and my views are based purely on my personal experience.

Bottom drains

I will, no doubt, financially depress you even further now by advising you that I regard bottom drains as non-negotiable necessities for a successful Koi pond.

Koi constantly emit chemical and solid nasties, through excreta, uric acid and through their gill action. The result of this is the production of a range of chemical nasties such as ammonia, nitrites, etc, and deposited solids.

All these substances, according to my tests, congregate at the bottom of the pond. It is therefore obvious that an efficient means of their removal is paramount. The only really effective means is via bottom drains. I

go further and say that only bottom water should be fed to filters and pulling bottom drains to waste supplements this ongoing purging action.

This is fine if you already have bottom drains or are busy planning, but what about those who only have middle feeds or no feeds at all? I would urge you to alter your system to provide some form of bottom drain.

For the middle feed hobbyists this is relatively easily done by adding extension pipework to your side drain as per Fig 1. This will help enormously but will need supplementing by siphoning the bottom (you also really need to review pond stocking levels and err on the side of sparse).

Filtration feeds

The arguments over middle or bottom filter feeds are legion. It is my view that the most heavily contaminated water in a pond is at the bottom and since this clearly irritates Kois' gills, it will constitute a continual source of potential problems, unless it is removed.

It is clear to me that although, over the years, arguments have persisted extolling the virtues of both bottom and middle feeds, in recent times the tide of opinion has swung in favour of bottom-fed gravity systems, with middle water feeds becoming a thing of the past as improved thinking has prevailed.

One important aspect to consider is that if you do take bottom water to your filter, it should flow by gravity; you should NOT pump it. Pumping bottom water to filters has the effect of "souping" the water and solids, making it very difficult to settle and filter effectively. This is because the mixture of solids and water passes through the impeller of the pump and is "liquidised" — a bit like the action of a food processor.

Gravity-fed bottom water is, however, eminently filterable, as the flow from bottom drain to settling chamber is gentle and easy, with the mixture of water and solids of differing sizes flowing gently from pond to filter.

Medium	Efficiency	Blockability	Weight	Cost	Overall Performance	Star(★) Rating
Cent. Spar	Good	Medium	Heavy	Medium	Good	2-
Pea Gravel	Poor	Medium	Heavy	Cheap	Poor	6
Perlag	Medium	Good	Lightish	Medium	Medium	5
Hair Rollers	Good	Good	Lightish	Expensive	Good	2-
Chopped	Good	Excellent	Medium	Expensive	Good	2-
Land Drain						
Filter Mat	Excellent	Excellent	Lightish	Very Expensive	Excellent	1+

★ The lower the figure, the better the rating.

Pond levels

I have made several references to gravity-fed systems. This is, I believe, a very important consideration for a variety of reasons.

I would advocate that the levels in the pond, settling areas and filter are the same. This will enable the pump to be located at the end of the filter, so that the only agitation that the water receives is when it is fully settled and filtered. Any agitation prior to this will, as I have discussed, make the filtration process more difficult.

In addition, mechanical pumps being mechanical pumps, will sooner or later fail. If your filter is higher than your pond, the whole lot will back-flush into the pond causing contamination of the pond water. This is bad enough in itself, but the most serious implication is that aerobic bacteria need a constant flow of oxygenated water to survive and if this supply stops, or worse still, the water drains away, total obliteration of the population of bacteria in the filter will result in a fairly short time.

If the water levels are the same, however, this cannot happen and, even with a pump failure, the water will remain in the filter and the aeration in the filter will sustain the bacteria until you can restore the flow by replacing the pump.

Pumps

There is an enormous variety of pumps now available, giving hobbyists a very wide choice. Broadly speaking, pumps fall into two types: submersible (internal) and surface (external).

Submersible pumps are available in a range of flow rates from 100 gals per hour to 10,000 gals per hour. Advantages are that they are easy to install, economical on pipework, more readily available and, as they are still the most widely used, are competitively priced with replacement components easily available. They are, in my experience, extremely reliable and, if installed correctly and not run without water, will operate continuously for several years.

External pumps divide broadly into central-heating-type pumps and specialist pumping units designed for ponds and swimming pools. Both these types of pump are also available in a range of flow ratings and the specialist units are, in general, more "beefy". This is because they are specifically designed for the job they are being asked to undertake, whereas central heating pumps are being used in a mode outside their primary design parameters.

Central heating pumps are fine, and they certainly are good value, but you should be aware of their disadvantages. They must be kept waterproof and the waterproofing must have sufficient ventilation to avoid overheating.

It is also important that you make provision in the form of special connectors to enable removal for maintenance. They are also very prone to blocking, which can be confused with pump failure as a small blockage in the impeller can render a pump totally incapable of pumping. This is easily resolved by dismantling and removal of



Sand pressure filters work particularly well when serviced by a "positive displacement" — type pump.



A pump which I have found exceptionally good in every respect is this "Hi-Blow" model.

debris, but I have seen many fully operative units discarded just because they were blocked.

CHPs are also prone to drawing in air which can prove difficult to remove and, as they are not self-priming, this is an important consideration.

Specialist pond pumps are also available as positive displacement units which have more sophisticated innards that effectively gear their performance to ensure that their output flow rate is the same as their rating. This means that their output is not as affected by bends, venturis, etc. as in their submersible counterparts. If you opt for a sand pressure filter you will find this type of pump a definite asset.

The choice of pump is very much a matter of personal opinion, as all the options I have outlined offer relative advantages and disadvantages. One final guideline is to avoid using pumps in an intermittent mode as continual stopping and starting will greatly reduce the pump's overall life expectancy.

This may be unavoidable in, for example, a power skimmer application, but if you plan not to use one of your pumps for any period, remove it from your system, clean it up, store it away and only reintroduce it when you intend to use it.

NOTE: Part 3 of Nigel Caddock's filtration series will include a look at test kits, pond shapes, power skimmers and several other topics.

NEXT MONTH

If you are interested in Koi — even if all you own is a colourful, "mongrel" — our August issue is for you..

● Our specially commissioned, colourful **Favourite Koi Supplement** contains some super articles from our resident experts **John Cuvelier, Roger Cleaver and Nigel Caddock**, plus a contribution from the team at **Nishikigoi International** (the recently-launched specialist journal which we reviewed in our June issue).

Subjectwise, all manner of "favourites" will be covered, from Go-Sankes to Gin Rins and Asagis, the aforementioned colourful "mongrels" that give so many of us so much joy, and lots of others in between.

● If you are not Koi-crazy, fear not — we've also got a fantastic editorial line up, including major articles on:

- * Diving in Roatan in Honduras (**Rick Gibson**).
- * Cypriot Reptiles and Amphibians (**John Skillcorn**).
- * Croaking Gouramis (**Stephen Clark**).
- * Banjo Catfish (**David Sands**).
- * Heiko Bleher's first-ever expedition report in a UK aquarium journal.

And this is just a sampler! For the full package, make sure of your August *Aquarist & Pondkeeper* by booking your copy early.