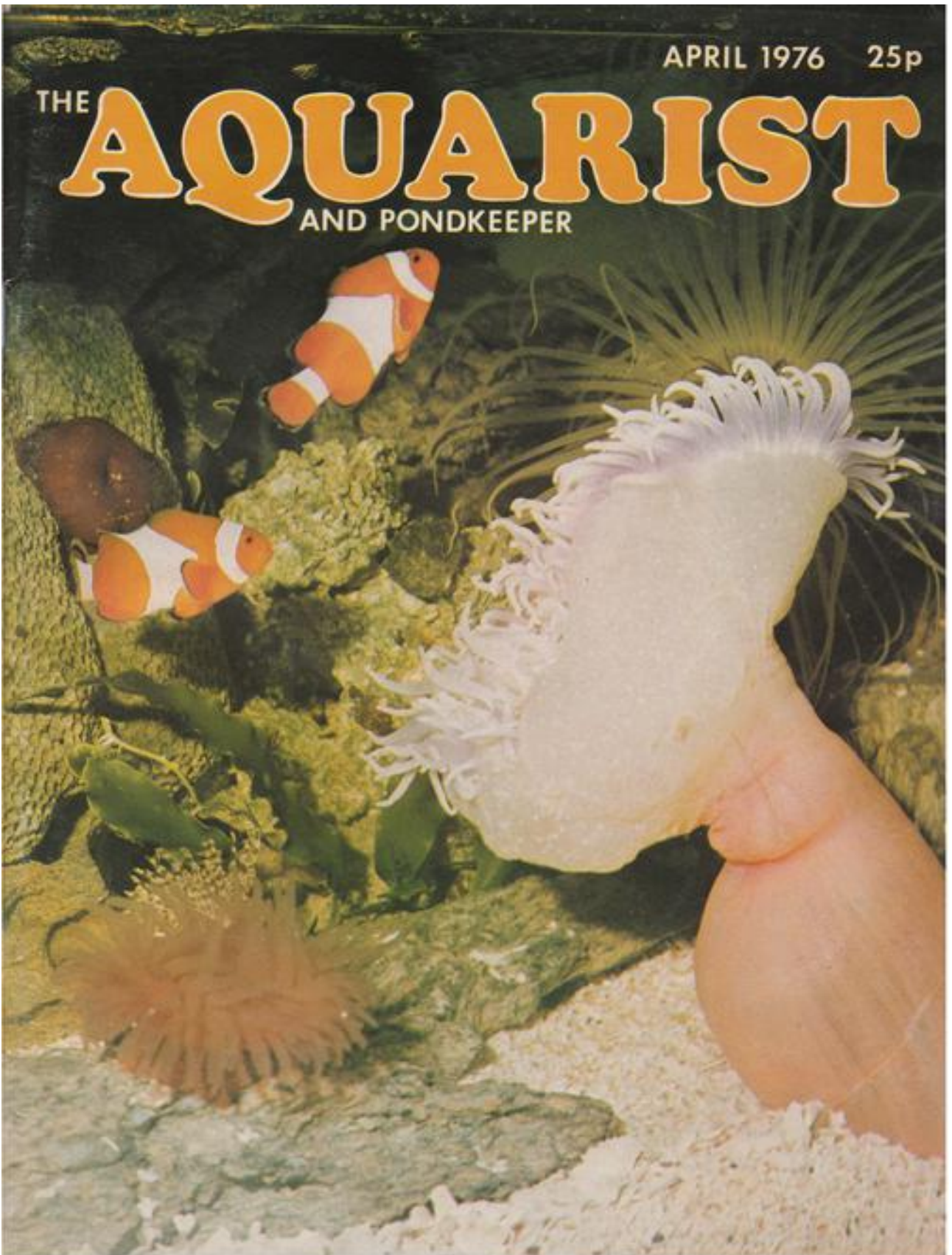


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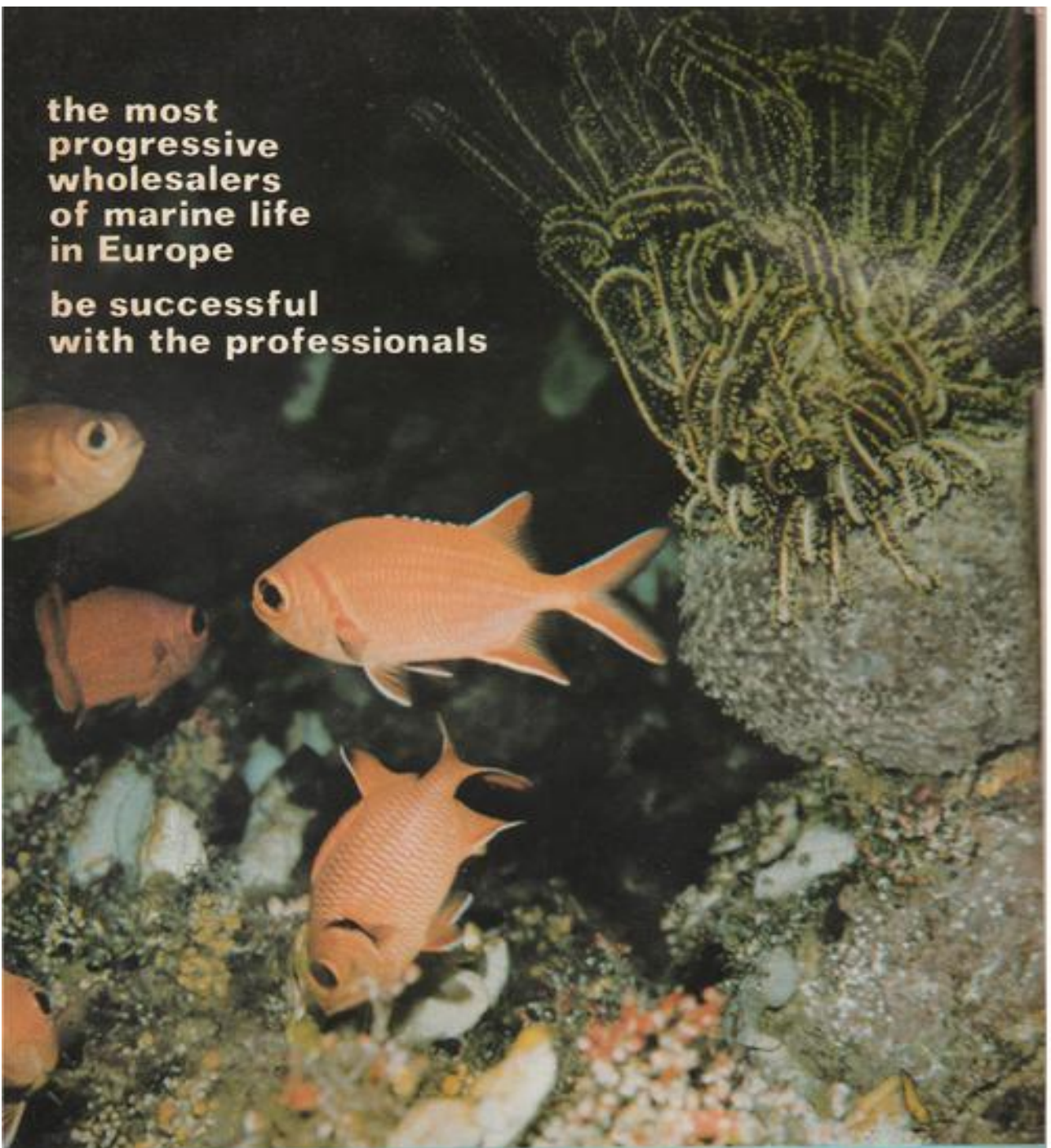
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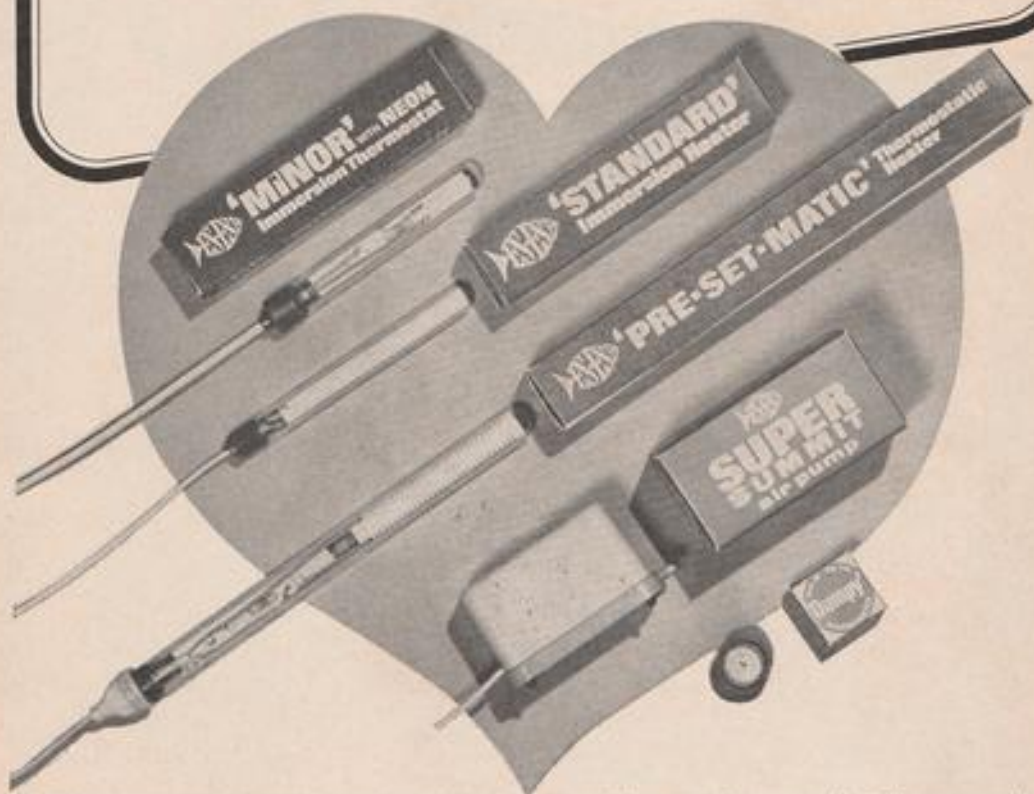
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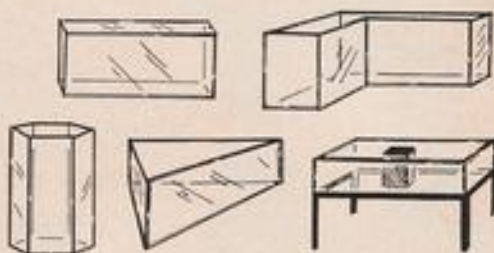
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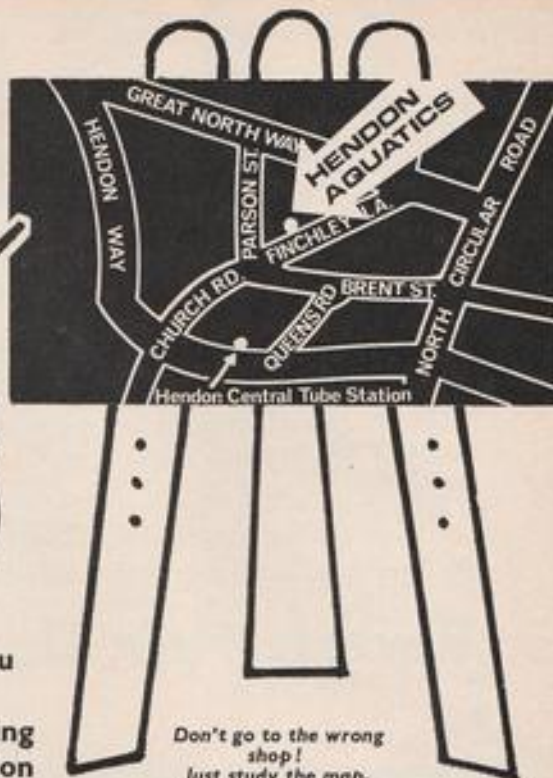
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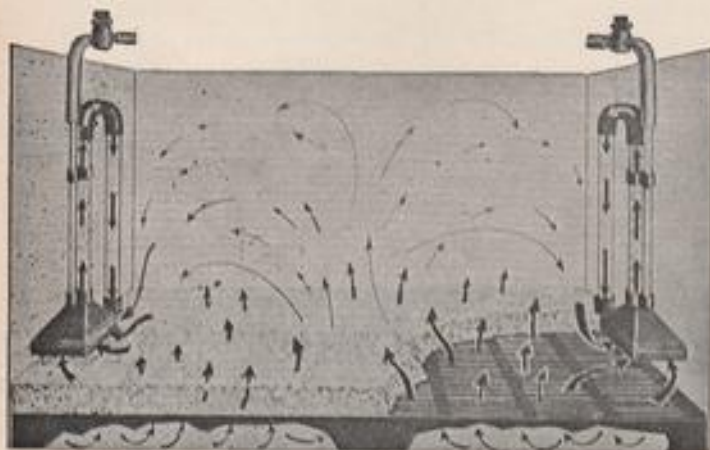
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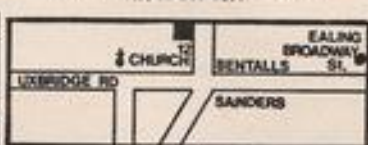
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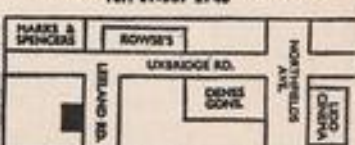
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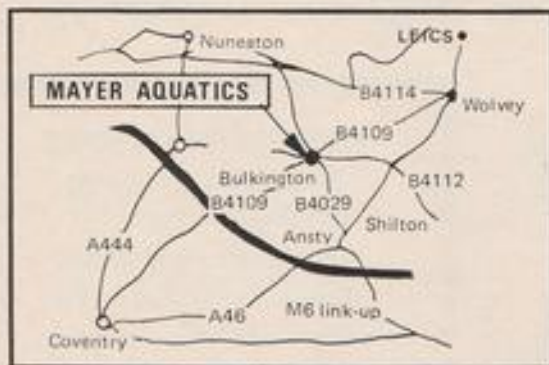
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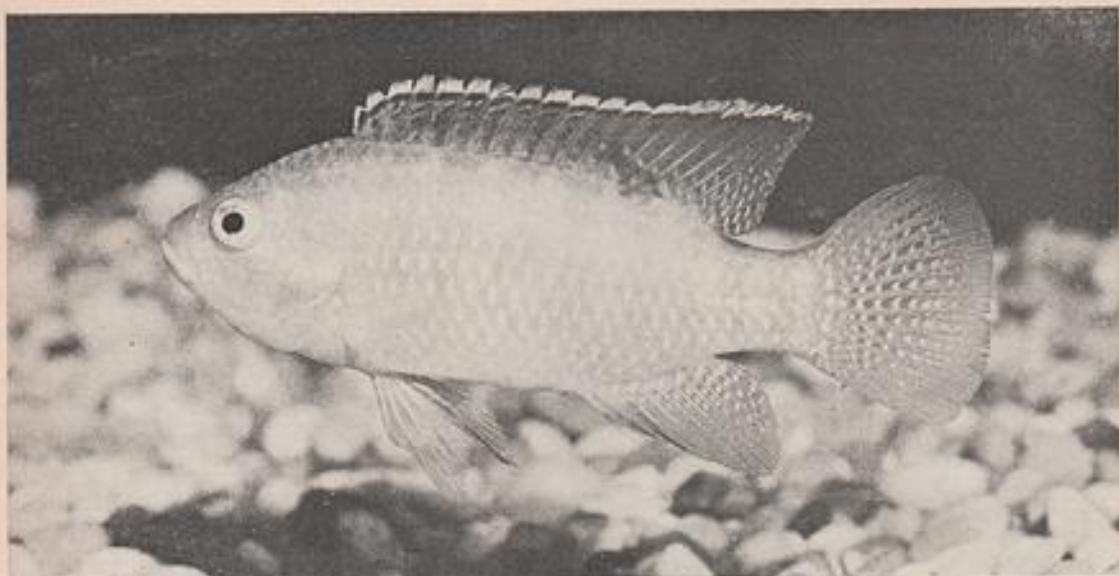
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The Editor accepts no responsibility for views expressed by Contributors.

April, 1976

1



Young Male

EXPERIENCES WITH *Tilapia ruweti*

Written & illustrated by Stephen Young A.I.P.

THE FIRST, and only, time I came across these fish was in Martin's Aquaria, where they were being sold as *C. ruweti*. They were a plain yellow-gold colour and about 6 cm. long. As they looked rather beautiful fish I purchased four of them, the two largest in the tank and two of the middle-sized ones.

I put them in a vacant 50-litre tank filled with matured tap water and they settled down straight away. Two weeks later I acquired two more of these fish from a friend who had bought them at the same time as myself. He had found that they were bullying the other fish in his community tank.

By this time, however, my fish were beginning to show their true selves. They loved plant life and had quickly eaten all the plants in their tank as well as a full quota of anything else which I fed them. A truly omnivorous diet is what they needed.

I had also observed colour changes in the fish under different circumstances. When they were frightened they paled and showed dark blotches on their sides. The basic yellow-gold colour was displayed when the

fish were either disturbed or upset. Their normal colour was the yellow-gold background with nine darker vertical bars in the body. There was a bright green spot on the gill covers. The dorsal fin was edged with red and blue bands and at times the lower finnage took on a dark green colour. There was also a dark spot at the rear of the dorsal fin where it left the back.

After I had been keeping these fish for four months the two male fish were 12 cm. long and the four females had reached 10 cm. They were now living in a 75-litre tank which had an under-gravel filter and pieces of slate arranged to form caves. I had taken to feeding them mainly on earthworms and chopped raw ox-heart supplemented with dried food and green stuff.

At this time I was witnessing the four smaller fish periodically darkening in colour, especially the lower half of the body which turned dark green, and showing breeding tubes. From the behaviour of the other two

fish I decided they were males although they were not showing any breeding tubes but were displaying to each other and expanding their buccal cavities in a threatening manner.

I had still not made a positive identification of the fish despite much browsing among the literature available to me and it was purely by chance whilst going through back numbers of the *Aquarist* that I came across Richard Dunleavy's articles entitled *Tilapia ruetti*. It was the *ruetti* that caught my eye and reading the article soon confirmed that Mr. Dunleavy was describing identical fish to mine.

Given this lead, I returned to my books and turned up the name *Pelmatochromis ruveti* (POLL and THYS 1965) but no description or photograph. Further reading brought me to POLL's reclassification list for *Pelmatochromis* sp. where he had entered *P. ruveti* as being a *Tilapia*-like species found in the Congo River

T. ruveti in the tank pounced on the fry devouring a good quarter of them before I realised anything was amiss. So the lights stayed on overnight and a divider was put in next day.

The divider being a temporary one, some of the fry could swim past it straight into waiting mouths so I removed the remaining fry (about half were left) into another tank.

At this stage the female was almost completely black in colour and the male very dark, his vertical stripes being particularly prominent.

The fry grew very quickly, being fed initially on brine shrimp and "Liquifry No. 2," phasing out the "Liquifry" very quickly for chopped white worms and *tubifex*. At one month they were $\frac{1}{2}$ in. long with the inevitable runts and small fish who needed weeding out. Their diet at this stage consisted of chopped ox heart, dried food and *tubifex*.



Female

from Angola to Katanga.

Being unable to trace any further information I contacted the Natural History Museum and eventually obtained a positive identification of my fish from Dr. Trewavas who told me that these fish had been originally described by POLL and THYS in 1965 as *P. ruveti* and she herself had reclassified them in 1973 as *Tilapia ruveti*.

So I had finally identified the fish which was probably just as well because they had spawned a month earlier. It was whilst the family was on holiday over Easter. When we returned late one afternoon after a long journey all I was interested in doing was quickly feeding my fish.

I noticed a pair of *T. ruveti* were guarding a corner of the tank and looking rather dark in colour, so I thought they would soon spawn. Imagine my surprise the next evening to find them guarding a shoal of about one hundred fry. Disaster struck that night, however, because on switching off the tank lights the other

Since the original spawning there have been several more, which, owing to pressure of space, have been left to the mercies of the adult fish or fed to other fish. These spawnings have been in a variety of sites, mainly vertical surfaces of slate but also horizontal surfaces, gravel pits and in caves.

The eggs, dark grey and $1\frac{1}{2}$ mm. in diameter, hatch in three days and the fry are transferred to a gravel pit. The fry become free-swimming on the sixth day and the parents will attempt to keep them under control for up to ten days.

These fish are easily kept and are not quarrelsome even when breeding although I would not recommend them for a non-cichlid community tank or a planted tank. *T. ruveti* are not difficult to spawn providing they are well fed and a partial water change always seems to set them off. I have never succeeded in spawning them at a water temperature below 25°C and the water in their tank is maintained at pH 7.2 and 14°GH by frequent water changes.

ANNUAL FISHES



Cynolebias bellottii

Written & Illustrated by Jack Hems

THE LIFE-HISTORY of some of the annual fishes has been a fairly open book for about half a century. Understandably the beginner in tropical fishkeeping is almost certain to ask: What are annual fishes? The answer to this question is simple enough. The annual fishes of the aquarist are genera of oviparous South American or African cyprinodonts (tooth-carps) which, when the rainy periods in their different countries come round, appear as though by magic in water-filled holes and hollows in the ground. But soon, only too soon, the months of drought return and all, or almost all, the aquatic life-supporting depressions dry out. Be all this as it may, before the annual fishes die they spawn in the mud. There the eggs remain until downpours of rain fill low-lying ground again. Immediately the slowly and sometimes very irregularly developing or completely quiescent embryos rush through the process which makes their short existence as adult fishes possible. In short, the fry break free from the eggs and emerge from the sludge.

Right away they feed on the minuscule forms of life which populate the dips and ditches in the inundated ground (nature is never backward in providing such sustenance). Lowly crustaceans and the larvae of the ubiquitous mosquitoes accelerate their growth. Thus in the space of a couple of months sexual maturation is reached and the perpetuation of the annual fishes is assured.

The above is only a rough outline of the breeding procedure. For, naturally enough, the spawning habits of all these fishes do not follow a rigid pattern. Some species extend egg-laying over several weeks,

others complete it in a matter of a few days. Some species bury their eggs deep in the semi-liquid vegetable debris and mud. Contrariwise, there are those which place their eggs just below the mud and humus. Further, hatching time differs in a number of species. For instance, the eggs of some species have been known to remain buried yet viable for more than two years. All this is perfectly understandable if we pause to relate the lives of the annual fishes to their climatic conditions and environment.

Recently I came across some Argentinian *Cynolebias bellottii* in a dealer's tank. This annual species first turned up in Germany in 1906. It did not take serious German aquarists (acquainted with on-the-spot observations of fish collectors in Argentina) very long to breed this species in captivity. They succeeded in doing this by duplicating (as well as they could) the regular existence of the fish in the wild.

C. bellottii is essentially a fish of the grass-and-thistle plains extending in some directions for hundreds of miles beyond the city of Buenos Aires. *C. bellottii* however, appears to be limited to the lower and estuarial regions of the River Plate. It is a tooth-carp of outstanding beauty. The male is the larger of the two and attains a length of about 3 in. It is deep blue (in general) shading to black on the back. A blackish band extends in a downwards curve from the upper rear of the head to and through the eye. Pin-head or larger light blue or greenish to white spots arranged in vertical bands adorn the sides. Similar spots are present in the green, or blue, vertical fins. The female is more heavily built than the male slightly taller too, that is from back to belly, and is of

clayey to khaki-green hue. The spots she wears are brown to grey. Like the male, she has a dark marking running through the eye. Coloration of *C. bellottii*, however, is subject to changes brought about by changes in the mood of the fish and its reactions to its environment. It is interesting to note, also, that apart from the noticeable differences in general garb, the sexes have another distinguishing feature: the number of rays in the fins. The male has more rays in his larger dorsal and anal fins than the female.

A great advantage of this fish is that it does not demand tropical heat. Indeed it is quite comfortable at livable room temperature. That is to say from autumn to the following spring. When spring arrives, however, it is time to give extra heat. A temperature in the middle to upper sixties or low seventies (°F) is likely to promote an increase in coloration and a great deal of display. A further increase in temperature up to the middle seventies is almost certain to result in spawning.

A tank of a length of 18 in. is large enough for a pair. The bottom should be carpeted with about 3 in. of previously soaked moss peat. Plants such as milfoil or hornwort may be introduced but are not really necessary. When the fish show unmistakable signs of sexual interest in each other, then it is of supreme importance to keep an eye on them.

Start off with a depth of water of about 10 in. Thenceforward reduce its level slightly every few days. If, every so often, the couple are seen to burrow head downwards into the peat and there engage in some excited wriggling and shimmying it is not being unduly optimistic to assume that mating is taking place. These burrowings and shimmyings (if eggs and milt are being shed) will be repeated at irregular intervals over a few or several weeks. (Here it may be mentioned that, if the male is eager to start a family and the female is unresponsive to his attentions fighting between the two will break out. The only answer to this is to separate them for a few weeks.) After egg-laying is completed, the female looks noticeably flatter in the side and wan. The couple must be removed to another tank set up and managed as before.

See the fish are well fed. In all probability they will spawn again. The water in the egg-loaded tank is now siphoned away to peat-floor level. A temperature in the middle seventies (°F) must be maintained throughout the storage period. This should extend from about three to six months, with the peat kept slightly damp. Neutral to soft water at a temperature in the upper sixties to lower seventies (°F) is now run in until the tank is about full. At the same time, first food for the fry must be available. Micro eels, brine shrimps and large infusorians are recommended. As the fry appear they will feed on these and make good progress. Larger live food must then be supplied to meet their needs. A spawning may consist of about fifty to more than a hundred eggs but as egg-laying is spread over days or weeks, then the fry show up at different times.

C. bellottii is predacious by nature and therefore requires worms, gnat larvae and the regular non-harmful pond life to live on. It is by no means uncommon for some specimens to accept top quality dried foods. Although *C. bellottii* may be introduced into a community aquarium it is not advised. For one thing, the fish is rather erratic in behaviour and can be snappy. For another thing, and let's face it, it flourishes best for part of the year in lower than a so-called tropical temperature. Moreover, it does live best in peaty acid conditions.

Correction

OBSERVANT readers cannot have failed to have noticed that the title of my article on *Phallichthys amates* in the issue of February, 1976, was spelt with one 'l' instead of two. Also, in my final paragraph I made mention of "genera of *Limia*". To make sense this should have read "genus of *Limia*." Even so, I hasten to add that "genus of *Limia*" is outmoded. The livebearers formerly described under the generic label of *Limia* are now referred to the genus *Poecilia* which, of course, includes our old friend the guppy. Unfortunately I sometimes find that old scientific names die hard.

J.H.



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WHAT IS YOUR OPINION?

by B. Whiteside, B.A., A.C.P.

Photographs by the Author



MR. I. BELLARD, of 577 Hotham Road South, Wold Road, Hull HU5 5UE, gets us on the move this month with a tale about his snakehead, Sam. He writes: "As a regular and grateful reader of your magazine, I have finally got round to writing to you. I have a 2 ft. snakehead which I started to show last year and he always attracts quite a bit of attention wherever I take him. He has had quite a bit of publicity in various papers and I think that, as the leading aquarium magazine in the country, it's only fair that you should get a bite of the apple. So, one night I sat down and, after locking the fish house door and hiding the key, wrote the enclosed poem—after a great deal of thought and attention." Mr. Bellard's amusing poem reads as follows:

"Sam the Snakehead's 1975 Diary"

Sam the snakehead was his name,
He jumped from his tank and rose to fame;
How he squirmed and went pale
When he read Hull's *Daily Mail*;
The story he read was only half true,
And this made his face go quite blue.
The *Express* he read was a lot better,
As it was true to every letter.
Now, the best was yet to come,
When he read it in *The Sun*:
There on the centre page was his photo,
With his best friend, Ian's daughter.
How the fame made him quiver
When he appeared in the *Daily Mirror*.
How Sam jumped and splashed with glee
When his next appearance was on TV:
On Calendar with Karen and Kay,
Then on Maggie another day.
Goole was the start of this story,
When he took a first and lots of glory.
Bridlington was not so bright,
Third he got when he came in sight.
Rotherham was a much better day
When with a first he swam away.
The city of York opened its arms,
And Sam came first with his charms.
Wakefield jail he did not win
Because he tore a pectoral fin.
Sam's turn at Nottingham was very good,

He got the Blackburn Trophy and Robin Hood!
Alfreton was another thing,
As second was all that he could bring.
At Thorne he had a bit of a struggle,
But he took a first for all his trouble.
Chesterfield was another day
When Sam he took a first away.
Home to the Hull Show our Sam went,
And won a first in a tent.
Castleford it brought him fame
As he added two trophies to his name.
At Doncaster he didn't do so well
As he jumped from his tank and on the floor fell;
He scratched his back and also his side,
The marks were so big they just wouldn't hide.
But then at Brid he did very well,
And best in show to him befell;
Then to his check it brought a tear
When he was announced The Fish of the Year.
In January the phone rang out,
"It's the BBC," said a voice with a shout;
"Angela," it said, "we would like to meet her,
Please bring Sam to appear on Blue Peter."
So off we went to Shepherd's Bush,
We took our time, and didn't rush,
And there for millions of folk to see,
Once again Sam appeared on TV;
Before he left he'd a good look round,
Now he's back in his tank in his own home town.

Mr. Bellard, writing about his trip to the Blue Peter studios, says: "When the BBC rang up and asked me to take Sam to the London studio, I was reluctant to go. The weather was frosty and the round trip was 450 miles! When showing Sam I usually stick to a radius of 100 miles as travelling usually upsets him a bit. I explained my problems to the BBC and they were very understanding; they agreed to reimburse me for expenses incurred, for hire of a more suitable vehicle, for polystyrene, petrol, meals, hotel, loss of earnings, etc. The offer was so good that I couldn't refuse. Let's face it, it's a lot better than driving a 32 ton lorry about! So off we went with Sam wrapped up like an Eskimo. I knocked his water temperature up 4° before leaving, and put him in a 20 gallon tank

for the journey. He usually travels in a shallow 6 gallon tank for easy handling. On this occasion more water paid off. I put him in the tank at 6.30 a.m. and checked the temperature at 1.00 p.m. It had only dropped 2°. This is a tip worth remembering. By the way, if you ever start a 'Tip of the Month' feature I can provide some very good ones—and I'm sure most readers could do so also. My tips include one about a unique tank I've invented. . .'

Well done Sam—and Mr. Bellard! That fishy tale should take some beating. Do any other readers keep fish as famous as Sam? If so I'd be pleased to head from you. I'd be pleased to receive any useful tips from you, Mr. Bellard—and from any other readers. I'll publish original ones in future editions. Mr. Tom Jones, whose home is at 43 Rudd Street, Hoylake, Wirral, Merseyside, passed on the following piece of useful information in one



of his letters to me. He arranges, with his dealer, to pick up new fish after dark, and introduces them into already inhabited tanks when the lights have been out for some time. As all the fish are in the dark for the remainder of the night, the new fish seem to be accepted much more easily and settle down much more quickly than if they had been introduced when the tanks were lit up. Mr. Jones is a keen marine fan and finds that this technique works well with expensive marine fish.

I received the following letter from Mr. F. J. Ayres, of 35 Manor Drive, Hilton-in-Cleveland, Yarm, Cleveland, who is Chairman of the Yorkshire Koi Society. "Thank you very much for the kind remarks about my booklet *Koi-Keeping for Beginners* and the mention of this Society in your 'column' in *The Aquarist* of February, 1976. They were both appreciated. However, with respect to your comments on the apparently high subscription to

this Society, I should like to point out that this covers the following benefits: (1) a monthly Journal posted by 1st class post; (2) monthly meetings either at a place of interest to Koi enthusiasts, or with a guest speaker; (3) free advice service covering pool construction, filtration, medicines, etc.; (4) Society imports of fish directly from Japan. Considering that Koi normally cost substantially more than the subscription rate and that by telephone we have diagnosed and recommended successful treatment for about seven out of every ten cases, we feel that perhaps our subscription is a little low. Membership of the Society is open to anybody, regardless of where they live. In fact, about a third of our members live outside the Yorkshire area. Further details can be obtained from our Secretary, J. W. Mawson, Esq., 78 Gledhow Wood Avenue, Roundhay, Leeds 8, Yorks."

Mr. Ayres was kind enough to send me three copies of the Y.K.S. monthly Journal. Its format is the same as the beginners' booklet Mr. Ayres published, and it is equally professionally printed. The Journals' contents are, in general, of a high standard, diagrams and photographs being used in some of the three editions I received. Copyright prevents me from quoting from the Journals. (In fairness to myself, Mr. Ayres, I did end my comments about your Society's subscription with the sentence: ". . . Surely it's not too much to pay if a club or society is well run!") I know little or nothing about Koi—other than what I have read—and I have seen only a few specimens on a couple of occasions. Perhaps some enthusiast would write me a few lines giving approximate prices for Koi of different sizes and colours. I presume large Koi can be very expensive. A friend, Mr. Ian McNaghten, proprietor of High Street Aquatics, informed me recently

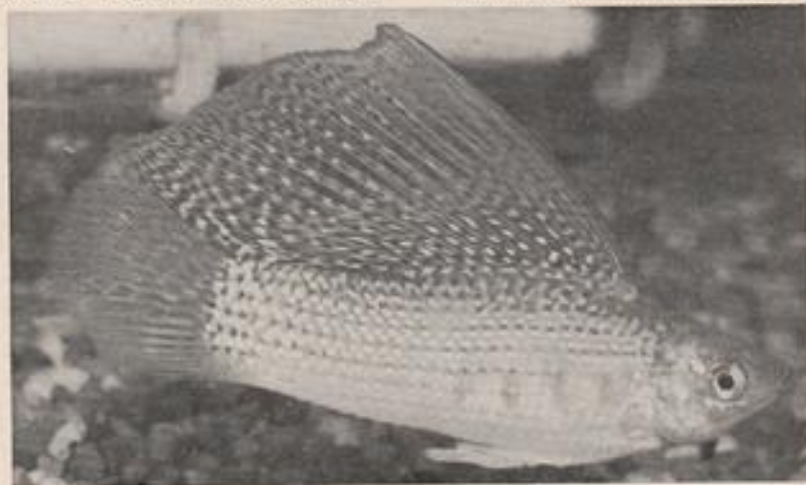
that he had ordered a pair of special discus that would retail at about £40 to £50. The most expensive fish I ever bought, several years ago in Belfast, was a young discus. If I recall correctly it cost me £3.50 and, due to my delay in getting it home, it was dead on arrival. No doubt many readers have fish that cost them double figures. I'd be pleased to publish details of the most expensive fish various readers have bought—if they'd be kind enough to send me details.

Recently I conducted a private, mini survey of a few postal suppliers of aquatic plants. In all cases the plants were well packed and delivery was reasonably fast. In all cases I ordered new plants that I wanted; but in the case of one firm from which hadn't purchased plants before, I was disappointed to find that several of the species I ordered were

during the past few years. The 'bulbs' they supplied were young, healthy, cheap and the species I ordered. They are currently producing some fine young plants. Although the firm doesn't appear to stock some of the less common species of plants, those they do stock seem to be of consistently high quality.

Photograph 1 shows a selection of plants growing in one of my tanks. Unfortunately aquatic plants don't show up very well in monochrome. At the centre rear are large and small leaves of Java fern; to the extreme right is a small patch of Java moss growing on a stone; to the extreme front left is a small patch of hairgrass; and in the centre foreground can be seen plants of *Cryptocoryne nevillii*. Please send me details of your experiences with any of these species.

As usual, I was pleased to receive a copy of *Torax*



replaced/substituted by totally different species. Had I stated that substitutes would be acceptable I wouldn't have minded; however, I didn't do so. I think it reasonable to expect that if I order, say, a spatterdock, then I shall be sent a spatterdock, or have my money refunded. After all, if one orders a recording of Beethoven's 9th Symphony one doesn't expect to receive Beethoven's 5th Symphony—or Mozart's Clarinet Concerto! More appropriately, if one orders a dozen bushes of the hybrid tea rose 'Peace' one doesn't expect delivery of three standard roses of 'Circus'. In another instance I ordered a particular species of *Cryptocoryne* and was sent none too vigorous plants of a different species. One group of plants received contained a liberal sprinkling of duckweed—a pest which I most certainly did not want. However, many of the plants I received were of good quality. I was most pleased with the specimens I received from a Kidderminster firm that I've recommended frequently, in this feature,

Topics, the magazine of Torbay Aquarist Society. My admiration goes out to all those who carry out the difficult task of editing and producing regular club and society magazines. Having edited a good many school magazines as well as this feature, and having contributed factual and creative material to a variety of publications, I know just how difficult such tasks can sometimes be. I was interested to read, in the Torbay magazine, that the Society has been producing some tape/slide programmes. I note that the Chairman of the T.A.S., Mr. F. Orsman, would like to know if there is any demand for cassette recordings. Interested parties might care to write to him at his home at 75 Home Park, Ashburton, Devon. Programmes I've heard so far have all been on open reel tape—recorded at 3½ in. per second. The existence of club magazines, and features such as this, depend upon readers contributing letters and articles; so please keep the material rolling in.

No. 4 Hilltop Avenue, Blackley, Manchester M9

2PF, is the address from which 20 years' old Miss Elizabeth Bailey sent me a very neatly typed letter. She writes: "On reading the February *Aquarist* I became quite excited when I saw your photograph of the bala shark—more commonly known as the silver shark—as one hears and reads so very little about this beautiful fish, although they are seen quite often in aquarist shops. I have admired silver sharks for a long time but found the majority of those available in the shops were approximately 6 in. long and cost between £6 and £8, which I certainly couldn't afford. In December, 1974 I was visiting an aquarium centre and to my delight saw six small silver sharks, of 2 in. in length, at £3.75 each. Unfortunately, at the time I did not have enough money with me, so I went home and persuaded my parents that we should go for a day out the next day

is a characteristic of the silver shark. I would be interested to hear from anyone else who has had this experience—and if they have any explanations. Another characteristic I have noticed recently is that after interlocking themselves, one of them runs his mouth down the side of the other one, as if kissing it. My silver sharks are extremely peaceful and will eat anything—including nibbling at my fingers! My red-tailed black shark occasionally has spasms of chasing the silver sharks but has never bitten their fins or done any harm, so I am not unduly worried. I am surprised that there is so little literature on silver sharks—unless one sees more of these fish in the aquarium shops than in the home aquaria. I enjoy *The Aquarist* very much and look forward to receiving it each month, although I, personally, would prefer it if common names of



and visit the centre again. I did so and purchased two of these beautiful silver sharks. They are now 3 in. in length. The silver sharks are my most valuable and treasured fish; in fact I think I'd be heartbroken if I ever lost them. They are extremely happy in my 48 in. × 12 in. × 15 in. community tank, which contains 1 red-tailed black shark, 1 blue gourami, 1 kissing gourami, 1 filament barb, 1 pair of black swords, 2 yellow tetras, 2 silver angels and 1 golden marbled angel.

"The most fascinating thing I find about my silver sharks is that every so often they swim very close together, as though rubbing themselves against each other; and they begin to interlock themselves for quite a few minutes. This can go on for days at a time and is really fascinating. When they first began to do this I thought that perhaps I had a pair which might spawn, although I could hardly believe it as they have never been bred in captivity. I was then informed at one aquarium shop that this

fish and plants were put in brackets."

Mr. Peter Hardwick lives at 1 Orchard Street, Otley, West Yorks., and he sent me two reasonably good coloured prints of fish. One was of a male sailfin molly and the other of a pimerdale barb. The photographs were taken with a non-reflex camera, using a close-up supplementary lens of 12 in., focused at infinity. The film speed was 50 ASA and Mr. Hardwick says the process was: "... hand held guesswork, with 90 per cent luck..." He tells us: "Being one of the fortunate ones I am able to return home for my lunch hour; and seeing my male sailfin molly arousing himself and making sham advances towards my pimerdale barb I dashed for my camera. As you know, male sailfins do not regularly go round in the 'full sail' position. Imagine my delight when I received the two prints back from the processing house!" (Photograph 2 shows a male sailfin with his dorsal erect. Photograph courtesy of High Street Aquatics.) Mr. Hardwick continues: "Things

have not always been so successful. At the end of last November I bought a new stainless steel framed 36 in. x 15 in. x 12 in. tank. After a month it was well established and looking beautiful. On Christmas day my wife and I were out for Xmas lunch. We arrived home at 4.30 p.m. and settled down to an evening of TV/fish tank viewing. I pulled an easy chair over to the fish tank and settled down. After a few minutes, right before my eyes, and for no apparent reason, the front pane of glass cracked at 45° from the bottom right hand corner! For ten seconds I was motionless, really not believing my eyes. The escaping water, under such pressure, spouted out in quite an arc. Fortunately my wife leapt to attention and pushed the plastic waste bin—ex-kitchen—into my hands. Holding this against the water flow we were able to deal with 60-70 per cent of the water; however, the carpet absorbed 5-7 gallons! What an asset an understanding wife is at times like this!

"It was quite impossible to catch three 4 in. tin foil barbs and one 6 in. eel-like European catfish until after carrying the tank, with its remaining 3 in. of water, out to the drive way—on a cold Christmas night! I am still amazed that none of the fish took white spot; none is any the worse for the incident. May I ask for your help in identifying the fish in my photograph as I cannot find any reference to it in my local library? It was sold to me as a 'pimerdale' barb. One dealer has ten in a 3 ft. square tank, under the name of *Leoptobarbus*. My favourite fish before I came across 'Madam Pimerdale' was the bala shark you mentioned in the February edition. I think you will agree, from the photograph, that the barb is very similar to the shark—except for the beautiful yellow and black finnage of the shark. The swimming habits of both fish are identical—mid to lower half of the tank, to and fro, giving endless pleasure..." (I don't know the fish in Mr. Hardwick's photograph—and I can't find any mention of it in any of my books. Can anyone provide him with details about the fish he has described?)

In the February edition I published a photograph of a species of talking catfish. Mr. A. McKinley, who lives at 51 Seymour Avenue, Lipson, Plymouth, has the following to say: "In the February edition you asked for details of experiences with the talking catfish. I bought one of the spotted variety—as opposed to the striped kind—and was told it was from the first batch to be brought into Britain and that it was caught in the same waters as the discus fish. So, I put the catfish in my discus tank. Its companions are two large, brown discus, four medium, red heckel discus, two clown loaches and one *Plecostomus*, all of which are housed in a 7 ft. x 18 in. x 18 in. tank. I keep the temperature at 84°F.; pH 6-8; normal gravel and U/G filters; some rockwork and

bog wood; but no plants as I have trouble keeping them alive. Fluorescent lighting is used. The catfish is very timid, gets on well with all the other fish and doesn't bother them. When I first had it I discovered it fed mainly at night and was a gluttonous scavenger. It eats in excess of its needs and its stomach swells to an enormous size with no apparent upset to the fish. After a feeding bout it will go back to a resting spot and stay there at any elevation, e.g. upside down, on head, on tail or side. It likes to keep off the gravel unless it is under a rock. Mine stays in the bog wood which is sticking up. It feeds on anything left in the tank, i.e., beef heart, spinach, white worms, blood worms, earthworms and fish flake. Once I saw it take a piece of beef heart from the mouth of a large discus as it was eating it; and then it went off to look for more food. It has reached a length of 3½ in. so far and still seems to be growing."

Photograph 3 is of a catfish of the *Pimelodella* group—possibly *P. gracilis*. Please let me know if you can identify the fish and please send me details of your experiences with it. (Photograph courtesy High Street Aquatics).

Mr. John Carpenter, whose home is at 10 Thornbank Close, Stanwell Moor, Staines, Middlesex, obviously knows about catfish as he is a member of the Catfish Association of Great Britain. Writing of my photograph of the talking catfish shown in the February edition he says: "... I believe this fish is *Agymaxis pectinifrons*, one of the *Doras*—*Doradidae* family (such as *Platydoras costatus*, *Anodoras gypres*, etc. This fish comes from the Rio Urubu, South America, and is nocturnal by habit, burying itself in the mud on the bottom, during daylight. I have found this species prefers a dark hiding place when the lights are on, but becomes active and feeds during the times when the lights are off. Preferred foods are *Tubifex*, chopped earthworm, meat, cat food and dried pellet foods. Water conditions are not too critical—but slightly acid water, none of which is too new, is preferable, with a temperature of 74-80°F. This species is not normally vicious but grows to a length of 6 in. as an adult, and will swallow smaller fish if hungry. It does not get many of the common fish diseases but if kept in adverse conditions does suffer from a slimy film over the body—and especially the head and eyes. This species is not really for the 'pretty' aquarium enthusiast because it hides and will uproot plants. I hope this information will be of some help to readers interested in catfish." (Any comments on this month's catfish photograph, please, Mr. Carpenter?)

Mr. P. M. Kolosice's home is at 22 Preston Crescent, Northampton, and he has the following to say about British and foreign items: "I had two well-known heater/stats in my marine set up and they worked

perfectly well until my tank burst, burning out both units. I wrote to the firm who promptly sent me all the necessary parts, including two glass tubes at a cost of £1.40—which also included postage. These were British products. I use three foreign pumps which have been in operation for a year now and I've only had to change two diaphragms so far. Incidentally, I tried another foreign brand of pump which just matched the other three—but cost twice as much. Both brands were Japanese. I work for a TV firm, but as far as I'm concerned if you don't want to rent a colour set buy a popular foreign brand. It's Japanese and won't go wrong." (This month's *Which?* supports Mr. Kolosice's latter comments.) He continues: "My marines are definitely foreign and are wearing very well on new, British flake foods. In my opinion the latter are the best thing ever produced. You not only get freshness but also a lot more flakes—flakes, that is, not dust! As they say, the proof is in the eating. My fish love them—even a trigger that would eat only lumps of meat and an occasional finger can't get enough—flakes, that is, not fingers! As you can see, I'm quite content to buy British or foreign, so long as it suits my pocket and is reliable."

Mr. Fank W. Orme is P.R.O. of the Associated Goldfish Societies, and resides at 94 Newman Way, Rubery, Birmingham. He writes: "In the December issue you wondered whether goldfish are as popular as they were 20 years ago and stated that you had not seen the varieties of fancy goldfish, listed in the Bristol Open Show schedule, for some time. Intentionally a reply has been delayed—for by now the announcement of the formation of Associated Goldfish Societies has appeared in the letter columns of the January *Aquarist*. This alone proves the popularity of the goldfish and the good fellowship that exists in the hobby. The goldfish is certainly as popular as it was and may well attract many more enthusiasts from the ranks of tropical fish keepers—especially if the cost of electricity continues to spiral upwards. Despite the popularity of the goldfish, many enthusiasts are unattached to a society. Specialist groups are very few unfortunately; however, the obvious answer is for these unattached enthusiasts to form themselves into goldfish societies and apply for membership of the Associated Goldfish Societies. If any reader is unsure about how to set about forming a specialist group, I should be pleased to offer advice. I instigated the formation of my own group—Associated Midland Goldfish Keepers—only a few years ago, and it is now a leading Midland Society. If you, or readers, wish to verify the popularity of fancy goldfish, and see first-class specimens of many varieties, in numbers, you could do no better than visit such shows as those staged by the Midland Aquarium and Pool Society, Bristol Aquarium Society,

and the Goldfish Society of Great Britain. These are open shows and attract entries from wide areas of the U.K. I can assure you that you will need no further proof of the popularity of the goldfish—or that they are the equal of any that have gone before." (I'm pleased to hear that fancy goldfish are flourishing—and that various groups have united to further the cause. Current electricity bills could well convert many tropical fanciers to coldwater fanciers. Recently, I saw some very attractive shubunkins in my dealer's shop. On learning that they were £1.50 each I was strongly tempted to buy a couple—even though I haven't kept coldwater fish for many years. I resisted the temptation on that occasion because it would have meant emptying some tropicals out of a tank. However, I still feel that I could yield to the temptation. The fish seemed to have more 'character' than the majority of tropicals. One of the first fish I kept, many years ago, was a 6d. shubunkin. I named him Horace and he lived for years. Horace was the only fish that ever merited a name—and the only fish that I actually buried when it died. I was very young in those days! I wish I were in a position to visit some of the shows mentioned by Mr. Orme—but the return air fare to London is quickly approaching the £50.00 mark, and that's a lot of money for a flight lasting less than an hour. Perhaps some day I'll make Bristol and the Midlands).

Mr. Barry Black is 17 years old and lives at 123 Mount Street, Fleetwood, Lancs.—a place I visited during my student days while doing some vacation work in Blackpool. Barry's letter was prompted by my photograph of Gnasher, the piranha, in the February issue.

Barry writes: "I would like to tell you about my piranha. I have identified it as *Serrasalmus brandti* from the piranha book by Dr. G. S. Myers. It is one of the most beautiful. At the moment it is only 3½ in. long and lives in a 42 in. × 24 in. × 18 in. tank. Unlike the normal *nattereri* piranhas I have seen, this is by far the most active and is always swimming up and down the front glass asking for food. 'Jaws', as it has been nicknamed, prefers earthworms to live fish, but the worms have to be tied on a piece of cotton so they will dangle in the centre of the aquarium. If worms are just dropped in they are refused and soon bury themselves in the gravel. So far it has not bitten me—but I will not tempt providence! I would also like to tell you about a very rare fish that I recently purchased. It is a long nosed knife fish *Rhamphichthys rostratus*. The first I had became very nervous and died of fits. This second fish, up to now, is quite well and eats white worms, earthworms and *Daphnia*. It is nocturnal and lives in a plastic drain pipe along with a black ghost knife fish. It has a shorter snout

Continued on page 22

IF YOU WISH to stock a cold marine aquarium, such as the one described in this journal in January this year, perhaps you would like to know more about some of the creatures you can keep. There are hundreds of kinds, some of which are easy to find, while others need a longer search.

Mermaid's Purses, which can be found empty on many beaches, are the empty egg-cases of dogfish or skates. A fascinating experience is to find live ones, and watch the young emerging in a tank. It is necessary to go to the beach at the lowest spring tides, and wade out into deep water to where thickets of seaweed grow. There, a careful search should reveal an egg-case or two tangled with the weeds, or fastened to rocks.

Carry a polythene bag to hold the egg-case in water, and transport them home in as cold a state as possible. At home, suspend the sealed polythene bag and its contents in the marine aquarium until the water in the bag has arrived at the same temperature as that in the tank—which usually takes about half an hour or more—and then empty the bag contents into the aquarium, as gently as possible. Where possible arrange the egg case in a permanent position, with the slit at one end uppermost.

Skate egg-cases can be 6 in. long without the spikes, and dogfish cases about half that. Whichever kind you find must be kept in clean sea water, changed regularly, and it can take 6 months or so to develop into the baby fish. During this development the fish uses up the yolk sac, so that when it emerges, through



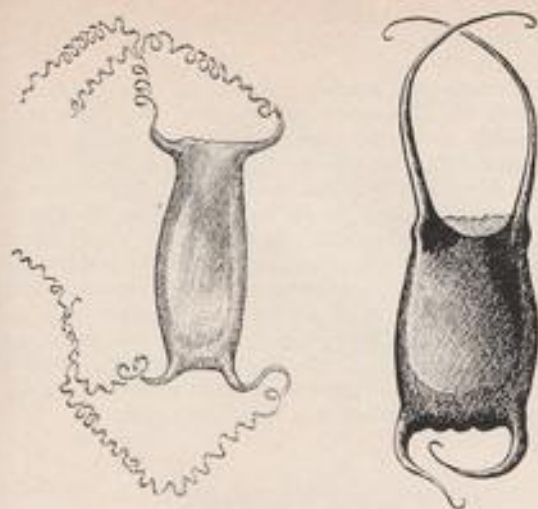
Chrysaora hysocella

STOCKING A COLDWATER MARINE AQUARIUM

Written & illustrated by Bill Simms

the slit in the top, it is hungry, and at once starts looking for food. Those I reared were fed at first on large brine shrimps (which were left in their own water to cool down slowly, and then were not at once killed by being placed in the cold aquarium). After a time I found that the two babies I had, took most other kinds of scraps of raw fish and molluscs, and soon they grew too big for the tank they were in.

The Sea Cucumber, or Cotton Spinner, *Holothuria forskali*, is a member of the five-pointed group that includes starfishes and sea urchins. It is a fat, worm-like creature covered with prickly points, and the mouth end has a fringe of feathery tentacles. From its other end it can throw out a mass of sticky white streamers that entangle any enemy. This quaint creature, specimens of which can be anything from



Egg-cases of (left) Dogfish and Skate

two to six inches long, is usually found near weeds and rocks at the lowest tide marks. In an aquarium a small specimen is most attractive because of its slow movements, and weird appearance.

Sea slugs of many kinds, ranging in size from less than half an inch to 6 in. or so, are found without entering the sea, but are extremely difficult to see because of their perfect camouflage. Many of the smaller kinds may be in a weedy rock pool without being visible, for they look like whatever they are feeding on, and can only be located by stroking the weed or spongy matter. Then, the jelly-like smooth feeling is felt by the finger tips, and a close look reveals the slug.

Often such a tiny slug will be an *Aeolis*, perhaps like one of the two shown here: *Tergipes despectus* and *Favorinus albus*, but it will depend on where it is found. These slugs appear to remain on their food plant or animal always, and since they browse on such widely different things as seaweed, hydroids, coralline weed, and sea anemones, they can be found almost anywhere in the sea.



Holothuria forskali

Antedon bifida is a beautifully feathery form of starfish, properly called the Feather Star. It has five pairs of arms, with shades of mauve, pink, red, orange, and yellow, which wave sinuously in the water to catch food. Normally it remains attached to a stone, but it can move about, and sometimes allows the sea currents to carry it about.

The feather star is found around our south-west coasts only, and appears to confine itself to a zone near the lower tide marks—though I have seen one out in deeper water. By searching the sides of rocks (under water) and even under some rocks, it is possible to find specimens anything from six to twelve inches across. The smaller ones are better in an aquarium in which are other creatures, for they will feed on anything small enough to be swept into their mouth by the feeding arms. Scraps of raw fish will suit them well.



Above: *Tergipes despectus*

Below: *Favorinus albus*



A somewhat different sea star is *Marthasterias glacialis*, the Spiny Starfish. This one tends to lose an arm at the slightest provocation—even netting one to lift it out of the water may cause it. I find it best to keep it under water all the time, and to be most careful that it is not jolted. Even then only one in three reaches the aquarium complete with all its arms.

Fortunately, the loss of an arm or two does not harm a starfish, for it can always grow another one. This habit of casting an arm easily is a defence mechanism, for a loose arm is usually sufficient to distract an enemy intent on feeding. The starfish then can quietly crawl away, and after some time a new arm grows to replace the old one.



Antedon bifida or Feather Star

Brittle Stars, also, are given to arm-casting; hence their name. There are many kinds, and in some places they are so common that the sea bed appears to be carpeted with them. The kind shown here, which has arms about fifteen times as long as its body width, lives on and in the sand between the middle and lower tide marks. If you find one that appears to be complete, do not try to lift it up, but use a scoop of some kind to lift it complete with the sand around it, and transport it in a stiff container of sand and seawater—not a plastic bag, for it is too brittle to be bent about.

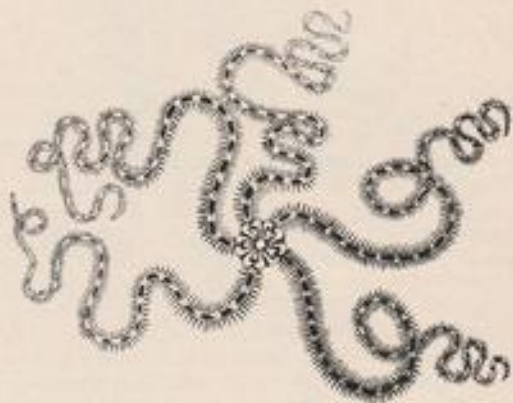
There are some lovely colourings and patterns among the brittle stars, and they make fascinating aquarium inmates, but never keep one in the same tank as a crab, or any other larger flesh-eating creature, for to them it would be a good meal. Most brittle stars have a body size of only half an inch or so, and they are not fast movers. Their food consists of almost anything edible in the water, and this they collect with their arms, and pass to the centrally placed mouth underneath. At times they will cover fleshy food, and tear it apart with the tube-feet below them. It is with these tube-feet that they



Marthasterias glacialis

walk about, but sometimes their arms are used in a rowing fashion, and they swim—nearly. They are very pretty to watch.

Perhaps you fancy a jellyfish in your aquarium. There are some pretty ones to be found, and if it is possible to secure a small specimen it can be quite eye-catching, particularly if it has plenty of streamers, like *Chrysaora hysocella*, shown here. Jellyfish must be kept in water all the time, for they are mostly made of water, and can soon lose it. A polythene bag is suitable for transportation, but the real trouble is in finding suitable food; a jellyfish captures small fish and other creatures by stinging them with its streamers, and then transferring the victim to the mouth below the umbrella. It is possible, with a very thin stick, to place small pieces of raw fish on the streamers, but it has to be done fairly often.



Brittle Starfish

As a final suggestion for suitable inmates for the cold marine aquarium I return to the sea slugs—in this case *Doto coronata*—and also to the plant-like animal on which it feeds: *Sertularia*, which is a hydroid that fastens on seaweed, and develops there. *Sertularia* grows in a rather lanky tangle, usually 4 to 6 in. long, and you have to remain perfectly still, without your shadow falling on it, in order to see the fine feelers it puts out of its branch-like openings. It is a pale cream colour, sometimes marked with a tinge of red, and seems to be a most dainty plant.

The Crowned Sea Nymph, the slug that feeds on it, becomes almost invisible when on its food, because of its size and colour, and so needs feeling for. It is only half an inch long, but when seen under a hand lens is truly beautiful. Because the *Sertularia* is generally fastened to a seaweed frond, which can be obtained intact, it is relatively easy to transport it in



Doto coronata



Sertularia

seawater, and instal the frond in your aquarium. This small combination of seaweed, *sertularia*, and sea slug is well worth searching for.

For real success with a cold marine aquarium you must stick to just a few rules: keep the temperature low; change the water regularly—with water of the same temperature; see that uneaten food is removed;

use an aerator all the time; and make sure that there is plenty of light—but not more than an hour of sunshine in any one day. In addition make sure that any creatures transported home do not suffer a change of water temperature. This last point is often forgotten in the thrill of finding a new species, but it is really important.

WHY NOT KEEP A CROAKER?

by Lothar Fuchs

THE Croaker belongs to the toadfish family or Batrachoididae. Although it is often mistakenly called the 'lion's head catfish,' its correct name is *Batrachus grunniens* Linne, 1758.

One should emphasize that *Batrachus grunniens* is a genuine marine fish, which is found in fresh and brackish water only in its immature stages. Specimens kept permanently in freshwater are invariably short-lived. It is advisable, therefore, to increase the salinity of the water progressively until a level of undiluted seawater is reached.

The fish has an almost primeval appearance. Its mouth is armed with an array of sharp teeth, the large and ponderous head is compressed. Along the lateral lines there are spines, standing in pairs or groups of three. Also characteristic of its type are the black, wedge-shaped markings—between four and six in number—within the brown dorsal fin, the sharp tips of which slant towards the tail. Its unhurried and

leisurely movements are rather majestic as it spreads its pectoral fins in a fan-like manner.

Although it is an innocuous and, indeed, relatively inconspicuous member of the aquarium by day, it is a voracious nocturnal predator which devours anything it can catch, including small-sized and immature fish.

Young guppies, dragon-fly and great water beetle larvae, earthworms and gnat larvae are all swallowed down where available. If they are the 'Croaker' soon reaches maturity (maximum size 20 cm).

In addition to its strange appearance, this fish is of interest for a further reason: like most of the toadfish family it emits sounds—a toad-like tone which is clearly audible. These sounds are produced by means of the swim bladder and are responsible for the name Croaker.

It is found around the coast-lines of India, Sri-Lanka and throughout Indonesia. In these areas it is found in such numbers that it provides a popular source of food.



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

TROPICAL QUERIES

by Jack Hems

Please give me some information about the three-spot barb. I am particularly interested in finding out its place of origin, its maximum length, sexual distinctions and whether it is possible to breed it in the home aquarium.

The three-spot barb (*Barbus trispilus*) (*trispilos* as one authority has it), is native to tropical West Africa. The fish attains a length of about 2½ in. and the female is fuller-bodied and paler in coloration than the male. The species does breed in captivity. For this, however, a temperature in the upper seventies to lower eighties (°F) is required.

Would plate glass quarter-inch thick be all right to make a tank 36 in. × 18 in. × 18 in.?

It would be safer to use three-eighths glass for the base and quarter-inch glass for the back, front and ends.

I have an aluminium hood housing my lighting system and no glass cover on my tank. My water is soft and acid. Do you think that the beads of moisture that collect inside the hood and drop off into the aquarium will have a harmful effect on the fish?

It is not a good thing to allow drops of water to return back into the aquarium from the inside of a metal hood. In the long term this metal-tainted water—especially water known to be soft and acid—will have an adverse effect on the health of the fish. Furthermore, habitual moisture under the hood will probably damage the lighting fittings. Insert a sheet of stout glass between the top of the tank and the hood.

Is it true, as I have been told, that under-gravel filtration is the best method of keeping aquarium water healthy and clean?

There is no question that under-gravel filtration is one of the most satisfactory methods of keeping a fish tank clear and sweet. However, it is hardly necessary to state that the owner of an aquarium must observe a few basic rules. These are not to overfeed and then allow uneaten food to remain on the bottom. Next, remove dead fish and decaying plants without delay. Finally, do not overstock the tank with fish.

I have two major problems: loss of my plants through fishes such as mollies and platies eating them away and algae everywhere especially on the gravel where the food collects. Can you provide me with a solution to my problems?

You are introducing too much food into your aquarium. This is one mistake. The second is that you are mistaken in thinking that your live-bearers are eating your plants away. What they are doing is feasting on the algae. A certain amount of algae is beneficial for greenstuff-eating fishes (that is, algae eaters) but you have too much. It is encouraged by the food decaying on the bottom and, I guess, insufficient higher plant life. Cut down on the food and increase the higher plant life. In the meantime clear out as much of the algae as you can.

I live on the south coast and my young son is an enthusiastic fishkeeper. During the holidays, I would like to take him on a visit to some of the best dealers in London and the west midlands to see their set-ups of tanks and fishes. Have you any suggestions to make?

I think your best plan would be to study the advertisement pages of our magazine and then try and visit the establishments which advertise a wide range of aquarium apparatus, fishes and books. One of the finest emporiums for the aquarium enthusiasts is situated only about seven minutes' walk

from Victoria station (underground or main line). Another treat for your son would be to take him to the famous plant and fish farm some eight miles south of the centre of Birmingham.

I should be grateful for information regarding the general behaviour and breeding procedure of the cichlid called *Pelmatochromis thomasi*.

This pygmy cichlid from Sierra Leone is reasonably mild-mannered except when courting and breeding. In short, it is all right most of the time in a thickly planted and fairly spacious community tank. The pair deposit their eggs on a previously cleaned stone. Laying of the eggs follows a pattern not unlike the general run of cichlids such as angel fish. As a rule, the parent fish take great care of their eggs and young.

I am very puzzled by the seemingly contradictory statements made about lighting the tropical aquarium which appear every now and again in your journal. Is there any definite rule about the duration of light and the wattage required for a given sized tank?

The most knowledgeable aquarium keeper can only give a rough idea about number of hours and wattage required because some plants demand more light than others, and the quality of natural light reaching the aquarium makes a great difference too. If you allow at least 10 hours warm-white fluorescent light a day for plants such as species of *Cryptocoryne*, *Microsorium* and *Vesicularia*, then you can hardly go wrong. A lamp of 20 watts is right for a 2 ft. tank, a lamp of 30 watts for a 3 ft. tank. Special types of fluorescent light used by aquarists of considerable experience have their uses in growing certain water plants.

I should appreciate some information on a cichlid bearing the formal name of *Cichla ocellaris*.

This fish is said to be widespread over much of South America. It is also said by no less an authority than Professor G. Sterba to attain a length of more than 2ft. It is a voracious feeder on smaller fishes and probably any other living creature small enough to be swallowed that comes its way. As it increases in size it puts on a great deal of firm flesh. Therefore the Indians that live in settlements along river banks look upon it as a valuable source of food. *C. ocellaris* breeds in typical cichlid fashion and the parent fish guard eggs and young against molestation. It is handsomely marked with eye-catching colours.

Since installing Gro-Lux lighting the colours of my fishes show up better, but increasingly algae smothers my rockwork and plants. What can I do about the algal pest?

I am afraid that any type of lighting designed to promote the growth of plants will also promote algae, that is unless you go in for a forest of higher plant life which will rob the algal growths of nutrients in the water and starve them of a lot of light.

Can you tell me something about nitrite and nitrate and their effect on fishes in the aquarium?

The whole business of nitrite and nitrate in the aquarium is too big a subject to go into here, that is in any depth. Also, I am not qualified to do so. However, to rest your mind nitrite and nitrate are two different salts which are the end products of bacterial action on the waste products of fish and decayed and decaying organic matter. A lot of these two salts are taken up and used as food by plants. An excess of such salts leads to an unhealthy environment for fish. An abundance of nitrite is more dangerous than too much nitrate. In short, the lethal effects of nitrite are quicker. Occasional and partial changes of water, proper filtration, the right sort and quantity of submerged plants, understocking rather than stocking a tank to its recognised capacity with fish, and so on and so on must all be taken into account. For all that, in a properly stocked and cared for aquarium it is possible for the fishes to remain perfectly healthy for years. A badly managed aquarium housing a collection of greedy flesh eaters is more likely to be troubled with an excess of nitrogenous matter (all tied up with nitrites and nitrates) than an aquarium stocked with the smaller omnivorous species such as small tetras and the more diminutive barbs.

I have just bought two 1½ in. fantail goldfish. Later in the month I am giving them a cold-water tank to themselves. For the time being, however, I have introduced them into a tank large enough to support them but maintained at a temperature of about 72°F (22°C) to keep alive some *Poecilia (Limia) caudofasciata*. Will this tropical temperature do the fantails any harm?

The short answer to this is no. All the same, when you remove the fantails to their new quarters see that the water is the same temperature as that in their old tank. After they have been introduced into their new home bring down the temperature very gradually.

What species of fish are likely to be found living in the rivers and streams as *Chilodus punctatus*, the headstander?

Various species of *Metynnis*, *Aequidens*, *Charax*, *Leporinus* and quite a few surface-swimming hatchet fishes.

COLDWATER QUERIES

by Arthur Boarder

Some time ago I found an anchor worm on a fantail goldfish and removed it. Now, at the same spot there is a parasite which is not dark coloured but resembles a pale nylon bristle. What is this please?

I am fairly certain that the parasite is just another anchor worm (*Lernaea cyprinacea* L.) and as it is a young one has not yet fully developed. The first parasite, being a female, would have had eggs attached to the extruded end of the pest. The eggs could have hatched out into tiny nauplii which are free-swimming until they find a host. The development can be retarded by cold conditions. The nauplii attach themselves to a fish and become embedded under the skin. In cold water they may remain dormant for some time. It seems that a fresh parasite found an easy entry at the site of the previous pest. At the time of adult stage it is not easy to remove the pest from a fish, but the parasite can be touched with a strong disinfectant, such as neat Dettol or T.C.P. A careless removal of a pest can cause a bad wound which could turn septic. Once the eggs are laid the female will die and drop off. This can leave a nasty hole which could become the seat of fungus disease. The male *Lernaea* is small and free-swimming and is rather similar in shape to a *Cyclops*.

Can you please supply me with the names of a few bog plants which would grow in about three inches of water?

I presume that there is some loam or sand at the bottom of the three inches of water in which the plants can get rooted. If not, and the base is plastic or concrete, I suggest that you use shallow plastic trays in which to place some soil in which the plants can grow. There are many suitable plants for your purpose and I just name four species which I have, personally, found suitable and very attractive. A hardy plant is the Pickerel weed, *Potamogeton cordata*, which forms a clump of elongated heart-shaped leaves and has a flower stem with small blue flowers. A white flowering plant is *Sagittaria japonica alba flor pleno*. This specimen has arrowhead-shaped leaves and the flower spike has small white flowers like miniature carnations. A strong growing type of rush is *Butomus umbellatus* which sends up an attractive umbel of pinkish-red flowers. There are several species of *Ranunculus* which you could grow, a good one being, *R. gramineus*, with bright yellow flowers similar to those of the buttercup.

I have a fish house with a south facing window and would like to grow some Cacti on a shelf to shade out some of the sun in summer. However, I have been told that Cacti will not grow in the humid conditions of a fish house. What is your opinion?

Most of the spiny types of Cacti do appreciate a dry atmosphere but there are some which are ideally suited for your position. Choose from the Epiphytes, such as *Epiphyllum*, *Schlumbergera* and *Rhipsalis*. These plants grow naturally as epiphytes on trees in dense forests such as are found in Brazil. In such conditions they thrive in the humid air similar to the atmosphere and conditions appreciated by Orchids. Among the Epiphyllums (previously known as *Phyllocactus*), may be found very large flowering varieties with vivid colours ranging through reds to pink and white; some purple ones can also be found. The popular Christmas cactus (*Schlumbergera barkleyi*), which flowers in winter is very suitable and to follow it is the Easter cactus (*Schlumbergera spec.*). These plants will grow well in a potting compost of J.I. potting No. 2.

Where can I get a female goldfish as I intend to try to cross a goldfish with a crucian carp?

I am enclosing an address from which you can obtain a female goldfish but what you intend to do is rather a mystery to me. I cannot see any value in the fish which you might produce. In any case it is hardly a cross as both fish are reputed to be of the same genus. The crucian carp is *Carassius carassius* and the goldfish *Carassius auratus*. It is also thought by many people that the goldfish is a crucian carp which developed a variety with different colour pigment. Any youngsters from your proposed pairing will be mostly bronze in colour and there may not be one decent coloured goldfish among them. When breeding from the goldfish it is often found that many of the fry revert back to the bronze colour of the crucian carp which does give credence to the thought that the goldfish originated from the crucian carp.

Can you tell me where I can get the necessary hormones to give to a female goldfish to encourage it to spawn?

There is no need to consider giving hormones to encourage goldfish to breed. Providing the fish are in good health, they have been well fed and are

Continued on page 22



Do our fish need Sodium Fluoride?

We are hearing much at the moment regarding the benefits we may all experience by the inclusion of sodium fluoride in our domestic water supplies. It is claimed that this drug will prevent our teeth decaying but this, surely, could just as easily be achieved by us eating correctly, or by us being a little more particular regarding our oral hygiene.

I do not wish to discuss the merits or otherwise of this aspect; what concerns me is what the effect will be on our fish, whether they be tropical freshwater, marine or coldwater.

Sodium fluoride is a poison and this fact has been quoted by a pro fluoride biologist, i.e. Dr. H. J. Leese, University of York. He does, however, go on to state that used at the ratio of 1 p.p.m. it is not a poison. What a contradiction! No doubt our Red Indian colleagues were thinking of a similar gentleman when they uttered the now famous phrase, "Him speak with forked tongue."

I understand sodium fluoride is a by-product in the manufacture of aluminium, consequently it is produced in huge quantities and must be disposed of to make room for more. As often is the case with all these unwanted wastes, it was presumed that it could be dumped in the sea, but in 1972 an international agreement was signed with active British support, banning the dumping of toxic chemicals in the sea. This agreement included the highly toxic chemical sodium fluoride. Now some four years later we are going to have it dumped in our tanks, with presumably the same fatal results as was feared would occur to our marine life.

Once sodium fluoride is in our water it cannot be removed, either by boiling or filtering, neither can it be neutralised, so we shall be stuck with it. Although the Government have not as yet made its use legal by law, they have intimated that they will indemnify local councils against claim for illness or death. This to my mind makes its use rather dubious.

It does therefore appear that we are not going to be allowed to keep anything from which we get pleasure.

Many thousands of non-aquarists receive untold pleasure from tanks in hospitals, schools, banks, libraries, dentist's waiting rooms and other similar places. Are they, too, to be denied this pleasure? I hope not, and I would ask Societies in every corner

of the country to rally to the call and bring their objections to the notice of their local councils.

Mass medication is wrong, especially in a democracy, and as far as I am concerned this includes the fish in our tanks.

Yours faithfully,
G. B. HAWKSBY,
Sec. York & District A.S.
71 Milner Street,
Acomb, York YO2 4NJ.

Perfidious Albion

I feel I must tell you about my shopping experience. Approximately two years ago I enquired about the price of a Grolux light and a starter switch. I was told the tube, a 24 in., would be £2.75 and the starter £9.00. As I did not have the money then, I had to save up to get it, and I know this is what I paid because I could not afford another one for my second three foot tank. This week I went to another Aquarist shop and bought a 36 in. tube for £1.91 and a starter switch for £4.04. I asked several times if the price was right as I had paid more than double two years ago, I was assured his price was the right one.

How can anyone be so dishonest? Since such a lot of time has elapsed and I have no proof of what I paid, it is no use going back to complain as this boy would surely deny it anyhow. I am Austrian and it seems I am still a silly foreigner in this country after 26 years. It really did hurt my feelings today, not because I was robbed of my money, but to think I was a good customer at that particular shop and because I have been taken for a complete fool (I can't help wondering how often I have been charged the wrong price). This does not reflect a good mirror on the British people, it makes me feel very angry indeed. It is a good job for us foreigners that there are still more honest than dishonest people in England.

On a brighter note, I do like your magazine, it has helped me a lot as I did not know anyone to ask for advice about my fishes. Since my husband died I have surrounded myself with fishes, they help to keep me occupied and watching them soothes one's mind better than any tablets. I should know, I took them for long enough.

Mrs. C. King,
12 Curwen Crescent,
Heckmondwike,
West Yorkshire.

Dessicated but not dead

I am afraid I can go one better than Mr. Kane of Billingham, September issue.

I came home from a show late one Sunday night and not wanting to switch the lights on in the fish house, I poured my fish into their respective tanks.

Feeling a bit dispondent at only getting a third with my *Otocinclus*, I sat down to watch the television.

A couple of days later I had only just missed old "Oto", and not till the following Friday did I decide to look in my show jars and there he was, layed on the gravel with a very sore belly and with just enough water to wet the gravel. So I put him in his tank where he has fully recovered, ready for the show bench again.

NORMAN CARR,
12 Stonecross Drive,
Sprotborough,
Doncaster DN5 7QH.

The Odd Survivor

I am writing to you regarding a series of events in my tank. It has tiger barbs, swordtails and various other live bearers. Among these is now only one guppy. It all started when a friend of mine, who works at the college in Aberystwyth, gave me some guppies from a tank there. In time all of them died except this one small red guppy. It has been in my tank now ever since I've had it. A bit after all the other guppies died I bought another one. I soon noticed that his tail was becoming ragged. Soon after that, great big chunks kept falling off it. This happened with four separate guppies. While all this was going on the one red guppy did'nt get fin-ripped once. As a result of continuous fin-ripping the other guppies died. Has anyone had an experience like this? If so could they please send me a line?

GUY YEOMANS,
9 Pentrosfa,
Llandrindod Wells,
Powys, Wales.

Trace Elements

I was very impressed by the advertisement which appeared on the back cover of *"The Aquarist and Pondkeeper"* in January of this year. The number of trace elements in "Tropic Marin" synthetic sea salt was quite large.

You may remember an article by Des Roberts (May 1975) which also included a list of trace elements which the writer believed to be necessary for the well being of marine animals in the aquarium. In a subsequent issue (July 1975) a reader pointed out that some of these elements "are unlikely to matter in marine salts." The basis of his argument was that they were inert gases (which form no compounds under normal circumstances) or were man-made elements.

I would like to point out that our atmosphere consists mainly of oxygen (20 per cent approximately, by volume) and nitrogen (79 per cent approximately). The remaining 1 per cent consists of a family of gases (i.e. helium, neon, argon, krypton and xenon)

known as the inert gases. I think that most people would agree that all air breathing animals could exist equally well in an atmosphere devoid of the inert gases, provided of course, the relative proportions of nitrogen and oxygen remain the same. Although these gases are present in the atmosphere, they are not essential for our well being. These gases are not utilized by air breathing organisms in any biochemical process within the organism.

Therefore I question the advertisers of "Tropic Marin" as to whether *all* the trace elements in their product are necessary even though they are all present in sea water. I doubt that all these elements are utilized in the biochemical processes occurring in marine animals (we are, however, still very ignorant of the nature of many of these processes). It is possible that many of these trace elements occur in sea water through leaching of river beds, sea beds, pollution etc.

I wonder therefore, if "Tropic Marin" is unnecessarily expensive, consequently deterring people from taking up the fascinating hobby of keeping marines at home. I am a freshwater tropical fish keeper and, like many people, would like to see the keeping of marines become more widespread. I appeal to manufacturers not to cloud hobbyists with unnecessary facts.

Yours faithfully,
DR. MERVYN HUDSON,
16 Lydiat Lane,
Woolton, Liverpool 25.

— And Responses

I was pleased to receive your letter together with that of Dr. Hudson, and I quite appreciate his thinking but not all his reasoning by a long way.

First of all he is mixing up air breathing animals with organisms which both feed and breathe to an extent in the fluid in which they are living. It must be appreciated that the lower forms of animal life, and certainly the plant life, may well require a more varied intake of elements than fish would need. He uses the expression "marine animals" so that I presume he is referring to all marine animal life.

Perhaps I can take the matter of sophisticated synthetic seasalt through its stages of developing. In 1951 I used to charter every three months a York freighter from B.O.A.C. to bring fishes from Singapore to London. This was before the days of oxygen-filled bags and insulated containers, and we used to have to carry out our heating and apparatus at enormous cost, and the four or five day journey back, as it used to be, was spent in keeping the fish well aerated and at the right temperature. The bringing back of freshwater tropical fish in those days was very simple and successful and quite profitable,

but we knew very little about the requirements of marine fish and our losses on these were enormous.

In those days there was no synthetic seasalt on the market and we had to collect the water from the sea, preferably two miles out to avoid polluted water, and carry it home. One can well appreciate the expense of this. In the old German books on fish-keeping there were formulae for synthetic seasalts and we made this relatively simple synthetic sea-water up and quite successfully kept a fair range of fishes in this and also some invertebrates, but we found, for instance, that whereas the native Beadlet anemone survived well in this and even re-produced itself, the common Snakelock anemone did not survive. Gradually more sophisticated salts were developed in Germany and gradually we became able to keep a wider range of marine life, until now we are able to keep many very delicate forms of sea-life such as corals and also to grow successfully a fair range of marine plant life, many of our forms of marine life growing well and even reproducing. As the synthetic salt has become more and more approaching that of the coral oceans, so has the ability to keep a greater range of sea-life also developed.

I agree with Dr. Hudson that it may well be that some of our large range of trace elements are not necessary and it is possible even that some might be harmful, but one will need a lot of expensive research to ascertain this, and who would pay for such research? The hobby of fishkeeping altogether has developed very largely thanks to the trade in general; by far the greatest cost of endeavouring to provide a wide range of fish and aquatic life for the hobbyist has been through the hard work and efforts of the trade. Research into methods of collecting, breeding and transporting has cost the trade over the years vast sums of money. One does not discount here, by any means, the valuable work done by many painstaking hobbyists who also have incurred great expense and many losses in learning how to keep and produce both fishes and plants.

I would suggest that Dr. Hudson buys one of the books on marine fishes and takes the formula for making simple seasalt and lets us know of his successes with some of the more difficult fishes and delicate sea creatures and plant life, and I wish him all success and hope that he is able to make some useful contribution to the hobby of marine fishkeeping.

Yours faithfully,

C. D. ROE,
Director, Shirley Aquatics Ltd.,
Stratford Road,
Monkspath, Shirley,
Solihull, West Midlands B90 4EF.

Communications Breakdown

Could you please print an apology on my behalf to a Mr. Tom Jones, of Hoylake and a reader from

Stafford, who very kindly wrote to me after my letter appeared in the *Aquarist*. Their letters have been accidentally mislaid, and I have been unable to reply. I would be very grateful if perhaps they could send me their addresses. Thank you.

Yours faithfully,

PETER BARKER,
66 Hall Lane,
Hindley, Wigan WN2 2SA,
Lancs.

Illegal to keep young lobsters

In a recent edition of "*The Aquarist*" (Jan. 1976) there appears a review of the book "The Lobsters" in which it is suggested (first paragraph) that the lobster may be suitable for the aquarist. I understand that in an earlier edition of your magazine there appeared an article on temperate marine aquaria in which the same opinion was voiced. I should like to point out to you and your readers that the holding or possession of undersized lobsters, less than 9 in. overall length, is illegal in this country. This point is of great interest to me because at the moment I am engaged in research to establish the feasibility of commercial culture of the lobster which will, of course, be impossible with the law as it now stands.

While juvenile lobsters would make ideal pets, they would be difficult for the amateur to rear through their larval, free swimming, phase as special equipment is needed. It is possible that a commercial lobster farm, when the law is changed, could retail juvenile lobsters as a sideline, especially slow growing animals which are worthless to an aquaculture enterprise.

J. G. MUNFORD,
Conway,
Caernarvonshire.

Extolling the Guppy

My dad has a "Piranha" and he also breeds fancy Guppies.

One day when I was reading one of my dad's books about Guppies, I decided to write a poem about them. I am sending it to you because you may like to print it in your Readers Write page. My dad gets the *Aquarist and Pondkeeper* every month and I read it after him. I think that the Beginners' Corner is a good idea for children like me.

Guppies

Rocks and stones are in the tank,
But without Guppies
It would look blank,
With their shining fins
And coloured tails,
They are as bright as
Silky veils.
There are lots of Guppies,
Now let's see,

Feeling a bit dispondent at only getting a third with my *Otocinclus*, I sat down to watch the television.

A couple of days later I had only just missed old "Oto", and not till the following Friday did I decide to look in my show jars and there he was, layed on the gravel with a very sore belly and with just enough water to wet the gravel. So I put him in his tank where he has fully recovered, ready for the show bench again.

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THE SEA SPIDER IS A PYCNOGONID

Written & illustrated by
Huw Collingbourne

A THOROUGHLY confusing little animal is the sea-spider—it isn't a spider at all, and it has taken science a very long time to decide just what it is.

It looks like a spider and it has many characteristics of a crustacean—but not quite enough characteristics. So what is it? Well, eventually the answer was found: the sea-spider is a Pycnogonid. And what, you may wonder, is a Pycnogonid? And, I'm afraid I would only be able to answer that a Pycnogonid is a sea-spider. In other words, it seems there just isn't another animal like it.

And a very curious creature it is too. Perhaps the marine aquarist will regard it simply as an unwelcome guest in his aquarium (for some sea-spiders parasitise certain marine invertebrates) but this is doing the animal great injustice.

You might just as well condemn a long-nosed butterfly fish for eating coral polyps. Of course, it would be foolish to include such a fish in a tank of living coral, but I am sure that, if one were accidentally introduced with the water, few aquarists would think of scooping it out and flushing it down the toilet.

So please don't condemn the subject of this article for its mode of life—it may well be *your* loss.

Of course, even if you do take an interest in sea-spiders, you won't want them eating up all your favourite anemones and sponges. And if you are going to encounter sea-spiders at all, that is just where you are likely to find them—clinging firmly to the sides of anemones, hydroids and sponges. But that doesn't necessarily mean that these creatures are being parasitised, for sea-spiders feed in many different ways. It is quite possible that an anemone will be employed as no more than a solid "home base" from which to conduct operations. *Pycnogonon littorale*, numerous around the coastal waters of Britain, frequently uses beadlet anemones in this way.

Those species which actually eat certain forms of large, soft-bodied invertebrates are well equipped for the job, with little pincers called chelifores, which rip off chunks of flesh.

In addition, there is a large proboscis protruding from the head. This is a formidable construction. The animal's mouth is situated at the far end and

rasping jaws enable the sea-spider to penetrate deep within the body of the unfortunate host. As the flesh is rasped away a strong sucking action carries it down the central channel of the proboscis and into the sea-spider's stomach.

Other types of Pycnogonid crawl about on the ocean floor, eating detritus and algae, and a few forms swim from place to place in search of food.

Some sea-spiders feed on polyzoans, the little colonial animals which may frequently be seen patterning large seaweed fronds.

Occasionally the little creature forms just one part of a very complex chain of dependency, the members of which all live one upon the other, as is demonstrated most effectively by P. E. King¹, who records instances of the sea-spider, *Achelia longipes* eating red algae which is growing on the polyzoan, *Flustellidra*, which is itself growing on an algae (*Gigartina* and *Nymphon rubrum*), which is feeding on *Lasmedea angulata*, which is growing on *F. foliacea* (pause for breath). Of course, while this may be of great interest to the professional marine biologist, I think there is a

practical message for the amateur aquarist too, which is: if you don't want sea-spiders in your aquarium, don't look simple for sea-spiders. Take a good look at the things that are growing on the things that you put into your aquarium—and the things on the things on them too!

There is just one other way that I can think of in which the inscrutable sea-spider may con his way into your aquarium. I call it "the wooden-horse trick," because he may actually arrive *inside* the animal which you've just put into your aquarium (yes, and after all that bother removing the things on the things on the things!). Because, you see, the larvae of some types of sea-spider develop in little swellings on the body of the host anemone. Yes, and there were you thinking your treasured anemone was in the process of budding! Oh dear, and here am I trying to convince you how interesting sea-spiders can be. I suppose you're most likely to like the little critters if you're not all that keen on anemones!

¹ 'Pycnogonids', P. E. King, Hutchinson and Co.

THE RED ZEBRA

by R. Dunleavy

THIS colour morph of *Pseudotropheus zebra* which is said to have been first imported in 1973, is, in my opinion, the most beautiful fish in this species; it also differs from the other forms, in that the female is the one with the most attractive colour. She is mandarin red all over with a very faint light line on the dorsal fin, while the ventral and anal fins have a light blue edge, and there are numerous small egg-spots on the anal fin. In contrast, the male of this red morph is, funnily enough, a very light blue with two or three darker stripes and, usually, when frightened will turn dark blue with many pale stripes. Egg spots are numerous and well defined on the anal fin; there are also a number of orange/red spots on the rear edge of the dorsal fin. This beautiful red variety was discovered on the Mozambique coast by Peter Davis who, along with his wife, has discovered quite a few Cichlids in the past few years. The place of origin of this form is, for economic reasons, a well kept secret, and the exact location where it was caught cannot be given more accurately.

Although said to have been imported in 1973, I first saw them in August, 1975. They had been bought by

two brothers who were local dealers and good friends of mine. The brothers Alec and Hugh Christie are well known in Scotland as breeders of Rift Valley Cichlids. As they hold numerous certificates for being first to breed and show quite a number of species, it could be said that the growing popularity of Rift Valley Cichlids in Scotland is due to their efforts and the encouragement they gave to anyone who wished to keep Rift Valley Cichlids. Now that they have unfortunately had to give up their shop, it is very hard indeed to get Rift Valley Cichlids in this part of the country. However, to get back to the story. When I saw these beauties I was very keen on getting a pair but the two pairs in the shop were not for sale as the brothers wanted to try breeding them themselves but they said they could order a pair for me, an offer I could not take up as they were a bit too pricey for my pocket at £24 for a pair. The female was the most expensive at £18 and the male a modest £6. However, toward the end of September I was informed that the shop was closing down and any fish I wanted I would be able to get fairly cheaply as there would be no overheads to add to the price. Needless to say

I jumped at the chance to get a pair of red zebras at a price I could afford, I also ordered a pair of *P. macrophthalmus*, and a pair of *Labotropheus fuelleborni* (orange?). I prepared a tank for these fish in the lounge of my home as I did not want to risk putting them in any of the tanks in my fish house. The tank was an all glass 36 in. \times 15 in. \times 12 in. and was furnished with a large number of rocks and pieces of bog wood arranged to form numerous caves and crevices along the entire back wall. The water was brought to the required hardness by the addition of Sandocal tablets which can be purchased at any chemist shop. A word of caution here: if anyone decides to use this method of hardening water, do not add more than one quarter of a tablet to 20 gallons of water at any one time or the results could be fatal. One week after setting the tank up I received a telephone call telling me that my fish had arrived. They were eventually installed in their new quarters taking care to release them all at more or less the same time. They settled down very quickly and seemed to be quite happy with the water conditions. I put the tank light out and let them settle down for the night. Next morning I had a quick look to see that they were all right before going to work and when I returned that night the six fish were swimming around apparently looking for food for as I approached the tank they all shot to the surface and began dashing excitedly up and down. I got the impression that they had not been fed for quite some time and put two tablespoons of Aquarian flake food into the tank which was all eaten within two or three minutes, I do not think any food got as far as the bottom of the tank. This was the first time I was able to get a good look at my new fish and I was quite surprised to see that they were in quite good condition. This may seem a peculiar statement to make, especially to English readers, but I am quite sure that if they could see the condition of some of the fish that are sent up here they would be shocked. The red zebra, especially, were pretty good, with only a few torn fins, and they did not have the hollow bellies which I had expected. I began feeding them on beef heart, garden worms, *tubifex*, and the occasional portion of dog food which they seemed to relish.

If tempted to feed your fish on tinned dog food, it is a good idea to put it into an old net or, better still, the foot off an old pair of tights, and run very hot water through it (this removes most of the grease and prevents a greasy scum forming in the tank). After two weeks of this feeding the fish were looking well and the damaged fins were completely healed. The *P. macrophthalmus* and the *L. fuelleborni* always swam about in pairs, but the red zebras did not appear to spend much time together at all as they always seemed to be at opposite ends of the tank from each other. The male spent most of his time swimming in and out

of a fairly large cave at one rear corner of the tank, going in one end and out at the other. The only time he moved very far from his territory was at feeding time and even then he did not stay away more than a minute or two, I guess he was not going to give any of the other fish a chance to take up residence. Three weeks after purchasing the fish I won a bottle of Aquavite tablets in the raffle at one of our club meetings and on returning home I dropped one of the tablets into the tank containing the red zebras, switched the lights off and went to bed. I fed the fish first thing in the morning before going to work and everything was as usual, all fish eating well. When I returned from work twelve hours later and went to feed the fish I noticed that although the female zebra was swimming through the food she was not actually eating any of it. When I finally managed to get a good look at her I noticed that her mouth was bulging—with eggs I hoped.

I immediately began making preparations for isolating her from the other occupants of the tank. As I did not have another tank available with the same water conditions I was afraid to move her as I did not want to take any chance of losing the spawning. I decided that the best thing to do was divide the tank and give her one end to herself. To facilitate this I cut a piece of flat P.V.C. and fitted it into the tank giving the female an area of some 9 in. \times 12 in. \times 15 in. As it was by now quite late I retired for the night. Imagine my surprise next morning when on switching on the light I saw that the female was back on the other side of the partition, swimming about quite unconcerned. I thought that there must be a gap in the partition somewhere but I could not find one, so she must have jumped over. This happened on three more occasions until finally I dropped the water in the tank by three inches and fitted a cover glass over the female's section of the tank. The spawning took place on the seventh of October 1975, and the water conditions were as follows: pH 8.3, temperature 82°F and hardness 23 dgH. The fry were released 19 days later on the 26 October and there were 17 in all, 11 females and six males. They were just under half an inch long, the males being almost black in colour and the females a kind of light orange. I left them with the female for three days and then moved them to a tank of their own. Whilst moving them I caught one male between the edge of the net and the tank-glass; result one dead male. As I write this article the fry are growing well and beginning to take on the adult coloration. One of the remaining five males has no tail. I am not sure whether it was born this way or not, but I hope to breed from this fish at a later date and see whether any of the resulting young will be born without a tail.

Did the Aquavite tablets trigger off this spawning? I leave you to draw your own conclusions.

TETRA JUBILEE COMPETITION

AS READERS will know, Tetra Werke, of West Germany, the well-known manufacturer of aquatic fish foods and remedies, recently organised a competition for British aquarists, to commemorate their Silver Jubilee, and this competition was advertised in *The Aquarist*.

On the 25th February a draw for the prize winners was made at the offices of Tetra's sole distributor in the U.K., Peterama Limited of Chelmsford, Essex.

The draw was made by Miss Sally Ann Littler, the 1975 British Pet Trade Queen and the correctness of the entries was established by Mr. Gordon Corrigan, Chairman of Peterama Limited.

The winner of the first prize, a fourteen day holiday for two in Europe's most exciting cities—Paris, Rome, Hamburg, plus a visit to Tetra, the world's largest fish food factory, was won by Mr. D. B. Hickman, of "Tamerisk," 14 Crumstone Court, Garth 21, Killingworth, Newcastle 12.

The second prize, a German Reflex Camera and slide Projector, was won by Mrs. M. Nelson, of St. Paul's Rectory, Erskine Road, Blackley Road, Manchester 2.

The third prize, a portable black and white T.V. Set, was won by Mr. W. Nowak, of 71 Glenhurst Avenue, Bexley, Kent.



From left to right: Mr. D. Wetton (Peterama Limited), Mr. J. Young (*The Aquarist*), Mr. Gordon Corrigan (Peterama Limited), Miss Sally Ann Littler, (British Pet Queen), Mr. Chris Corrigan (Peterama Limited), Mr. G. Bellenger, and Mr. A. Evans (Pet Fish Monthly).



The British Pet Trade Queen holding the winning entry.

The fourth to tenth prizes, a "Do It Yourself" Kit, consisting of an electric drill and numerous accessories, were won by the following:

Fraser M. A. Stephens, 4 Laird Street, Monifieth, Tayside.

Mr. J. S. Butler, 14 Dinas Road, Penarth, Glamorgan CF 2PL.

Mr. S. E. Brown, 174 Abbey Road, Barking, Essex. Name not known, address as follows, 89 College Street, St. Helen's, Merseyside WA10 1TP.

Mrs. S. Cameron, 52 Hunter Road, Crossdene, Cross House, Ayreshire.

Mr. R. Iles, 3 Rodney House, Woodhouse Road, Timerton, Bath BA2 1SN.

Mr. K. Underwood, 29 Hare Street, Springs, Harlow, Essex.

The eleventh to two hundredth winners each won a new edition of "Beginners' Aquarium Digest."

VIEWPOINT

by A. Jenno

SOME additional information concerning the practical applications of biological filtration in commercial food-fish farming projects has come my way lately and it has been instructive to consider this in the light of its relationship to domestic hobby aquaria. I make no apologies for bringing the subject up yet again; it is of such fundamental importance, especially in connection with marine environments, that it cannot be discussed too often or enlarged upon enough.

The first point concerns acidity and pH buffering. Due to the oxygen consumption by the bacteria in a filter bed and their release of carbon dioxide, the pH value of the aquarium water will tend to become more acid as time goes by. This reaction is further accelerated by some of the metabolic products of the aquarium inhabitants and other natural processes also add their influences. For really efficient biological filtration alkaline conditions are more desirable than an acid state. Nitrifying bacteria are more numerous and more easily acquired in alkaline conditions, in fact, this is why the system is so suitable for marine aquaria, where the pH value should always be above 8.0. Automatic buffering is usually installed in marine filter beds by employing calcium-, magnesium- and silicon-bearing materials as filter media which are then expected to constantly release these minerals into the water. Coral sand, broken shell, dolomite and siliceous gravels are all credited with this function and are frequently used in marine aquaria. In freshwater environments where more-or-less inert gravels are usually used there may be no effective buffering ability, except that in areas where the tap water is hard frequent partial water changes may maintain the alkaline content. When tap water is soft and acid (as in Birmingham, for instance), freshwater biological filters are unlikely to be very efficient unless materials with a definite buffering ability are used in the bed. This, of course, assumes the keeping of fishes which benefit from, or at least easily tolerate, alkaline conditions. Malawi Cichlids immediately spring to mind as confirmed hard-water subjects, for which a buffering media should prove a definite advantage. Discus, cardinals and other soft-water species, on the other hand, will probably never benefit from biological filtration, and where they are doing well in such a situation it will be because the water is so acid as to make the filter ineffective and more or less redundant.

Livebearers do not seem to respond well to soft water so they benefit from living in alkaline biological systems.

Gravel coatings are the next topic. Filter bed material gradually becomes coated with an impervious covering as a result of a reaction between carbonates and phosphates, known as carbonate apatite. Phosphorus occurs in the aquarium as a very necessary ingredient of foods. This coating blocks the buffering surfaces so that, in effect, the material becomes inert. Personally, I find that old, well-established freshwater filter beds develop a peculiar surface characteristic which makes the top of the bed feel like a sheet of lumpy glass rather than a layer of discrete pieces. Investigators have suggested tumbling the gravel, etc., regularly to abrade this coating away, to uncover the reactive surfaces and thus restore the buffering ability, but in domestic decorative aquaria we are unlikely to want to do this. The nearest approach might be to stir the gravel periodically which may break up the coating to some extent. It would seem that where we do not wish to create such a disturbance there will be a gradually decreasing buffering ability with time. Incidentally, shell material apparently only releases alkali from its broken edges, not from the whole surface, even when fresh.

Plant growth in biological filter beds is another interesting subject. Those which are very root-dependent never seem to do well, presumably because of the rather unnatural circulation of water around the roots and the unusually aerobic conditions which ought to be present if the filter is working properly. Conversely, aquaria with lush rooted plant growth and undergravel filtration usually prove to have a non-existent filtering function on investigation, often due to clogging. Floating plants and other rootless species and algae, should flourish, however, in working filters because as the filter matures the nitrate content of the water should build up, and nitrate is a basic plant food. I grow Riccia, Java Moss, Indian Fern, and (unfortunately) Duckweed very easily in my freshwater fry-raising systems and *Canterpa prolifera* in marine tanks. My large 100-gallon freshwater tank now has, I suspect, a clogged filter bed and I am changing this over into a planted community environment at present. So far *Hygrophila polysperma*, Amazon Swords, Bacopa, Aponogetums and various Cryptocorynes are doing well in there, but because the filter is now defunct, nitrate levels may increase with time due to biological filtration and so some kind of plant life is worthwhile as a means of keeping this down. Marine aquarists encourage algal growth for this reason.

Mechanical filtration by the filter bed, i.e. the sucking-in of suspended matter and general rubbish is not the advantage many believe. In the short term this function keeps the water clear and clean

but eventually the bed becomes clogged and internal water circulation virtually ceases. Those advertisers who advance this action as an advantage of under-gravel mechanisms should think again. If the aquarium is likely to become very dirty a separate straining filter should be used to clear suspended solids before they become jammed in the filter bed. Just about the only advantage of the very fine coral sand used in many marine aquaria is that its small size stops the infiltration of foreign material. Ideally the biological filter should never be called upon to strain the water.

Readers will realise that some of the above arguments go against traditional concepts of the use of biological filters. It would seem, for instance, that we should monitor the performance of buffering materials and not take their inclusion as an automatic guarantee of pH stability. Culture water can probably be more accurately buffered over a long aquarium life by the addition of properly-prepared alkali solutions, following reference to regular pH tests. Filter beds could then be constructed with cheaper and more suitably sized media, in particular expensive, too-small coral sand could be ignored. Filter maturation by means of a liquid ammonial preparation is said to produce a larger proportion of autotrophic nitrifying bacteria in the total population of the bed, with consequent benefits, than do the traditional methods using rotted food or the organic wastes of ammonia-resistant aquarium inhabitants. Organics encourage mineralisation and the growth of heterotrophic bacteria to produce ammonia, but inhibit the growth of nitrifiers. The direct addition of ammonia compounds, on the other hand, stimulates autotrophic development with only the necessary minimum presence of heterotrophs.

In conclusion, something should be said about aquatic medicines. Aquarists must realise that if a cure is put into an aquarium containing a biological filter and the preparation is in any way a bactericide, then the odds are that all of the autotrophic bacteria will be wiped out very quickly. There would then be no nitrifying ability left and the ammonia content can easily rise to a toxic level. Thus a medicine used to counteract a small problem can propagate a major disaster. To be safe, all disease treatment should be carried out elsewhere in a quarantine arrangement so that the filter bed is never subjected to such risks. Failing this, only medicines known not to affect filter bacteria should be used.

Over the last few years I have been slowly writing a book entitled "Aquarium Technology," which attempts to deal more systematically with the kind of theories I include in this column. The exercise has been nerve-racking at times, but always interesting, and sometimes it seemed that nothing would ever come of it. At the time of writing this (February)

everything is finally settled, however, and publication is expected to be very soon. I only hope that it will prove worthwhile and that fellow aquarists will find some use for it. Magazine columns such as this are very difficult to refer back to once the particular issue has been filed away and are almost impossible to index, being composed of unrelated bits and pieces, so the same kind of advice and theory in a more sequential layout should be an advantage.

In connection with all this writing, I have for some time been collecting together reference material on all aquatic subjects to form a small library. Unfortunately, it is not possible to just go out and buy everything one wants, even if the cash is available to do so, because many good books are now out of print and magazine back numbers are often unobtainable. I would therefore like to appeal to readers for assistance in this connection, especially those who may no longer have any use for older material in their possession. To save the editor forwarding letters on to me, my home telephone number is Tamworth 68510 if anyone feels co-operative.

I would like to recommend two new periodic publications for readers' attention. Both deal with specialised aquatic fields and will benefit those interested.

I mentioned Mr. Vivien de Thabrew's Aquatic Plant Information Service (APIS) in a previous issue. The first "APIS Bulletin" has now been received by members and should prove to be a very useful source of information on aquatic plants. Selected plants are reviewed, new varieties introduced and other matters of peripheral interest, such as biographies of famous plant scientists, are included. The current subscription is £3.00 per annum and the address to write to is Suhada Ltd., 4 Somerset Road, Cinderford, Gloucestershire.

Secondly, there have been some upheavals in the Koi-keeping fraternity which have resulted in the formation of the Yorkshire Koi Society and the subsequent introduction of a new journal called, quite simply, "Koi". The editor and instigator is Mr. Fred Ayres, whose "Chairman's Letter" of the Yorkshire branch of the B.K.K.S. was almost a magazine in its own right. The Y.K.S. is now a separate organisation with national ambitions, so the journal is written with non-local members in mind. Good definitive articles dealing with water quality, environmental requirements, Koi medicine and even surgery have been included in the first two issues. In addition Mr. Ayres has produced an introductory booklet aimed at the beginner in Koi-keeping, which deals with all the basics including pool and filter design. The subscription is £5.00 per annum and Mr. Ayres' address is 35 Manor Drive, Hilton-in-Cleveland, Yarm, Cleveland.



MARINE QUERIES

by Graham F. Cox

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex TW8 8BN.

Although I have kept freshwater tropical fish for many years, it was not until 18 months ago that I decided to try my hand at "marines". Since that time I have written to you on two occasions and your letters of reply were sincerely appreciated and the advice you gave was well heeded.

However, six weeks ago I set up a second marine tank expecting the same successes as I had with the first—but alas no. So, good sir, I would welcome once again your comments and advice.

After maturation of the water I purchased an adult Tomato Clown which was (and still is) in excellent condition. 10 days later I added two Percula Clowns (1½ inch specimens) and two Anemones for the benefit of all three. Could you please tell me why:

(1) None of the Clowns would go near the Anemones, although when I purchased them I noted several Sebae Clowns cavorting among them.

(2) The condition of the Percula Clowns began to seriously decline and on a suggestion from the dealer I administered "Odemor" which he claimed would not harm the Anemones.

(3) Three days later, both Percula Clowns were observed to be almost completely covered with a white filmy substance which was peeling off like sunburnt skin does on human beings. By the fourth day they were both dead.

At the time of writing the Tomato Clown still appears to be "fit as a fiddle" but ignores the anemones. May I also add that I never once saw the Tomato Clown act aggressively toward the Perculas, so what they died from

I cannot think. Incidentally, of the two Anemones, one has thick white tentacles with purple tips and the other a pale pink species with fine tentacles and lays itself flat out on the bottom. This was the one that I noted the Sebae Clowns playing in which I purchased them.

Please, what's wrong?

Question (1) Many species within the genus Amphiprionidae (the Clown fish group) are extremely selective about what species of anemone they will or will not use for their relationship (whether this relationship is of a *symbiotic* or *commensal* nature in all cases is far from certain in my mind, but this issue does not concern us here), and there is ample evidence of widely differing preferences being shown even on an *intraspecific* level.

After many years of observing these creatures both on the coral-reef and within closed-circuit marine biosystems the only generalisations which I feel safe in making are the following:

(a) The only clown fishes which will *always* use *any* anemone (except *Cerianthus* species and a few other rarer anemones) are the somewhat unhappily-named Orange Skunk Clown fish (*A. perideraion*). These clown fishes are very unhappy in the absence of an anemone, and rarely seem to wander more than a few centimetres away from "their" anemone once provided with one. Significantly, perhaps, they are also the two most delicate clown fish species.

(b) At the opposite end of the spectrum one or two clown fishes seem able to adapt very successfully, *under aquarium conditions*, to a totally anemone-less existence. Examples of these hard species are *A. ephippium* (the Fire Clown or Tomato Clown) *A. Sebae* (the Black and White Clown) and "Premnas"

(*Amphiprion*) *biaculeatus* (the Maroon Clown). However I must stress here that first, this would appear to be almost entirely a phenomenon associated with aquarium captivity, because I have not witnessed this condition in the wild state, and secondly, that when presented with an anemone of the "right" type, they will quickly take up residence in it, even after several years of unfamiliarity with anemones.

Again, perhaps significantly, these species of semi-independent clown fishes are amongst the hardest (disease resistant) and aggressive members of the entire genus.

(c) The only genus of anemones which I know of, which no clown fish can resist forming a close association with is the *Stoicactis* genus. These anemones all grow to a relatively large size and are all characterised by having multitudes of tiny (2 mm—12 mm long) tentacles scattered evenly over the dorsal surface of the oral disc giving, overall, an impression of coarse velvet.

Question (2) I am not free to comment on medications.

Question (3) There are at least two possible

explanations of this "white filmy" substance as follows: (a) the fishes were reacting to the medication, or (b) the fishes were suffering from a *Myxobacter* infection (to which *Amphiprion* *percula* is particularly prone), which the medication you mention is not able to control. The explanation (b) is by far the most likely.

Under separate cover I am sending you details of the medication which you should have used.

The two anemones which you have at the moment would appear, from your description, to be of the *Radianthus* genus (purple-tipped tentacles) and the *Discosoma* genus.

Finally, one last word of warning. It is extremely difficult, even in very large tanks (i.e., 200 plus gallons = 900 plus litres), to successfully culture *A. percula* and *A. ephippium* in the same marisystem. The two species appear to have a deeply-ingrained, instinctive antagonism towards each other (as do many other clown fish species), which probably arises from an evolutionary mechanism designed to prevent abortive hybridisations and over intensive competition within the same type of eco-system.

WHY DO YOU KEEP FISH?

AS PART OF a study at Stirling University into the development of the petfish industry, the question arose "Why do people keep fish?" This is a question you must often have asked yourself when confronted with a temporary set-back such as tank failure or fish loss. At such times the response may be highly emotional, but to seek a more carefully considered opinion Dr. G. Phillips has sent questionnaires to 25 Aquarist Societies distributed throughout the country.

Readers of the *Aquarist* magazine are also invited to take part in this survey by completing the same questionnaire, which is reproduced below.

Fish Keeping Study

- Q.1. For how long have you been keeping fish?
 Q.2. Which kinds of fish do you keep now?
 (a) Garden pond.
 (b) Cold, freshwater aquaria.
 (c) Cold, marine.
 (d) Tropical, freshwater.
 (e) Tropical, marine.
 Q.3. How many aquaria do you have in use now?
 Q.4. What are your main reasons for keeping live fish?
 (a) Interest in biology.
 (b) As pets.
 (c) Presents a challenge.
 (d) For competition at shows.
 (e) House decoration.
 (f) As a spare-time business.
 (g) To amuse children.

- (h) To interest visitors.
 (i) As a garden feature.
 (j) Others (describe).

- Q.5. Which of these reasons is the most important one for you?
 Q.6. Please indicate the age group to which you belong.
 (a) Under 15.
 (b) 16-25.
 (c) 25-39.
 (d) 40 and above.
 Q.7. Are you Single/Married?
 Q.8. Are you Male/Female?
 Q.9. Do you belong to an Aquarist Society?

Interested readers are asked to send their answers direct to Dr G Phillips, 11 Bath Street, Stonehaven, Kincardineshire AB3 2DH. To avoid cutting the magazine it is suggested that the replies be written separately in some abbreviated form such as:—

- Q.1. 3 years
 Q.2. a, c.
 Q.3. 2 aquaria etc.

If there is a sufficient response the results of the survey will be presented and discussed in a future issue of *The Aquarist*, but it is stressed that all replies will be treated in confidence. Whereas it would help if readers included their name and address with their reply to allow the organiser to sort out any queries that may arise, this is by no means essential.

From a Naturalist's Notebook

by Eric Hardy

ANGLERS ALWAYS found some difference between the twin Llanberis lakes Peris and Padarn, both deep, glacial gorges occupied by handsome char. Whether or not they formed one great chasm before the Ice Ages is another matter. Llyn Peris, the higher lake, has steep sides of slate rubble with its biggest trout. Though separated by only 200 yards of river Peris, the fauna and flora of the two lakes has been shown to be strikingly different by research from 3 universities, much of it financed by Central Electricity Generating Board grants.

Though white pondsnails do not receive the press publicity of white blackbirds, they occasionally occur, as do albinistic fishes (pike), frogs, snakes, axolotls, newts and other waterlife. Two Wigan infirmary medics, Dr. R. M. Forrester and Dr. McGuggan, working on the genetics of human pigmentation and albinism which occurs among children from West Africa to New Guinea, are seeking albino pond-snails. Dr. MacGuggan told me that they stumbled upon the novelty of it among snails by accident in some Cheshire nature notes, not having previously noticed it there.

That was from a pre-war pond near Antrobus Hall, where the strain lasted for at least some 10 years. Inbreeding among isolated pond communities might be the cause. I have two instances of albino ramshorn *Planorbis umbilicatus* and *Limnaea glabra* (the not totally white variety *albida*) in ponds near Manchester; but albinism occurs occasionally in land snails too. If you have any they would like to see them, or photographs.

I mentioned the other month that the American Alligator population had revived sufficiently to be removed from the endangered species list. Shortly afterwards, the American crocodile with a more tapering snout was added to the list. Last year, only 300 specimens of this rarest of North American reptiles were reported surviving, including 10 breeding females. Hide-hunters throughout south Florida were again to blame, but raccoons prey heavily on their eggs and young. Their chief survival is on the mangrove islands of Florida Bay, in the Everglades National Park. They also range through central America to Ecuador, Venezuela and Colombia and some West Indian islands, but are nowhere now common. Enthusiasts for these reptiles will find a useful Key to Identifying Living Crocodilians in the

New York Zoological Society's journal *Zoologica*, Vol. 58, No. 3 (1973).

A living coral reef off Florida Keys has been designated a federal sanctuary, the first U.S. underwater park. Other offshore sanctuaries are planned there, for protection rather than development of bays, lagoons, etc.

Instead of its plan to introduce Nile perch into Queensland, Australia's Fisheries Council has decided on 5 years research into its closely related native giant perch or barramundi (both are species of *Lates*). Fears of further introduction of alien fish arose from the explosive spread of alien carp in Victoria and S.E. Australia, which is now akin to the rabbit problem. Man-made changes in waterway ecology triggered this off. There is still a basic lack of knowledge of the distribution and population-statistics of native fish there and a grant has been provided to the Australian Museum for such a survey. They've already collected 44 species from only 100 sampling stations, grayling and river black fish being the rarest; but carp have been located so far north as the Paroo River, a tributary of the Murray. Success with breeding several native fishes is reported from the Inland Fisheries Research Station at Narrandera, induced by gonadotrophin hormone from the pituitary gland of the despised carp. At first they used recently captured mature fish, already stimulated in their natural spawning season at spring and summer floods. Hatchery procedure is to extend the breeding season, with a satisfactory feeding system.

We are more fortunate in our river studies with more numerous field-guides keys and monographs. From the Freshwater Biological Association at Far Sawry, Ambleside, Cumbria, comes a new 72 page, illustrated edition of their *Key to British Freshwater Malacostraca*, edited by T. Gledhill, D. W. Sutcliffe and W. D. Williams and good value for £1. These crustaceans range from crayfish and Chinese woolly-clawed crabs to waterhog-lice and freshwater shrimps. It is certainly the scientific authority on the subject. It includes the aliens colonising some of our freshwaters like the American water hog-louse *Asellus communis* in Northumberland's Bolam Lake and the North American freshwater shrimp *Crangonyx pseudogracilis* now in waters, even polluted, from southern and central England to Wales, Yorkshire, Lancashire, Norfolk Broads, Lakeland, Northumbria and Stirling (Grangemouth).

There are no distribution maps because too few field-workers have recorded the distribution of these small crustaceans, so here's an opportunity for pond-hunters to make use of this practical aid to the obstacle of identification. For instance, the translucent, prawn-like *Palaemon longirostris* is recorded only from Norfolk's Oulton Broad and River Waveney though it has been recorded under its old generic name *Leander* in an embankment freshwater pool and the Berkeley kypes of the Severn Estuary. Six American crayfish species have been introduced to supplement native stock depleted by fungus disease, while the Asian *leptodactylus* is extending into western Europe. Britain's native, now suffering the ponderous *Austropotamobius pallipes* name in place of old *Astacus* has only one Welsh record and is absent from Scotland. The larger red-clawed continental *Astacus astacus* (*fluvialtilis*) is stated to have "probably been introduced into Britain," but it was introduced into the Oxfordshire Thames.

Another good new book for aquarists which I am pleased to review is *Migration and Homing in Animals*, by Prof. Klaus Schmidt-Koenig, No. 6 in Springer-Verlag, the Berlin publishers' English language series on Zoophysiology and Ecology. At \$ U.S. 18.90 (about £9.8), it is rather expensive for a 99 page work illustrated with diagrams. Brief chapters give probably the most up to date summary of current knowledge of orientation in fishes, reptiles and amphibians, as well as insects, birds and mammals, first mentioning observations afield and then detailing experimental proof and theoretical interpretations. There is much evidence that fishes like salmon home by smell. Experiments also show sun-compass navigation in Bermudan parrot-fish and young salmon, to which fish can be trained; but there is still more to learn before solving open-sea navigation by fishes, turtles, etc. Many amphibians move at night, as has been shown in English tracking of frog-routes to traditional spawning ponds in spring, not mentioned in this work; so that sun-orientation shown in some amphibians does not apply here.

Tracking fish and turtles marked by attached balloons has proved more entertaining than revealing. Though some researchers incline to favour smell for navigation here too, much further evidence is required for the turtle's long journeys to limited breeding islands. Sun-compass experiments with box-turtles and lizards have mainly suggestive results, though the author wishes to credit reptiles with this use. It is on these lines that most navigational theories for aquatic life are directed. If there is one thing the book shows, it is the scope for preserving living material for experimental observation instead of the age old tradition of our examiners requiring pupils to destroy and dissect frogs and fish as almost their sole education

in aquatic biology, leaving school with next to no understanding of how these animals live.

Artists and photographers are forever portraying fish, seaweeds, shells and other aquatic life in fascinating books and articles. For more than a century fish-printing or gyo-taku has been a Japanese art of fish-printing by impression. This has recently been taken up with enthusiasm in Australia. After washing the mucous off a specimen with soap and water, a thick, water-based acrylic ink is brushed over the dried specimen, then rice-paper (or substitute) is placed over it and gently rubbed by fingers or art brushes to obtain a mirror-image print on the inner side of the paper. Naturally, flat specimens are easiest until skill is acquired, but prawns, crabs and a wide variety of fish are recorded much easier and cheaper than by taxidermy. Moreover, with edible fish, the ink may be washed off afterwards and the specimen eaten, or rarer ones returned to the tank. To level a specimen, the spread fins can be pinned out on clay supports or something. Eyes are usually left blank and painted in later. If excess moisture is first removed by pressing newsprint on the specimen, several prints may be obtained from the inking stage.

BOOK REVIEW

Life in the Aquarium

A large-format, pictorial volume which gives an excellent general view of the whole range of aquatic creatures which we keep in our artificial environments, even including freshwater invertebrates such as water-beetles and snails. The photographs are top-quality colour reproductions printed on thick, glossy paper. Many are of marine fishes and invertebrates and some of these last are really fantastic. The freshwater tropical fishes are well summarised and additional chapters cover maintenance, equipment, plants and general techniques. Overall the book has a nice balance, which reflects the state of our hobby at the moment quite accurately, in my opinion anyway.

The text is interesting and informative. The authors are Vanna Dal Vesco, Wolfgang Klausewitz, Bruno Peyronel and Enrico Tortonese, and the translation from the original Italian is by Olga Nunan. On reading through it is not easy to see who wrote what, or whether the whole thing was a collaborative effort, so it is impossible to give individual credit. Nevertheless it is a really good book and is recommended as a gift for any aquarist or for addition to the club library.

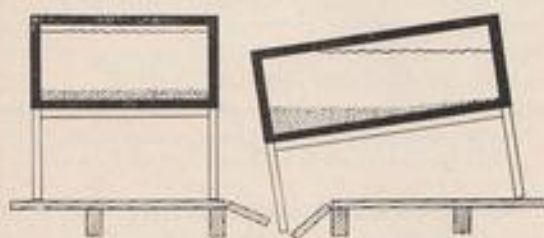
Published by Octopus books Ltd., 59 Grosvenor Street, London, W.1. 248 pages, many colour photographs and some line drawings. Price £7.95.
A. JENNO.

BEGINNERS' CORNER

(7) TANK WEIGHT AND PARTS OF A FISH

by Bill Simms

THE BEGINNER aquarist occasionally allows his enthusiasm to carry him away. The other day I had a letter from a reader who had installed some tanks for breeding tropicals in a bedroom without realising the weight he was putting on his floorboards. A three feet long tank, well supported on stout timber legs, had broken through the floor. It seems that one of the supports was standing on a piece of floorboard between two of its joists. In falling sideways it broke the glass of an adjacent tank, and about 12 gallons of water poured through into the room below.



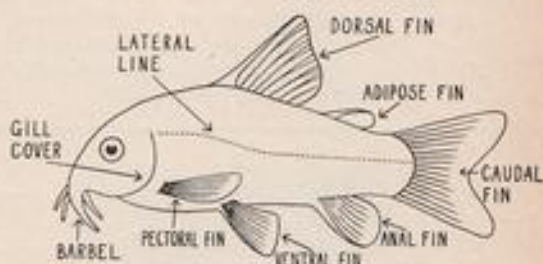
His insurance company refused to pay for the damage to floor and ceiling—to say nothing of the furniture and carpeting below—because they claimed he had been negligent. The weight of his tanks and water amounted to over 7 cwt., which they said was excessive.

This point should be born in mind when installing even one aquarium. A 24 in. aquarium weighs nearly 1½ cwt. when full, and so great care should be taken with its siting, making sure that whatever it is on can stand that weight without sagging at all. This point was mentioned in the first Beginners' Corner, but this recent letter suggests that it cannot be repeated too often.

When reading about the fish he is keeping for the

first time a beginner is often confused by reference to "parts of a fish," such as "caudal fin" or "dorsal fin." These are worth learning, so are shown here. The dorsal fin may be divided into two sections (joined together) called the first and second dorsal fins. Often the first dorsal is spiny, and the second soft. Also, a dorsal can stretch from near the head to the caudal (tail), and is sometimes joined to the tail. This applies to the anal fin, too, for in some fishes this reaches from near the ventral to the tail.

The adipose fin is usually fleshy and small, and



occurs only on certain species—others are without it. The ventral fin in male guppies and other live-bearing tropicals, is modified into a sperm secreting gonopodium, for fertilising the female, so it is relatively easy to sex such fish—the ventral fin of the female is a normal fin.

Occasionally the gill cover is referred to as the opercle, and on some fish there is a preopercle just in front of it. Barbels come in many shapes, sometimes altering the mouth shape (as shown here), and sometimes sprouting from the upper lip, or the lower lip, or both. These only occur on certain species, such as the catfishes, and usually apply only to a few ground feeding fish.

On some fish the lateral line is easily seen, on others

it must be searched for. It is a row of sensitive organs that give the fish a sense we find it hard to describe, or even imagine. So far as current research goes this line gives the fish a clear knowledge of water pressures and movements: a sort of "touch at a distance" sense. With its aid fish are immediately aware of

movements near them, whether or not they can see the movement. There is some reason to think that it also incorporates a sense of taste, so that it is occasionally described as a "taste-feel" sense. The truth is that it is so different from any sense of our own that we find it difficult to imagine what it is like.

Apistogramma reitzigi SOME NOTES ON SPAWNING

by Kevan Smith (Aged 15 years)

I OBTAINED a pair of these fish from a friend who had kept them in his Cichlid community tank. Their condition had gradually deteriorated due to bullying by the tank's larger occupants.

The male was a dull grey colour with a dark horizontal line along the length of the body and the female was a yellow-gold colour all over.

The pair were identified as *A. reitzigi* from scale and dorsal ray counts obtained from Goldstein's Cichlid Handbook. There is also a photograph on page 139.

I decided to house the pair in a small tank at first until they were back in peak condition. The tank was 16x8x8 in. and contained a small bog root and six *vallisneria* plants. They were fed on blood worms, *tubifex* and flaked food.

A week later the pair spawned on a *vallis* plant at the back of the tank. There were approximately 50 small tan-coloured eggs. The male was removed so that the female could guard the eggs in peace.

At this point I had to leave home on holiday for a week. My uncle was to feed the fish at the middle of this period. He arrived on Thursday to find that I had left the cover glass off the top of the tank. This resulted in a melted and distorted heater clip, a temperature of over 100°F and a very distressed female Cichlid. He poured in a bucket of cold water to reduce the temperature and then filled the tank again.

When I arrived home on Saturday I was surprised to find the mother and her attendant shoal of young swimming about the tank. After a week I removed the female to a 24x12x12 in. tank with the male and continued to feed the young with Liquifry.

Within a fortnight the pair had spawned again resulting in 150 young a week later. At the time of writing both broods of young are alive and eating voraciously. The parents are back together again and it looks like another spawning is imminent.



FRESHWATER DOLPHINS

by Michael Lorant

The marine collection of the famed Los Angeles County Museum have recently been enriched by the acquisition of several complete specimens of the primitive Amazon dolphins.

While most people are familiar with marine porpoises, many do not realise that there are a few species in other parts of the world which are completely restricted to freshwater.

Picture shows two freshwater dolphins that came to the museum from the upper reaches of the Amazon river.

Dr. David K. Caldwell, curator of ichthyology at the museum, is pictured with the dolphins. He recently received a grant from the American Philosophical Society, to continue his studies of these unusual freshwater creatures.

ALTERNATIVE TECHNOLOGY

by B. May

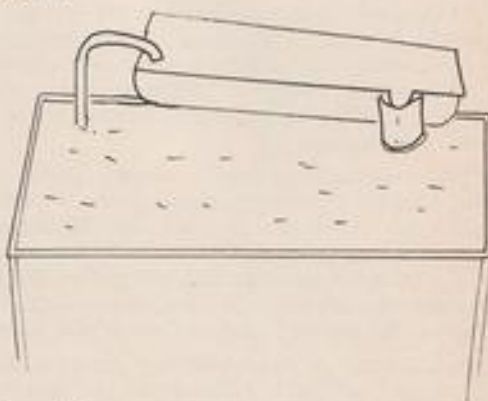
IN RECENT YEARS much work has been done to use our natural resources in order to save our limited supply of fossil fuels. Besides the saving of fuel, these 'Alternative Technologies' as they have been named, have also produced a number of beneficial side effects, such as reduced costs, lower pollution, etc. In the field of aquarium management we are already using alternative technology in the form of the under-gravel or bacterial filter. Instead of employing costly power filters, ozonisers, etc. We are relying upon the bacteria in the substrate to convert the toxic nitrites into less toxic substances. The main substances formed from this breakdown by aerobic bacteria are nitrates and ammonium salts. Although not very toxic in small quantities, if they are allowed to build up to any great degree these substances may cause considerable distress to the inhabitants of the aquarium. The normal way to avoid this situation is by frequent messy water changes and using some sort of charcoal filter in which the charcoal has to be changed regularly, usually with some degree of difficulty.

By the application of alternative technology I have achieved a device which will greatly alleviate these problems. I have simply taken nature's cycle of life a little bit further. I maintain the usual under-gravel filter to convert the nitrites formed by the fishes excretion into nitrates, etc. I then pump this water through a second filter which utilises a second group of minute plants, that is the Algae. These plants remove nitrates, and other more complex substances, from the water in order to build the proteins they need for growth.

In practice my algae filter consists of a piece of 3 in. diameter plastic guttering blocked at both ends. The guttering is just 6 in. short of the length of the tank and is clipped to the back about 2 in. above the water-line (see diagram). The filter slopes very slightly, and at the lower end a small notch is cut out with a lip to return the water to the tank. In the guttering I have placed a small amount of the filter material from the under-gravel filter with small pieces of rock every few inches to prevent the finer material from being washed away. The water from the tank is pumped in at the higher end by means of an air lift. I have regulated mine to about 2 gallons an hour. This I find is slow

enough to prevent the filter medium from washing away but fast enough to give complete turnover within 24 hours. The slow rate does not give rise to any problems with anaerobic bacteria as the extreme shallowness of the bed affords adequate aeration. As an added feature I have placed a small nylon bag full of filter carbon at the return end of the gutter to remove any phenols, etc. that the algae weren't able to deal with. In this way the bag can be lifted out and boiled with no difficulty whenever necessary.

The filter bed being shallow allows the maximum amount of light to enter thus promoting a luxuriant growth of algae, giving a very high degree of nitrate removal.



In addition to the nitrate removal the filter has several other very useful functions. The first of these is to promote the growth of Phytoplankton for whose development the algal beds are ideal. This results in much healthier filter feeders and generally improves most fish to a considerable extent. The food chain brings me to the second extra function of the algal bed and that is to raise Macroplankton. So far I have found numerous small crustaceans and Polychaete worms of up to $\frac{1}{4}$ in. long thriving amongst the algae and these make an excellent treat for the inmates. In addition I find that by placing newly-hatched brine shrimp at the inlet end I get shrimps at varying stages of development reaching the main tank at intermittent intervals for several weeks. This I find supplements the diet of my fish in a most natural way.

Although this filter was designed for a marine set-up, where the ecosystem is very inflexible, I believe it could also be very advantageous to a freshwater set-up where under-gravel filtration is used. The algal growth will help supplement the oxygenation brought about by the plant life in the aquarium which

is quite often poor with an under-gravel filter due to root disturbance.

Finally cost. I am happy to say that the complete set-up and installation cost me under £1 so that this kind of set-up may be enjoyed by even those on the lowest income.

FOR THE HERPETOLOGIST'S BOOKSHELF

by Andrew Allen

AFTER A FLURRY of criticism in my last review, it is a pleasure to discuss two unpretentious little books that offer lucid advice for those setting up their first vivarium. Like all introductory works they must needs be full of gaps and somewhat superficial, primers not manuals. But charming prose and thoughtful bibliographies over-ride this 'fault', render them invaluable to child or tyro, and a pleasing hour's reading for the more experienced.

The Vivarium and the Terrarium is by Joy O. I. Spoczynska (Nelson, 1967, 66pps.). The authoress is a schoolteacher with personal experience of guiding kids through the formative biological years, plus experience of writing in the erudite journals. These are good qualifications.

Her book is short on pretty pictures, strong on practical advice. Directed, perhaps, at ten to fifteen year-olds, the appropriate level and tone have been attained. The writing style is easy, the line drawings passable. Chapters cover the different groups, design and construction of indoor vivaria, instructions for establishing tropical and fern gardens in the house.

The excitements of the subject are conveyed, but supplemented by solid information on building vivaria, selecting plants, choosing appropriate animals, getting temperature, humidity and lighting just so. Emphasis rests on the enjoyment to be derived from studying undemanding species; gain experience on the simple things, and eventually the complex will fall into place. The young reader would delight in arranging a beautiful vivarium for a couple of toads, and not hanker too soon for iguanas and pythons. In addition this book would prove ideal for a biology teacher planning class projects, and able to add personal advice to the written word.

In similar vein is *Terrariums—an Insight into Container Gardening*, by John Hoke, 1972 and second edition 1974, Franklin Watts. This little book comprises 80pps. of large print, adorned by black and white photos that are both beautiful and in-

structive. It concerns itself with design, construction and maintenance of elegantly planted terraria, rather than with the specific care of reptiles.

The attitude taken is admirable. Terraria are bits of nature brought into the home. Each terrarium should be a miniature functioning ecosystem, able to perpetuate itself. Terrarium management should be based on ecological understanding, and planned control of the environment. A trendy tone? Well, yes. But it is nicely put across, and backed by hard advice. Chapters deal with lighting, soil condition, moisture, temperature, seasonal variation, cleanliness and ventilation. Choice of plants receives attention. The merits of different containers—glasses, bowls, domes, cylinders, cases—are discussed. There is a good bibliography, referring to slightly more detailed works on ecology, reptiles and house plants.

For a child just taking a first interest in reptiles and vivaria, I would recommend that three small books be bought. One is Hoke's work on terraria, for its distillation of the ethos of vivarium management: the vivarium is not just a backdrop, a pretty frame, for the animals at its focus; it is a complete living system. The total system must work harmoniously if its occupants are to flourish. Such a working terrarium is the first key to success with reptiles. Second book would be a *Study of Reptiles and Amphibians* by Leutscher, reviewed in *The Aquarist* of January, 1974, for its painless introduction to the fascination of reptiles and amphibians as a biological group. Third would come Joy Spoczynska's book, for its practical advice on elementary care of vivaria and their inmates, in its unpretentious, responsible style. This trio should send any youngster off to a good start, initial sights set on readily attainable targets.

Unfortunately when the time comes to progress from these primers, there is little to progress too! My next article probes a particularly poor vivarium manual.

A RECENT IMPORTATION OF AGAMAS

by H. G. B. Gilpin



EARLY in January this year a friend of mine received a group of eleven so-called Rainbow Lizards—*Agama agama*—from Ghana. They were certified healthy by a veterinary surgeon before leaving Africa and travelled in a large, well perforated hardboard box, by air. Immediately on arrival they were placed in a heated laboratory tank. According to one authority, Agamas are best maintained at 37°-39°C., temperatures above 45°C. proving lethal. Personally I have found 30°C. acceptable.

Five days later, three of the lizards, a male and two females, came to me. All three were a dark, greenish-brown colour, rather lighter on the tail, their toes barred with light and dark brown. The male was 14 in. in overall length, his laterally flattened tail one

and a half times as long as his head and body, and the dewlap hanging beneath his lower jaw a reddish hue. He sported a low crest, just behind his head, and a line of spiked scales along the upper surface of the tail. Pointed scales tended to stand out along the sides of the tail, giving a prickly sensation when handled.

The females were 8 in. in overall length and lacked the dewlap and crest. All three lizards possessed prominent eye sockets, jaws equipped with strong, pointed teeth and relatively large auditory apertures, surrounded by small spines.

They were placed in a 30 in. long, 15 in. wide and 12 in. high glass-sided, angle iron vivarium, heated from above by one 60 watt and one 25 watt electric

light bulb. A rockery, surmounted by two overhanging slabs of slate immediately below the 60 watt bulb, and containing a shady retreat, occupied one corner. The floor level was divided by a "dry stone wall" into two halves. One half was covered with coral sand and the other with a slope of moist—not wet—soil, two inches deep in front rising to four inches deep at the back. A watervessel was sunk to the level of its rim in the soil, which was sprayed with a fine mist of water whenever it showed signs of becoming too dry. The reason for this arrangement was that, from their extended abdomens, both females appeared to be gravid and hopes are entertained that they will breed.

These Agamas are egg-layers and under natural conditions breeding takes place during or towards the end of the wet season. The female lowers her head, arches her body on stiffly stretched legs, raises her tail and turns her rear end towards any male in full colour. The male grasps her neck in his teeth and, with one foreleg across her back, slides his tail underneath hers so that their vents come into contact. Seminal fluid is introduced into the cloaca of the female by one of the two intromittant organs (hemipenes) of the male.

In due course, the female, by alternate use of her forefeet, scrapes a hole in the soil about two inches deep. Five to seven cream, leathery shelled eggs are deposited in the hole and covered with earth which is tamped firmly into place by prodding movements of the head. During the eight to 10 weeks incubation period, these eggs absorb water from the soil and grow considerably in weight and volume. The emerging young are miniature replicas of the adults.

Agamas are voracious feeders and catholic in diet. Basically they are insect eaters strongly favouring ants, but cases are on record of them eating a small snake, a scorpion, sea-slaters, a tiny bird, infant rats, their own offspring, brightly coloured fruits and bread crumbs (!).

My three fed freely within an hour or so of their arrival and during the first few days demolished three three-quarter-inch slugs, some scraps of raw beef, an earthworm and over a dozen locusts ranging in size from one inch hoppers to adults. The hoppers were swallowed whole but only the abdomens of the adult locusts were swallowed, the thorax, legs and wings being discarded. At present, owing to a temporary shortage of locusts, their diet consists mainly of gentles and blow-flies. The maggots are seized in the Agama's jaws, chewed once or twice and swallowed. The flies are usually taken when they crawl near the lizards but quite often an Agama makes a standing jump of a foot or more to seize an insect otherwise out of reach.

One of the most fascinating aspects of *Agama agama* is the facility with which the male changes colour.

The first indication I had of this occurred when he was taken in hand for detailed examination. Although he was unenthusiastic about being picked up, he did not struggle unduly nor, in spite of opening his mouth widely in a warning off gesture, did he attempt to bite. His head, gular sac and the middle of his tail, however, did turn dull red.

A more spectacular colour change, for no apparent reason, took place one evening at 6.00 p.m. when he was lying on the flat slab of slate beneath the stronger electric light bulb. His head, neck, throat, dewlap and the middle third of his tail turned a brilliant orange red whilst the remaining two thirds of his tail and the rest of his body became steel blue. This ornate colour phase lasted until 9.00 p.m. and then faded to the original brown. He has since assumed vivid coloration on a number of occasions. The females show little variation in colour. One, usually to be found in the shade, is invariably dark greenish brown with whitish underparts and the other, constantly found in the open, is a uniform pale, brownish cream. Both occasionally exhibit a reddish flush on the dorsal surface and the darker specimen, at rare intervals, develops a broad dull orange flash along the sides.

The bright coloration in males varies to some extent geographically. For example in Western Nigeria the head is orange, in Northern Nigeria deep yellow and in Eastern Nigeria vermilion.

In the wild these Agamas live in strongly territorial groups comprising males, females and juveniles. Only the dominant male shows the bright colour in sexual display and territorial defence and he reverts to dull brown as darkness approaches and the lizards retire for the night to their sleeping quarters.

Individual lizards can be identified by their gular patterns, consisting of a network of faint grey lines and spots on the greyish underside of the head. These patterns persist unchanged in any one lizard throughout life but no two animals possess identical designs.

My three Agamas spend most of the day in a state of immobility, the male and one female basking on the slate slab and the other female below it. Towards evening they become very active moving rapidly around the tank between "halt" periods when they pose with their legs so stiffly erected that the space between their abdomens and the ground is greater than the depth of the bodies.

Even when static during the day they remain acutely conscious of their surroundings and detect movements outside the vivarium eight feet and more away. Such movements do not disturb the Agama's immobility but if one approaches within fifteen inches of the vivarium, the females beat a hasty retreat into the fastnesses of the rockery and the male parades rapidly around his territory.

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Even when static during the day they remain acutely conscious of their surroundings and detect movements outside the vivarium eight feet and more away. Such movements do not disturb the Agama's immobility but if one approaches within fifteen inches of the vivarium, the females beat a hasty retreat into the fastnesses of the rockery and the male parades rapidly around his territory.



from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarist societies for inclusion on this page should reach the Editor by 5th of the month preceding the month of publication.

THE New Forest A.S. held the February meeting at their regular venue the Community Centre, Lymington, when an important decision taken was that the Society should rejoin the Association of Southern Aquarist Societies which would be of great advantage to members. Table show results—A.O.S. Tropical: 1, M. Aust; 2 and 4, D. Woodford; 3, B. Higginson. White Cloud Mountain Minnows and Danios:—1, M. Aust; 2, 3 and 4, B. Higginson. A raffle was held to assist Club funds. Visitors are always welcome at meetings held on the third Monday every month at 7.45 p.m.

OFFICERS elected at the annual general meeting of the **Midland Aquarist League**, were T. Parry (Loughborough), R. Tedds (Bedworth) and Mrs. E. Underwood (Unit 59). The league now comprises eight societies namely:—Bedworth A.P.S.; Coventry Pool & A.S.; Goodyers End A.S.; Hinckley & D.A.S.; Rugby Fishkeepers; Loughborough & D.A.S.; Leamington & D.A.S. who rejoined the league at the first show last year, and Tamworth K.A.G. who were welcomed into the league at the annual meeting.

For the first time it was decided to run the league with a show committee and C. Chamberlain of Leamington was elected as the first show secretary. There will be four shows this season with six open classes at each show. It is hoped to attract support from as many societies as possible.

DURING the February meeting of the **Great Yarmouth & D.A.S.** an inscribed tankard was presented to Mr. Cris Beitzkreutz and with it went all the best wishes and good fortune for the future from the society as he has to leave and return to the U.S.A. A large auction of fish and equipment took place during this meeting and the evening was concluded by a discussion on fish keeping problems.

THERE was a change of officers at the first meeting in February of the **Portsmouth A.S.** Those elected were as follows:—Chairman: R. Smith; Secretary: P. Bealey; Treasurer: Miss W. Ryder; Show manager: J. Howard; Show Secretary: E. Salt; Table Show Secretary: W. Ryder; Social Secretary: Mrs. J. Stillwell; Vice-Chairman: Mr. J. Stillwell; Assistant Secretary and Publicity: V. Hunt; Librarian: I. Young; Host: A. Atkinson.

The second February meeting was devoted to slides of historical interest within the environs of the society. Mr. Howard and Mr. Ryder gave members a very interesting illustrated talk on social events throughout the history of the society which has been in existence for 25 years.

THERE was a very good attendance of members of the **Brighton & Southern A.S.** for the first show of the New Year for which there were three classes. The results were:—H. (Corydoras): 1, Mr. and Mrs. Rooney; 2, Mr. and Mrs. Houghton; 3, Mr. and Mrs. Ramshaw; 4, Mr. and Mrs. Sayers. K. (Danio W.C.M.M.): 1, 2 and 3, Mr. and Mrs. Rice; 4, Mr. and Mrs. Sayers. J. (Rosboras): 1, Mr. and Mrs. Sayers; 2, Mr. and Mrs. Sayers; 3, Mr. and Mrs. Houghton.

A lecture was given by Mr. J. Burtles of Mid-Sussex Club on loaches which was enjoyed

by a large and interested audience. New members and also visitors from other clubs are always very welcome. The meetings are now held on the first and third Monday of each month at 8 p.m. The society also has for hire tape and slides and details can be obtained from I. A. G. Smith (Vice-Chairman), 51 Eastbourne Road, Brighton BN2 4DL. Phone: Brighton 62407.

RESULTS of the annual show of the **East London Aquarists and Pondkeepers Association** held last October were as follows: Club Furnished Aquaria: 1, E.L.A.P.A. Mini Furnished Aquaria: 1, P. Harris; 2, K. Wrightson; 3, D. Flack; 4, L. Baker. Aquatic Rooted Plants: 1, K. Wrightson; 2, K. Priest; 3 and 4, P. Harris. Aquatic Cuttings and Floating Plants: 1, S. Hedges; 2, J. Boss; 3, M. Pearson; 4, T. Waller. Barbs: 1 and 4, P. Harris; 2, J. Boss; 3, J. Boss. Characins: 1, P. Harris; 2 and 3, J. Boss; 4, K. Priest. Cichlids: 1, P. Phed; 2, M. Pearson; 3, T. Waller; 4, D. Byfield. Dwarf Cichlids: 1, P. Harris. Labyrinth: 1 and 2, K. Wrightson; 3, P. Roche. Egg Laying Tooth Carps: 1, P. Harris; 2, J. Boss; 3, F. Vicker; 4, D. Chesswright. Fighters: 1, F. Vicker. A.O.S. Egglayers: 1 and 2, K. Wrightson; 3, D. Byfield; 4, M. Pearson. Danios, Rasboras and Minnows: 1 and 2, M. Pearson; 3, K. Wrightson; 4, C. Ball. Livebearers A.O.S.: 1 and 3, D. Chesswright; 2, K. Wrightson; 4, F. Vicker. Swordtails: 1, D. Edwards; 2, K. Wrightson; 3, B. Reeve. Barbs: 1, K. Wrightson; 2, M. Pearson; 3, J. Boss; 4, D. Byfield. Characins Hyp. Hem. Nann.: 1, F. Vicker; 2, K. Priest; 3, P. Harris; 4, T. Boss. Pres. Dwarf Cichlids: 1, K. Wrightson; 2, P. Harris. Pres. Platys: 1, R. Davies; 2, K. Wrightson.

THERE was a good attendance of seventy-eight members and friends for the **Stroud and District A.S.** February meeting, to hear Pt. Lt. Bob Eccles, a pilot in the Red Arrows display team, who brought along three films and also gave a talk on the history of the Red Arrows. This was enjoyed by everyone present and can be recommended to any other society or club. There is no charge. After the films Pt. Lt. Eccles was kept very busy answering questions especially from the younger members.

THE lecturer at the February monthly meeting of the **Accrington and District A.S.** was Mr. Foote, who was a member. He gave a tape recorded lecture on coldwater fish from spawning to rearing and showing.

There was also a small table show and exhibits were sorted out into two classes. The results being as follows: Juniper Class: 1, N. Holden (Best in Show); 2, S. Carter; 3, D. Hargreaves. Pairs Class: 1, N. Holden; 2, S. Carter.

Meetings of the Society are held on the second Wednesday in each month at The Great Eastern Hotel, Arnold Street, Accrington.

A **SLIDE** tape lecture on Killifish was the main item at the **Bournemouth A.S.** February meeting. The lecture from the British Killifish Association was very informative, and showed many slides of the large number of different kinds of colours and variations of this beautiful species. After the lecture a B.K.A. member answered questions from those present. Show table results: O.B. Egglayers: 1, Mr.

Chatfield; 2, M. C. Gibbs; 3, Mr. Bebb. Swordtails: 1, Mr. Bebb; 2, Mr. Chatfield; 3, Mr. Walters.

The society will be holding the Annual Open Show on the 9th May, at the Kinson Community Centre. Show secretary, Mr. J. V. Jeffery, 30 Brasenay Avenue, Southbourne, Bournemouth BH9 4JT.

OFFICIALS elected at the annual general meeting of the **Irish Tropical Fish Society** held in January, were as follows: President, Prof. J. N. R. Grainger, B.A., M.Sc., Ph.D.; vice-presidents, H. Wright and J. Tyrrell; chairman, Mrs. Ann Keenan; secretary, N. T. Bannister, 3 Maryfield Crescent, Artane, Dublin 5; treasurer, S. Mooney; committee, J. Dunne and J. Russell.

THERE were few changes of officials at the annual general meeting of the **Midland Tropical Aquarists** and the committee is: E. Cobill (re-elected chairman); Mrs. P. Billingham (re-elected treasurer); M. Harvey (re-elected secretary); K. Tomlinson, show secretary; K. Brown, librarian. Committee: C. Nightingale, vice-chairman; J. Darby; M. Eli; D. Clarke. Plaques for winners of 1974 end of year show were presented by the chairman and trophies for winners of 1975 end of year show were also presented by the chairman ably assisted by the newest member Dr. D. Foed. Mr. R. Trippas has resigned from his position as president and also from the society.

The club night is the second Wednesday in the month at 8 p.m. at the Junior School, Mallard Close, Acoccks Green, Birmingham, and details can be obtained from M. J. Harvey, Secretary, 19 Woodthorpe Road, Kings Heath, Birmingham. Phone 021-444 1229.

OFFICIALS for the forthcoming year of the **Coventry Pool and Aquarium Society** are as follows: President, B. Bromfield; vice-presidents, Mr. and Mrs. R. Fox and W. T. Oliver; chairman, D. Hancock; secretary, R. Cleaver, 59 Kensington Road, Radford, Coventry, Tel: 23979; newsletter editor, S. and Linda Woodbridge; show secretary, T. Himm; 79 Edward Road, Coventry; treasurer, C. Hinde; vice-chairman, B. Hirst; minutes secretary, A. Simmons; librarian, K. Foster; social secretary, R. Jones; advertising secretary, Jill Simmons; committee members, M. Fletcher and Pam Hinde.

The meetings are held on the second Tuesday of every month at the new venue which is The Heath Hotel, Foleshill Road, Coventry, commencing 7.45 p.m., and visitors are always welcome.

THE new list of officers for **Sheaf Valley A.S.**, Sheffield, is as follows: Chairman, F. Toyne; vice-chairman, D. Laycock; secretary, Mrs. C. V. Toyne, 10 Barber Crescent, Sheffield 10; treasurer, H. Darley; show secretary, C. Binley, 115 Lord Row, Hyde Park Flats, Sheffield; committee members, Mrs. P. M. Laycock, B. Moore, M. Povey. Meetings are held at the Ball Inn, Crookes, Sheffield on Friday nights and anyone interested would be very welcome.

OFFICERS elected at the annual general meeting of the **Petersfield and District A.S.** were as follows: Chairman, L. Yates; secretary, W. F. J. Crockford, 29 Durdorf Road, Petersfield, Hants.; treasurer, W. Upton; show secretary, G. Barkham; committee members, G. Stacey, J. Warner, A. Perry, Mrs. J. Upton, Mrs. C. Edwards.

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A HIGHLY entertaining and interesting talk was given by M. Strange of the **Basingstoke A.S.** at the February meeting of the **Gloucester A.S.** on his own experiences and methods of keeping fish and his attempts to get them up to show standard.

The monthly table show was very well supported with a total of eighteen livebearers on show. The table show was won once again by F. Timmins.

CHANGES in officers of the **Walsend A.S.** are as follows:—Chairman: J. Patterson; Vice-Chairman: H. Kelly; Secretary: A. M. Younger, 32 Aldwych Drive, North Shields, Tyne & Wear NE29 8SZ; Librarian: M. Eggo; Treasurer: A. Maitthous.

OFFICERS for the **North Wilts A.S.** this year are as follows: Chairman: I. D. Mcginley; Vice-Chairman: N. Taylor; Treasurer: Mrs. M. Mcginley; Secretary: A. R. Daniels, 63 St Andrews Close, Wroughton, Wilts SN4 9DN.

MEMBERS of the committee of the **East London A. & P.A.** are as follows: President: P. S. Campkin; Vice-Presidents: P. Arnold, J. Brydon, A. Field, P. Peto, R. A. Taylor; Chairman: K. Wrighton; Vice-Chairman: K. Priest; General Secretary: Mrs. P. Harris; Treasurer: A. Harris; Show Secretary: J. London; Show Organiser: L. Baker; Librarian: C. Sweeting; Social Secretary: J. Boss; Programme Secretary: D. Flack; Press Secretary: W. Carter; Editor: T. Waller; Equipment Officer: W. Argent; F.B.A.S. Delegate: J. Boss; Lay Committee members: K. Palmer, C. Ball.

A VARIETY of fluorescent tubes was used by Mr. S. Lloyd to illuminate his talk on "Lighting" at the February meeting of the **Bristol A.S.** The variation in colour of the same fish under differing lights made the choice between truth and novelty a difficult one. A fish auction completed the meeting.

DETAILS of benching for the **Sheffield & District A.S. Open Show** to be held on the 11th April are 12 to 2 p.m. The society holds fortnightly meetings at The Mail Coach Inn, West Street, Sheffield 1. Visitors and new members most welcome. Hon. Sec. Mrs. J. Sanderson, 12 Greystones Rise, Ecclelland, Sheffield 11 7JP.

EARLY in February **Cardiff A.S.** entertained **Port Talbot A.S.** in the first round of the C.N.A.A./F.B.A.S. inter-club K.O. Trophy. While the judging was taking place, a very enjoyable quiz which was chaired by Mr. J. Edwards took place. Port Talbot winning by 41 pts. to 37. Cardiff, however, won the inter-club by 29 pts. to 13. The results were as follows:—Egglayers: 1, P. Harding (C); 2, J. Egan (PT); 3 and 6, M. Guy (C); 4, C. Robert (PT); 5, B. Batten (C). Livebearers: 1 and 3, M. Guy (C); 2, B. Batten (C); 4, T. Edwards (PT); 5, J. Egan (PT); 6, P. Harding (C).

Due to economic reasons the Cardiff A.S. have changed their meeting place and date of meetings to the first Thursday of every month at The Oddfellows Club, Newport Road, Cardiff. Anybody interested will be made more than welcome where slide shows, lectures, quizzes etc. take place. For further details phone Cardiff 45007.

MEMBERS of the **Taunton & District A.S.** met at The Railway Club, Taunton to hear a talk by Mr. Doubleday of Torquay on native

marine life. The members found the talk both interesting and stimulating.

The club also held a table show. There were six classes but very few entrants. The results were:—Danios: Mrs. Vellacott 1, 2, 3 and 4; Rasboras: Mr. Earnshaw 1, 2, 3 and 4. Labrets one entry only: Mrs. Vellacott. Furnished Aquaria competition: 1, Mr. Floorwood; 2, Mr. Bray; 3, Mr. Pallant.

FOLLOWING the success of last year's open show the **Catfish Association of Great Britain** will be having another display of unusual catfish at this year's open show on 16th April. The theme for this year's exhibition will be some of the larger members of the South American catfishes. The exhibition will be open from 12 o'clock and all visitors will be welcome to come along.

At a recent meeting members participated in a quiz organised by D. Lambourne of River-side and D. Allison of Hendon. It was a very interesting and entertaining evening as members watched 150 colour slides and answered over one hundred questions. Details of membership and meetings can be obtained from the Secretary A. Haley, 255 Lewisham Way, S.E.4. Telephone 01-692 8296.

AT the **Fancy Guppy Association North West Lancs-Manchester** section February meeting Dr. David M. Ford of Aquarian Foods delighted members with many slides of colourful fish, both tropical and marine. The raw materials, plant and equipment used in the preparation of a correct diet for all the fish interested members who appreciated the study and hard work involved in supplying these fish foods. A table show was also held. Meetings are held on third Sunday in the month and further details can be obtained from Mrs. Joan Eise, Secretary, 3 The Dell, Fulwood, Preston PR2 3FX. Tel: 718866.

COMMITTEE changes for the **Barrow & District Aquarium Society** are:—President: K. Ralph; Vice-President: A. Parkin; Secretary: W. Fittes, 2 Salthouse Road, Barrow-in-Furness, Cumbria; Treasurer: Mrs. K. Parkin; Shopkeeper: Mrs. J. Fittes; Librarian: R. Dickinson; Show Secretary: C. Burns; Deputy Show Secretary: R. Brennan; Committee members: Senior, M. Ross; Junior, B. Dickinson.

IN the monthly report of the **Mid-Sussex A.S.** Mr. D. Stone (Newsletter Editor), once again appealed for articles for the club magazine. He also announced that he is going to produce a membership list and would be grateful if members could inform him as to the type of fish they keep. This is to enable other members who keep the same fish to talk over problems. The lecture was given by C. West, on Showing Fish. D. Soper judged the table show and awarded the following:—Male Guppies: 1, P. Berry; Female Guppies: 1 and 2, E. and T. Tester; 3, P. Berry. Guppies (pairs): 1 and 2, P. Berry. Results from 1975—Exhibitor of the Year:—1, A. Holmes; 2, D. Soper; 3, E. & T. Tester. Notice of the Year:—B. Burtles. Further details from the Secretary, B. Slade, "Sandown," Bolney Road, Anstey. Phone: H. Heath 53747.

MEMBERS of the **Hounslow and District A.S.** recently spent an enjoyable and instructive evening listening to a talk given by fellow member T. Bollinbrook. The subject was East African mouth brooding cichlids of Lake Malawi. These particular species were talked about, and a description of the aquarium requirements and feeding habits for each species was given by Mr. Bollinbrook. He also pointed out the need for clean conditions and large aquaria for the fishes' well-being although these fish are not very demanding but are aggressive and territorial in their habits.

Some very good pictures of the fish in all their colours were shown on the screen, and underwater scenes of their natural habitat in Lake Malawi. The chairman Mr. S. Nofham thanked Mr. Bollinbrook for a very pleasant evening.

An auction of fish and plants was held and also a raffle. The table show for the evening

was Corydoras and Brochis and other varieties. Visitors are always welcome at the meetings held at St. Stephens Church Hall, Whilton Road, Hounslow on alternate Wednesdays at 8 p.m. All enquiries to the Secretary, H. Parrish, 18 The Barons, Twickenham. Tel. 01-892 5091.

THE date of the **Cymru National Aquarist Association's** third Welsh National Open Show and Exhibition is the 28th August, the venue being the Capital's foremost hall "Sophia Gardens," Cardiff, and the aim of the association is to present to the hobbyist an exhibition comparable in quality to the "National" in London and Manchester.

The show is open to the general public from 10.00 a.m. to 7.00 p.m. on Saturday, 28th August. Applications for trade stands are invited and these should be erected from Friday, 27th August, afternoon onwards. Almost unlimited floor space available. Electricity points available and the charge per stand is £5 trade. Free to non-profit organisation. Show schedules available later.

The Cardiff and district area of South Wales contains a population of approximately 2,000,000 with the hobby locally enjoying extensive expansion through the organisation of C.N.A.A. A greater following than ever before is being experienced and it is the sincere view of the committee that not only will there be a great interest in the show, but trade stands will be an economic proposition. To enable detailed planning in the hall, applications stating area and services required should be received by late May, together with any other queries.

THE **Rhondda A.S.** met in February to compete in the first round of the C.N.A.A. Interclub competition with Blaenau Gwent A.S. It was unfortunate that Rhondda's opponents failed to arrive, as obviously keen competition was expected.

Present at the meeting was J. Edwards, secretary of the C.N.A.A., and R. Batten, chairman of Cardiff A.S. Despite the setback of there being no opponents the fish were benched, and very ably judged by Messrs. C. Harding and P. Jordan, Class A, F.B.A.S./C.N.A.A. Placings: Egglayers: 1, M. Williams; 2, G. Legge; 3, A. and M. Smith; 4, M. Parsons. Livebearers: 1, B. Ashcroft; 2, 3, 4, A. and M. Smith. Cats: 1, B. Ashcroft; 2, G. Legge; 3, T. Click; 4, M. Parsons.

ON the 6th April the **Northampton and District A.S.** meeting will be given over to "Aspects of Goldwater Fishkeeping," by J. R. Amos, and the 20th April meeting subject will be on "Prepared Foods and Feeding." The secretary is Mrs. S. Taylor, 25 Ranley Crescent, New Dutton, Northampton NN5 6PU.

ON the 26th April the **Lincoln and District A.S.** is holding a Being and Buy sale at the Liberal Club, St. Swinens Square, Lincoln. 15 per cent to the Society.

THE table show held in February by **Llantwit Major A.S.** proved a great success with ninety fish being benched. Results: Class M; 1 and 2, H. Chick; 3, L. Lynch; 4, J. P. Edwards. Class T: 1, M. C. Guthrie; 2, G. Lewis; 3, G. Best; 4, T. Seymour. Egglayers: 1, A. Ibbertson; 2, M. C. Guthrie; 3, R. Hughes; 4, G. Best. Livebearers: 1, M. C. Guthrie; 2, G. Best; 3, A. Ibbertson; 4, C. Bamsley.

While the judging was in progress members were entertained with an F.B.A.S. tape/slide lecture by C. A. T. Brown which proved to be extremely interesting. The standard of tape and slides are to be recommended to any society who may require an interesting evening.

FEBRUARY proved to be a busy month for **Port Talbot and District A.S.** In addition to their two fortnightly meetings, the club also travelled to Cardiff for the first round of the C.N.A.A. K.O. trophy, only to be soundly beaten by 29 pts-13 pts. The month was rounded off with a very successful dinner/dance held at Porthcawl, at which nearly 140 members and friends were present.

Results of the Cardiff A.S. v. Port Talbot A.S. first round, C.N.A.A. trophy: Egglayers:

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1, Mrs. C. Harding (Cardiff); 2, J. Egan (Port Talbot); 3, M. Guy (Cardiff); 4, Miss C. Rupert (Port Talbot). Livebearers: 1 and 3, M. Guy (Cardiff); 2, B. Batten (Cardiff); 4, T. Edwards (Port Talbot). K.O. Egg-layers: 1, C. Morrison (Port Talbot); 2, Miss C. Rupert (Port Talbot); 3, P. Jones (Cardiff); 4, B. Batten (Cardiff). K.O. Livebearers: 1, T. Edwards (Port Talbot); 2 and 3, R. Perkins (Port Talbot); 4, C. Morrison (Port Talbot).

THE S.E. Area Cichlid Group of the British Cichlid Association held their second meeting in February. An interesting talk on Cichlids (with slides) was given by Ian Sellick, B.Sc., showing some of the fish that aquarists may not be lucky enough to see on general sale. Mervin Strange of Basingstoke A.S. mentioned the proposed Basingstoke (Cichlid) Open Show, and asked for any ideas to be incorporated into the show, and also for persons willing to participate.

FOR the Portsmouth A.S. Inter-Club Show at the Portsmouth Community Centre, Malins Road, Portsmouth on the 30th May, there will be films for those who do not wish to spend a few hours on Southsea beach or looking around Portsmouth, and the films are: Goffey's Progress, Among the Rushes, Stories from the Sea, and The River Must Live, and of course, there will be refreshments. Last year the Shield was won by Gosport A.S. The other clubs taking part were: Southampton, Havant, Beachell, Newbury, Basingstoke, Kingston, Southampton, Petersfield, Haslemere, Littlehampton and Bognor, Fines and of course Portsmouth A.S. Reigate and Redhill A.S. and Salisbury A.S. had decided to take part, but at the last minute found they were unable to, as were South Park A.S.S., Hounslow, Riverside, Brighton and Southern, New Forest, and Isle of Wight.

A VERY successful meeting at the new venue was enjoyed by the Cheltenham Tropical Fish Club in February. The chairman, Mr. Bishop, welcomed new members, who enjoyed a slide show of different fishes and plants. Anyone is welcome to the meetings in the L. room, St. Marks Community Centre, Cheltenham, on the second Friday of the month at 8 p.m.

THERE were 107 entries for the first table show this year of the Dunlop Aquarium Keepers Society. The winners were: Best in Show: Master I. Hopkins. Best Junior (Livebearer): Master D. Edwards. Best Junior (Egg-layers): Master I. Hopkins. Best Pair: Master I. Hopkins. The retiring secretary, Mr. K. A. Sey, was thanked for his services and presented with a tankard.

THE Witney and District A.S. held their first two meetings at the new venue of "The Eagle Vaults," Witney. The programme for the meetings consisted of a slide show entitled "Rift Valley Cichlids," and "A Fist Full of Show Tanks."

Meetings are held at 8 p.m. every second and fourth Friday of each month. New members are very welcome, juniors also.

A HIGHEST ever attendance was recorded at the annual general meeting of the Huddersfield T.F.S. and the officers elected to serve on the committee are as follows: chairman, J. Duckett; secretary, D. Brook, 9 Bankfield Park Avenue, Taylor Hill, Huddersfield; treasurer, D. L. Harrop; P.R.O./magazine editor, I. J. Bingham; show secretary, M. Wood, 17 Tenors Grove, Beackonhill, Huddersfield; catering officers, Mrs. T. C. Bingham and Mrs. S. Huntington; librarian, F. Huntington; vice-chairman, G. Smallwood; assistant show secretary, Mrs. C. Wood; junior member, Master C. Harrop.

The first three meetings of this year have all been attended by well over fifty members and guests, and these were, respectively: The Junior evening organised by Masters D. Brook, C. Harrop and H. Brook. A series of talks on live foods and their cultures, given by I. J. Bingham, D. Brook and D. L. Harrop, and lastly a slide show and talk given by Mr. Jerry Harper of York entitled Amazon Adventure.

All three events were very well received, the last one being a standing room only evening.

Around 150 people attended the first auction of the year, held in February, where almost £200 worth of goods were sold.

This year for the first time a photographic competition is being held and anyone wishing to come along will be made very welcome at The Invalid Car Club, Mill Street, Crossland Moor, Huddersfield, where all prospective members are well received every other Tuesday at 8.00 p.m. Next meeting 4th May.

AN interesting talk on Fish Housing was given at the first February meeting of the Hastings and St. Leonards A.S. by one of the members, G. Pryke, who stressed the importance of good insulation. It was a really helpful and amusing talk. The table show result was as follows: Classes T and AG: 1, 2 and 3, Mrs. A. Adams. Classes H and M: 1 and 2, C. Pannell; 3, Mrs. A. Adams. The second monthly meeting was given over to an F.B.A.S. slide/tape show, "The verdict is yours," by C. Brown, and gave an insight to what judges do and do not like to see on the show bench.

SECRETARY CHANGES

Coventry Pool & A.S.: R. Cleaver, 59 Kensington Road, Barlston, Coventry. Tel: 23979.

Wallend A.S.: A. M. Younger, 32 Aldwych Drive, North Shields, Tyne of Wear NE29 8SZ.

Newbury & District A.S.: R. Townsend, 18 Barfield Road, Thatcham.

Thorne A.S.: W. O. Hunt, 20 Orchard Lane, Moorends, Doncaster, S. Yorks DN8 4PX.

Association of Goldfish Breeders: L. F. Clemens, 33 Leigh Avenue, Redbridge, Ilford Essex IG4 5PH. Tel: 01-550 5526. Meetings are held at the above address at 8 p.m. on the third Monday in each month.

SHOW SECRETARY CHANGE

Blackburn Aquarist Waterlife Society: D. Wolstenholme, 39 George St., Great Harwood, nr. Blackburn, Lancs BB6 7JF.

CHANGE OF NAME

The South East London A.S. formerly Lewisham A.S. now meets at Community Centre, 141 West Greenwich House, Chairman: J. Walker; Secretary: A. Higgins, 01-857 0430. Fortnightly Friday 7.30 p.m.-10.00 p.m.

NEW SOCIETY

THE Ichiban Rancho Society has been formed and would like prospective members to contact the secretary: Mrs E. Davidson, 14 Garnetts, Takeley, Nr. Bishops Cleeve, Herts CM22 6RJ. Telephone: Bishops Stortford 870395.

VENUE CHANGE

The Hemel Hempstead A.S. have changed their hall, and meetings are now held at the Rose & Crown Hall, High Street, Hemel Hempstead, Herts., every other Thursday at 7.45 p.m.

RETURN OF TROPHIES

The Stroud & District A.S. would like to know if any society has received cups that do not belong to them as two have gone astray. Details please to Mrs. D. Cole, Secretary, Avignon, The Hill, Randwick, Stroud, Glos. Tel: Stroud 4504.

Would Mr. T. Cripps late of 38 Waterlidge, East Oakley, Basingstoke please contact Mr. F. S. Denning, Acting Hon. Sec. Torbay A.S., 297 Teignmouth Road, St. Marychurch, Torquay, Devon TQ 14 RT, regarding a trophy won by him in September, 1974, and which appears to have gone astray.

AQUARIST CALENDAR

3rd April: Corringham and District A.S. Open Show to be held at The Red Cross Hall, Corringham Road, Stanfeld-Le-Hope, Essex. Further details from, D. C. North, 198 Southend Road, Stanford-Le-Hope, 77311, and B. Smith, 240 Abbots Drive, Stanford-Le-Hope. 3768. (Schedules ready March).

3rd April: Bath A.S. Annual Open Show.

4th April: Nelson A.S. annual show, Civic

Centre, Stanley St., Nelson. Details from I. J. Stokes, 3, Beckenham Court, Burnley, Lancs.

10th April: Catfish Association of G.B., Annual Open Show at St. Saviour's Church Hall, Cobbold Road, London, W.12. Schedules and further details from Show Secretary, D. Lambourne, 7 Wheeler Court, Plough Road, London, S.W.11, Tel: 01-223 2630.

11th April: Coventry Pool and Aquarium Society Open Show, Templars Junior School, The Hill Lane, Coventry. Large S.A.B. for schedule and entry form to Mr. T. Emma, 79 Edward Road, Coventry CV6 2QS.

11th April: Taunton A.S. annual open show.

11th April: Stanley and Consett A.S. Annual Show at the Morrison Busy Sports Club, Anfield Plain, Stanley, Co. Durham. Schedules available later.

11th April: Sheffield and District A.S. Open Show, Granville College, Sheffield. Enquiries to: Mr. E. Stanton, 97 Medlock Crescent, Hanworth, Sheffield 13.

18th April: Easter Sunday Hyde A.S. Annual Open Show will be held at Hattersley Community Centre, Hattersley Rd., East, Hattersley, Hyde, Cheshire. All aquarists are invited to enter their exhibits in the competitive sections: 8 F.N.A.S. Judges. Fees the same—Prizes up. Show schedules and further details from the Secretary, G. L. Danby, 1 Deniston Road, Heaton Moor, Stockport, Cheshire. 061-432 8817.

18th April: Rotherham & District A.S. Annual Open Show, Benching 12-2 p.m. Assembly Rooms, Civic Buildings, Frederick Street, Rotherham. Details and schedules from: Mrs. J. Hagleton, 218 Hague Avenue, Rawmarsh, Rotherham S62 7PR.

24th April: Chingford and District A.S. Open Show to commemorate 25th anniversary at St. Edmund's Church Hall, Chingford Mount Road, London, E4. Schedules from Mrs. S. Harvey, 54 Kenilworth Avenue, Walthamstow, London, E.17. Available end of February.

24th April: Rhondda A.S. Open Show to be held at the Y.M.C.A., Porth, under F.B.A.S./C.N.A.A. rules. Postal entries 5p per entry. On day of show 10p. For further information please contact: Show secretary, A. Smith, 12, Glanant Street, Penygrig, Rhondda.

24th April: Bristol Tropical Fish Club Open Show at the Congregational Church Hall, Newton Street, Stapleton Road, Bristol. Tropical and Coldwater classes. Schedules and further details from show secretary, Mrs. M. C. Graham, 24, Romney Avenue, Lockleaze, Bristol BS7 9TW. Phone Bristol 695898.

25th April: Reigate and Redhill A.S. Open Show at the Village Hall, Betchingley, Surrey. Details from M. Sandford, 5 Victoria Road, Earlswood, Redhill, Surrey. Tel. Redhill 69339.

25th April: Yeovil and District A.S. Open Show at the School Hall, Marstock, near Yeovil, Somerset.

25th April: Stockton-on-Tees A.S. are staging their eleventh Annual Open Show at Kia Ora Hall, Community Centre, Stockton-on-Tees. Details obtainable from Mr. R. Wood, 67 Victor Way, Thornaby-on-Tees, Cleveland.

25th April: Warrington A.S. Eighth Open Show at the Parr Hall, Palmira Square, Warrington. F.N.A.S. rules. Schedules, J. Higham, 42, Hood Lane, Sankey, Warrington, WA5 1JJ.

25th April: York & District A.S. Open Show, Melbourne Youth Club, Fishergate, York. Schedules and further details from show Secretary, A. Sykes, 59, London St., Pocklington, York YO4 2JW.

25th April: East Kilbride Aquarium Club. Fifth Open Show in East Kilbride Civic Centre.

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Details from W. Bell 65 Ballochmyle, Calderwood, East Kilbride, Scotland.

25th April: British Cichlid Association, S.E. Area Group. Next meeting at 15.00 hours, Arundel Cricket Club (on A27). Non-members welcome.

25th April: Sunday—Midlands Aquarist League. Six class open show Bulkington Parish Hall, Bulkington, Nr. Nuneaton. Details C. Chamberlain, 2 Stanley Court, Sydenham Drive, Leamington Spa. Tel: 26957.

2nd May: Medway A.S. Open Show at Medway and Maidstone College of Technology, Oakwood Park, Tunbridge Road, Maidstone, Kent. Schedules and details from Mr. C. A. Elliott, Beechwood, 72, Dargate Road, Walderslade, Chatham, Kent ME5 1BL.

2nd May: Ocran A.S. Open Show at Recreation Hall, Refuge Street, Shaw, Oldham.

2nd May: Hull A.S. Open Show will be held at The Blind Institute, Beverley Road, Hull. Schedules from show secretary, G. Andrews, 4 Church Mount, Speesley, Nr. Hull, North Humberside, tel: 0482 811334.

2nd May: Bristol A.S. Tropical Open Show. Bishopston Parish Hall.

2nd May: Biskeborough A.S. are holding their annual Open Show at the Canteen of Blakeborough & Sons Ltd., River Street, off Birds Royd Lane, Brighouse, W. Yorks. Bunching is from 12.00 to 2 p.m. Information from M. E. Garvey, 37 James Street, Brighouse, W. Yorks.

8th May: Southend-Leigh and District A.S. Open Show, St. Clement's Hall, Leigh-on-Sea, Essex. Club and individual furnished aquaria, aquascapes, marines, tropical, coldwater and junior classes included. Details from Show Secretary, D. C. M. Durrant, 172 Trinity Road, Southend-on-Sea, Essex. Tel: 0702 610576.

8th May: Port Talbot A.S. Open Show at the Talbach County Youth Centre, Margam Road, Port Talbot. (This is a change of venue from previous years). Ample parking space is available. Schedules are already available from the Show Secretary B. Foucaire, 3, Cross St., Velindre, Port Talbot, West Glam.

8th May: Bournemouth Annual Open Show to be held on Sunday at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show secretary, J. V. Jeffery, 30, Braemar Avenue, Southbourne, Bournemouth BH16 1JF.

9th May: Thorne A.S. Annual Show at Grammar School, St. Nicholas Road, Thorne. All details from E. Breakwell, 12 Churchill Avenue, Hatfield, Doncaster, S. Yorks.

15th May: Trowbridge & District A. & P.S. Open Show at the Bradford-on-Avon Rowing Club. Schedules from April onwards from Show Secretary 190 Frome Road, Trowbridge. Tel: 5012.

15th-22nd May: Bishop Auckland A.S. Proposed Aquarium Exhibition at King James I, Community Centre, Bishop Auckland.

16th May: Gloucester A.S. Open Show. Stainless steel tankard, for 1st trophy for 2nd, and cash prizes for 1st in all classes. Schedules available in March from K. Taylor, 69 St. John's Avenue, Churchdown, Gloucester. S.A.E. please.

16th May: Goole and District A.S. Third Open Show at Goole High School. Show secretary, J. Scurl, 41 Carter Street, Goole, North Humberside.

16th May: Merseyside A.S. Annual Open Show will be held at the Rainhill Village Hall, Rainhill, Lancashire. Hon. Secretary, J. Bailey, 11, Auburn Road, Liverpool L13 8UJ.

16th May: Gosport & District A.S. Open Show at Crofton Community Centre, Stubbington, Hants. Schedules and details from Mrs. K. Clarke, 36, Cambridge Road, Lee-on-Solent, Hants.

22nd May: Merthyr A.S. First Open Show will be held at St. David's Hall, Church Street, Merthyr Tydfil, Glam., S. Wales. Plaques for all four places plus usual awards. Schedules available from show secretary, P. K. Stonehewer, 22 Vernon Close, Penyard, Merthyr Tydfil, Glam., S. Wales.

23rd May: Middleton and District A.S. Fifth Open Show to be held in the new Civic Hall, Middleton. Further details from Show Secretary, L. Dean, 24 Richmond Avenue, Chadderton, Oldham.

23rd May: Lincoln and District A.S. Annual Open Show will take place at the Drill Hall, Broadgate, Lincoln. Show secretary, D. Driver, 6 Hawthorn Chase, Bunkers Hill, Lincoln.

23rd May: Goodyears End A.S. Third Open Show at Newdigate School, Anderton Road, off Smorall Lane, Bedworth, Nr. Nuneaton. Schedules from G. Horton, 13, Raynor Crescent, Goodyears End Estate, Bedworth, Nr. Nuneaton, Warks. Phone Exhall 2193.

23rd May: Pancy Guppy Association, National Guppy Show at Birmingham. Further details shortly.

23rd May: Havant & District Open Show, The Merchant Hall, Harewood, Hants. Schedules: 11, Armitage, 74, Park House Farm Way, Leigh Park, Havant, Hants. Phone Havant 73192.

30th May: Corby and District A.S. Open Show. Sunday, at the Corby Civic Centre, F.B.A.S. rules. Details and schedules from the Show Secretary, C. McInnes, 18 Westminster Walk, Corby, Northants, Mid-March.

30th May: Bridlington and District A.S. Annual Open Show, will be held at Hilderthorpe Junior School, Shaftesbury Road, Bridlington. Schedules available in March. Secretary, P. Robson, 47 Matson Road, West Hill Estate, Bridlington, N. Humberside YO16 4SZ.

30th May: Cheltenham Tropical Fish Club (formerly Bishops Cleeve) Open Show at St. Marks Community Centre Brooklyn Rd. Cheltenham. Details from show secretary, Mrs J. Hawkins, 44 Burton Street, Cheltenham.

30th May: Portsmouth A.S. Intra-Club Show, Portsmouth Community Centre, Malins Road, Portsmouth.

5th June: Weston-Super-Mare Tropical Fish Club Open Show will be held at St. Johns House, Oxford Street, Weston-S-Mare. Schedules available from Show Secretary, Mrs. M. Tanner, 6 Byron Road, Locking, Weston-S-Mare.

6th June: Accrington and District A.S. Open Show, Antley Methodist Church Hall, Blackburn Road, Accrington. Details S. Walsh, 133 Lammack Rd., Blackburn, Lancs.

6th June: Loughborough & District A.S. Open Show at Boleigh Community College, Thoepe Hill, Loughborough. Schedules from I. S. Purdy, 10, Cleveland Road, Loughborough, Leics. (available later).

6th June: Sudbury A.S. Open Show at the new venue, Waups Rugby Club, Repton Ave., Sudbury. Schedules: L. J. Brazier, 66 Ormesby Way, Kenton Middx. 01-204 5374.

12th June: Llanrwst Major A.S. Annual Open Show to be held at The Town Hall, Llanrwst Major. Plaques awarded to first in every class, and medallions to all runners-up. Schedules available April onwards from J. J. Edwards, "Glanafon", Mall Park, Llanblethian, Cowbridge, South Glamorgan CF7 7BG.

12th June: Hinckley and District A.S. are holding their 5th Open Show at Westfield Community Centre, Rosemary Way (off Coventry Rd., A47) Hinckley. Bunching 11.30-2 p.m. Schedules will be available shortly from the secretary: E. Baxter, 29 Northfield Rd., Hinckley.

13th June: Salisbury & D.A.S. 12th Annual Open Show at the Acivity Centre, Wilton Road, Salisbury. The show will be run to F.B.A.S. rules. Schedules and further information from Secretary, R. P. Adams, 26 Empire Road, Salisbury, Wilts, SP2 9DP.

13 June: Northwich & District A.S. Eighth Open Show at the Hartford Secondary Boys School, Chester Road, Hartford, Northwich. Judging to F.N.A.S. standards. Details from Show Secretary N. R. Thompson, 54 Gramere Road, Frodsham via Warrington, Lancs. WA6 7LQ. Tel: Frodsham 32745.

14th June: Dunmow & District A.S. Open Show at the Foakes Memorial Hall, St. Dunmow. Schedules may be obtained from I. Farrow, 12 Castle Cross, Saffron Walden, Essex.

19th June: Whiteley and District F.S. Fourth Open Show at Whiteway Community Centre, Keston View, Whiteway, Bath. Schedules available from Show Secretary, Mrs. E. Daniels, 21 Harcombe Drive, Whiteway, Bath BA2 1PG, Avon.

20th June: First Redditch Open Aquatic Show organized by Delson A.S. At the Abbey Sports Stadium, Birmingham Road, Redditch, Worcs. Details: P. J. Binsley, 25 Plyford Close, Lodge Park, Redditch, Worcs. Phone Redditch 67342 (nights only).

20th June: Alfreton and District A.S. Annual Open Show at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, K. Dean, 22 Fletchers Row, Nottingham Road, Ripley, Derby DE5 3HA. Phone Ripley 3902.

20th June: North West Lancs., Section F.G.A. Annual Open Show at Preston. Details: Mr. D. Ormerod, 55, Barnes Ave., Rawtenstall, Rossendale, Lancs.

20th June: South Shields A.S. Annual Show will be held in the Bolingbroke Hall, Bolingbroke Street, South Shields. Schedules from B. H. Ribbidge, 13, Chesterton Road, Biddick Hall Estate, South Shields.

20th June: Swillington A.S. Open Show, John Smeaton School, Barwick Road (off York Road), Leeds 15. Beginning 12.30 to 2.15 p.m. Further details from Show Sec. T. Seaman, 24, Raincliffe Road, Leeds 9 LS9 9LE.

26th June: Malvern & District A.S. Third Open Show at Barnards Green Cricket Club, North-end Lane, Malvern. Schedules available later.

26th June: Nailsea & District A.S. Annual Open Show at Grove Sports Centre, Nailsea. Details and schedules may be obtained from D. Kenwood, Show Secretary, 90 Shade Road, Portishead, Bristol. Tel: Portishead 848947.

27th June: Dunlop Aquarium Keepers Society Open Show will be held at the Dunlop Factory, Speke, Liverpool. Schedules are available from show secretary, T. Hampton, 3 Madeline Street, Liverpool, 8, tel: 051-709 5509.

27th June: Boston A.S. Open Show. Particulars later.

3rd July: Cardiff A.S. Open Show, St. Margaret's Church Hall, Roath, Cardiff. Details from H. Gray, 3 Meadvale Road, Cardiff. Tel: 793749.

4th July: Lytham A.S. Annual Open Show, will be held at Lytham Baths, Disconson Terrace, Lytham, Lancashire. This is a larger new venue. Show Schedules from: Show Secretary, Mr. P. Ham, 1 Wyndene Grove, Freckleton, Preston, Lancs. Telephone Freckleton 633182.

4th July: Chard & District A.S. will be holding its Second Open Show at Furnham Scham School, Chard. Details from Mr. B. Riste, 126 Henson Park, Chard.

4th July: Grantham and District A.S. seventh annual open show.

4th July: South East London A.S. Open Show at the Community Centre, 141 West Greenwich

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House, London S.E. Details and entries—T. Asquith, 49 Central Avenue, Welling, Kent.

10th July: Basingstoke A.S. will stage an Open Show for Cichlids at the Carnival Hall, Basingstoke. Schedules from C. Wells, 271, Overdown Rd., Tilehurst, Reading or via: Tel.: Bas. 67039 (M. Strang).

18th July: Provisional date for Sandgrounders Annual Show at Meols Cop School, Meols Cop Road Southport. Further details when available from Hon. Show Secretary, G. A. Waterhouse, at 23 Moss Lane, Southport, Merseyside PR9 7QR, or phone Southport 24743, S. Hooton.

25th July: Brighton & Southern A.S. Open Show and Exhibition at St. Barnabas Hall, Sackville Road, Hove, Sussex. Show Secretary, R. Sayers, 11, Scaview Estate, Southwick BW4 4AS. Phone Brighton 593851.

25th July: South Humberside A.S. First Open Show, Memorial Hall, Cleethorpes. Schedules available from G. Wilson, 100 Guildford Street, Grimsby.

25th July: Aircborough & District A.S. Annual Open Show, at Menston Civic Centre, Main St. Menston Nr. Leeds, West Yorks. For further details contact Stuart Hall (Show Secretary) 34 Salisbury Street, Calderley, Pudsey. Phone: Pudsey 74609.

1st August: Tonbridge & District A.S. Fifth Open Show, Schedules from Secretary, J. Feast, 19 Eardley Road, Sevenoaks, Kent TN13 1XX.

7th August: Newport A.S. Open Show at St. John's Hall, Victoria Avenue, Maindee, Newport, Gwent. Details from Show Secretary J. Iliffe, 1 Hawarden Road, Newport, Gwent. Tel: 74506.

8th August: Grimsby & Cleethorpes A.S. are holding their Fifth Open Show at the Memorial Hall, Cleethorpes. Show schedules are available from the Show Secretary, Mrs. S. E. Walker, 51, Chesbire Walk, Willows East, Grimsby, South Humberside.

15th August: Oldham & District A.S. Annual Open Show, Werneth Park, Oldham. Schedules obtainable from A. Chadwick, 341, Broadway, Chadderton, Oldham. 061-652 0809.

15th August: Stroud A.S. Open Show at the Subscription Rooms, Stroud. Show Secretary, J. Cole, 13 The Hill, Randwick, Stroud, Gloucestershire. Tel.: Stroud 4504.

15th August: B.K.A. Severnside Killifish Show: incorporated in the Stroud Open Show and open to everyone at the Subscription Rooms, Stroud. Show schedules from the Show Secretary J. Cole, 13 The Hill, Randwick, Stroud, Gloucestershire. Tel: Stroud 4504.

21-22nd August: Yorkshire Aquarists Festival.

22nd August: Long Eaton A.S. First Open Show. Details to follow.

28th August: The third Welsh National open show to be held at the Sophia Gardens Pavilion, Cardiff. Further details available from: C. Turner, 146 Arran Street, Roath, Cardiff. Tel.: Cardiff 498952. M. Guthrie, 4 Nurston Close, Rhosce, Glamorgan. Tel.: Rhosce 710649.

29th-30th August: Gt. Yarmouth & District A.S. Tropical and Coldwater Fish "Exhibition 76" to be held at the Hopton Village Hall (on A12 between Gt. Yarmouth & Lowestoft).

5th September: Bethnal Green Aquatic Society Open Show, at the Bethnal Green Institute, 229, Bethnal Green Road, E.2. Schedules and further details available from the show secretary, R. Dale, 14, Rutland Road, Wanstead, London E11 2DY, tel: 01-989 9015.

5th September: The Killingworth Aquarist Association is to hold their second annual open show at Communicare, Killingworth. Schedules from W. Kidd, 75 Hartlands, Bedlington, Northumberland.

11th September: Kingston & District A.S. Open Show. Benching times will be arranged when F.B.A.S. Conference times are known.

12th September: Harlow A.S. open show.

12 September: Sunday—Midland Aquarist League, six class open show, Bulkington Parish Hall, Bulkington, Nr. Nuneaton. Details C. Chamberlain, 2 Stanley Court, Sydenham Drive, Leamington Spa. Tel: 28957.

18th September: Bristol A.S. Coldwater Open Show. Schedules from Show Secretary, E. N. Bowden, 12, Stoneleigh Walk, Bristol, 4. 775355. Postal entries close 31st August. Venue Bishopston Parish Hall.

19th September: Bassetlaw Fishkeepers A.S. First Open Show. Schedules from K. Clarke, 4, Big Lane, Clarbrough, Retford, Notts.

19th September: Priory A.S. Tyne-mouth Open-Show. Schedules later from W. J. Walton, 25, Rutherford St., High Howdon, Wallsend, Tyne & Wear NE28 0AW.

19th September: Wythenshawe and District A.S. Open Show at The Forum Hall, Civic Centre, Wythenshawe, Manchester. Tropical, Marine and Coldwater Sections. Show secretary, S. Barratt, 14 Piperhill Avenue, Northenden, Manchester M72 4DZ.

19th September: West Cumberland Aquarists' Club Open Show, The Civic Hall, Whitehaven, Cumbria.

26th September: Northampton & District A.S. Open Show. Further details to follow.

2nd October: East London Aquarists and Pondkeepers Association annual show breeders, to be held at Ripple Road School, Barking. Entry forms can be obtained from Mr. J. London, 41 Maybank Avenue, Hornchurch, Essex.

3rd October: Newbury & District A.S. Fourth Annual Open Show at the "Plaza," Market Place, Newbury. Schedules and full details from Mrs. S. Cunnings, Show Secretary, 6 South End, Thatcham. Tel: Thatcham 64254.

3rd October: Ealing & District A.S. Open Show. Details to follow.

3rd October: Eboracum Aquarists Open Show at Nointhorpe Grammar School, Scarcroft Road, York.

10th October: Hardlepool A.S. Open Show at Lonscar Hall, Seaton Carew. Hardlepool. Further details from Mrs. A. Lion, 1, Loyalty Court, Hardlepool, Cleveland.

17th October: Sunday—Midlands Aquarist League, six class open show, Bulkington Parish Hall, Bulkington, Nr. Nuneaton. Details C. Chamberlain, 2 Stanley Court, Sydenham Drive, Leamington Spa. Tel: 28957.

23-24th October: British Aquarists' Festival Silver Jubilee, Belle Vue, Manchester. Further details shortly.

7th November: Blackburn Aquarist Waterlife Society Open Show. Venue at a later date. Secretary Mrs. J. Wolstenholme, 39 George Street, Great Harwood, nr. Blackburn BB6 7JF.

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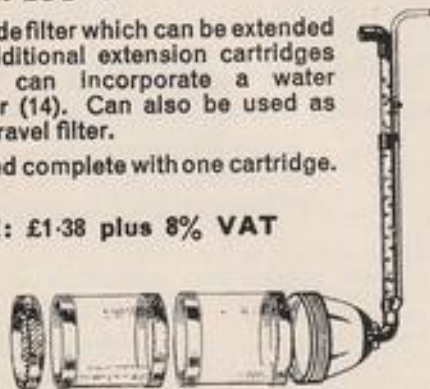
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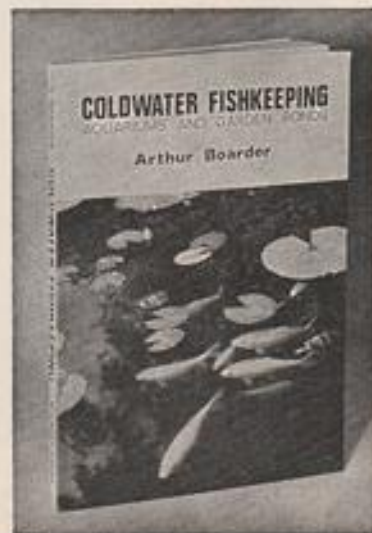
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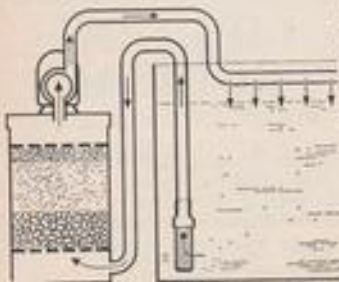


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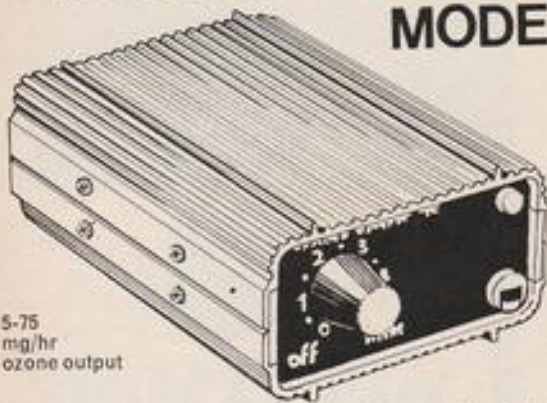
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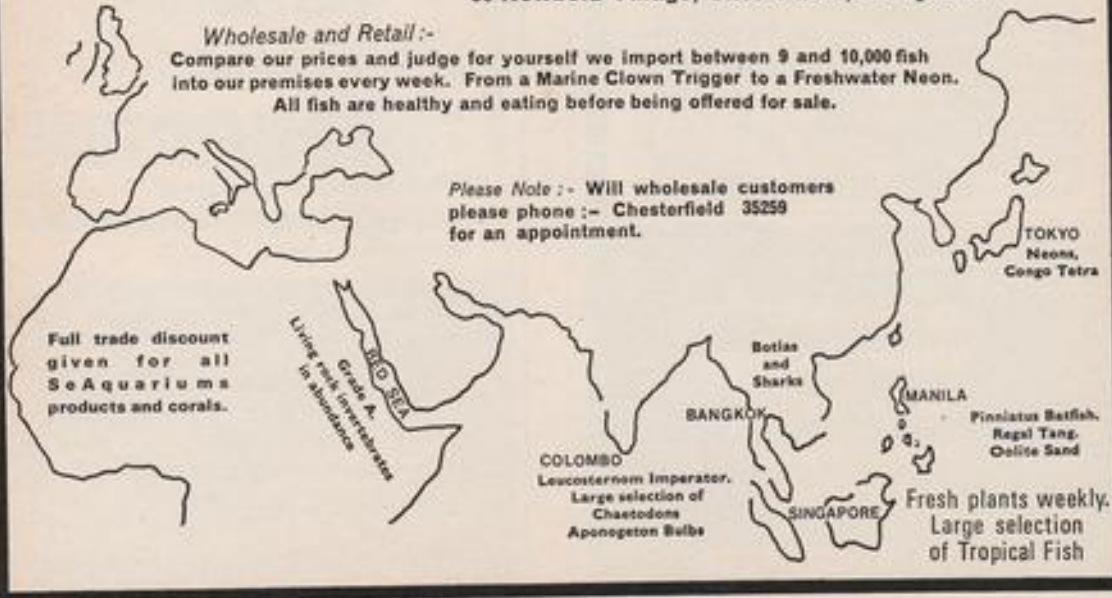
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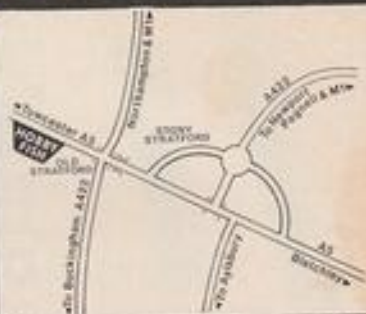
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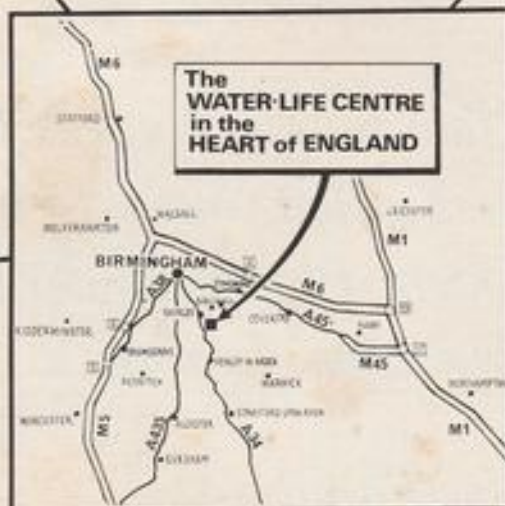
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TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Minimum order £20.00, insulated container and carriage £1.50 (Scotland £2.50). Plants by post (minimum order £2.50) please add 25p. post and packing on aquarium plants up to £3.00 and 50p. on orders over £3.00. Postage and packing on pond plants, £1.00.

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