

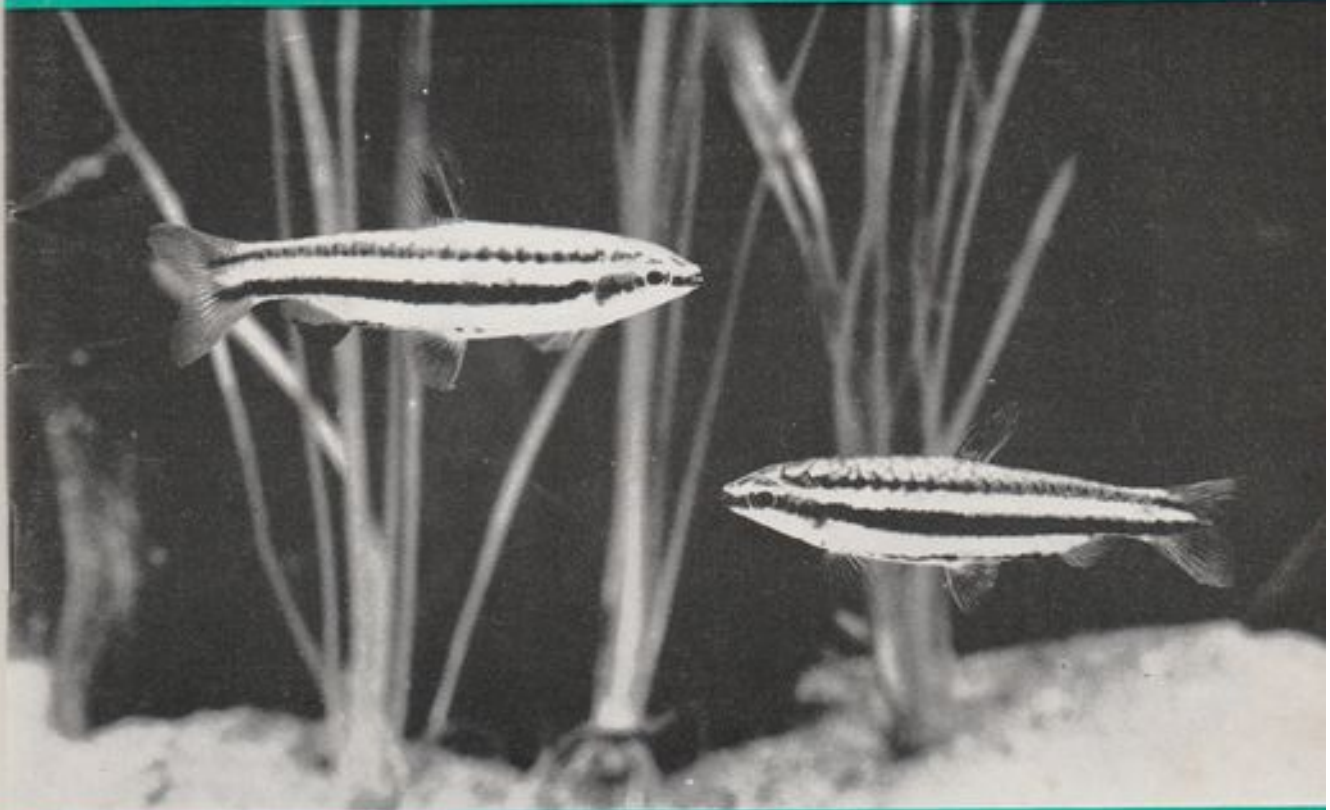
AUGUST 1971

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Pet Fish

monthly

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A Garden Fish House
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In This Issue

	Page
Comments and Quotes	153
Letters	154
Experiences in Keeping and Breeding Red Oscars	162
Small-Tank Fishes that are Ready Breeders	164
An Economical Garden Fish House	165
Most Popular Variety of all	169
Meetings and Changes of Officers	170
Personal Comment	171
Transatlantic Topics	172
Amusing Marine Tank Inmates	173
Guppy World	175
Breeding the Dwarf Pencil Fish	176
Variation in Guppies	180
In an Antique Setting	180
Club News	181
In Brief	184
Federation News	185
Dates for Your Diary	186

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Comments and Quotes

This Year's Aquarium Show

AUGUST is certainly not the month when aquarist society meetings are so well attended that future activity planning is a profitable occupation. Sunny beaches, woodland picnics or lazing in the garden are more likely to be occupying aquarists' thoughts. However, October will be here soon enough and the organisers of London's annual AQUARIUM SHOW are certainly already full of plans for this year's event taking place then. We know that many societies have long since started work on their tableau entry for the Show; others are still in the discussion phase. But we would particularly like to invite societies who have not before thought about entering a tableau at The AQUARIUM SHOW to consider 'having a go' this year.

We have never actually been given 'shortage of ideas' as a reason for not entering, but in case the only schemes that members in your society could come up with were too grand for your resources, demanding gold-plated tanks and shoals of discus, we would like to feed a thought or two for simple displays that, in our view, could easily be staged and with a lot of advantage. As well as its large attendance of aquarists The AQUARIUM SHOW has many visitors who come to be enlightened about our hobby, and numerous beginners eager for information. Displays that are informative and 'aquatically educational' are therefore likely to be extremely

popular, and any society who decided to stage a tableau to illustrate the elementary principles of aquarium filtration, for example, need have no fears that this would be without interest for the Show's visitors (or indeed for other societies).

It's worth thinking about—societies have the know-how in their ranks; with a little expertise applied to the presentation such a display could win the votes of other societies, too. When your society members next come together, why not suggest an entry? Procedure for entry is simple and rules are minimal. If your secretary has not received a Tableau Entry Form, one can be obtained from PFM's offices. All entering societies receive a cash grant towards expenses and cash prizes (first, £25, second, £15 and third, £10) as well as trophies are awarded according to the votes of the societies competing.

For this year's Show a new venture organised by the Federation of British Aquatic Societies that is creating a lot of additional interest is the 1971 Supreme Championship. On page 185 of this issue will be found a list showing the Championship Trophy winners to date and also the shows yet to be held at which further winners will become eligible for the Supreme Championship Trophy Competition at The AQUARIUM SHOW.

The AQUARIUM SHOW '71 is open Friday, 29th October to Sunday, 31st October and like the three previous annual Shows it is at the Royal Horticultural Society's Old Hall, Vincent Square, London, S.W.1.

At Last the Secret of it All

THE month before last we were saying in PFM how wonderful it would be if there were an absolutely infallible blue-print for successful fish keeping and fish breeding that could be trotted out for use by all and sundry. Since then we have found a document by a Japanese fishery scientist that gets the whole business of fishkeeping down to this simple theorem: 'Fish cultured in an aquarium must be kept well for a long time if the following relation holds in that aquarium—'

$$\sum_{i=1}^n \frac{10W_i}{0.70V_i + \frac{0.95 \times 10^3}{G_i D_i}} \geq \sum_{j=1}^n (B_j)^{0.334} \times 10^{-2} + 0.051F'$$

Any questions, class?



LETTERS

Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt Lane, London S.W.17

Reply to Critics

REFERRING to the letters (PFM, July) criticising my article 'About Showing', I should like to comment on some of the points raised.

First, Mr Greenhalf: I have never liked personalities being used in place of arguments, and were I to reply in kind saying that I had never heard of him I would merely be stating the obvious without furthering the discussion. Also, I feel that a résumé of one's personal achievements is equally out of place, so let's discard them shall we?

I am aware that size is only one-fifth of the points scheduled, but it is the interpretation that is in question, not the composition. I also agree that the scales on large fishes are more easily seen than on small ones, but judges are expected to be able to see small fishes adequately or they shouldn't be judging, should they? The class divisions Mr Greenhalf mentions are merely palliatives and not a cure. He makes remarks about the quality of most other paragraphs without making statements to be agreed or refuted. As Eric Morecombe says to Ernie Wise: "There's no answer to that!"

His tabulated list of Best in Show Awards is largely irrelevant—I never mentioned this in my article, and even if a small fish won this award, that would not debar large fish from receiving undue preference as best Characin, Cichlid, Anabantid, A.O.S. etc. at the same show, would it?

He mentions the Goldfish Society of Great Britain, to whom I intended no slight (I was writing

about tropicals), but I believe that in their Standards they say that size must not take precedence over quality, and I admire them for that.

Now, Mr Withers: on the question of size he is seeking to make a virtue out of ignorance and has fallen into the common error of supposing that only aquarist society members and judges know anything about fishes. This is not the case; biologists and geneticists know far more than they do, and have far more information. This information is available to people who take the trouble to acquire it. He also says, and I quote: "It is much more difficult to show large fishes successfully than small ones. They require large tanks and heavy feeding to keep in condition . . ."

I never mentioned this in my article but I knew this was the thought behind most people's minds when comparing large and small fishes, and this was the main reason for the article being written. It needed to be said. Now Mr Withers, an FBAS judge has said it too, and proved my point!

Mr Mathieson: it is the policy of Editors to table all points of view, which has been proved by the Editor printing your letter. In a discussion it is necessary to keep a cool head and an analytical mind to succeed, and being 'on the boil' merely indicates prejudice and intolerance. I never suggested that exhibits should all be shown in the same size containers—I said standard containers, which can be various sizes for various classes. As far as sweet jars being banned for 3½ years, I have sent the Editor a photograph of a recent show where they were much in evidence, and I know he saw plenty of them at a northern show which he visited.

Mr Mosley: I think I answered your point in the foregoing remarks. May I wish you and your progressive Keighley Club every success?

Bingley, Yorkshire

F. W. COLES

Don't Call it the 'Bristol'!

I HAVE been reading with interest the letters published under the heading 'Poor Relations Indeed,' and feel that I also should contribute my opinions to the high feelings that have run riot just of late. I direct my response to my very good friend and fellow committee member, Mr Eric Wilson, whose letter, printed in the May issue of

Continued on page 161



Part of Accrington A.S. Open Show of June this year—as at other shows confectionery jars are still widely used

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LETTERS

continued from page 154

PFM, motivated my pen to write strong and endurable facts in defence of the goldfish breeder in this area.

I must, first of all, point out that goldfish varieties bred in the Birmingham/Bristol area are reared to conform with Bristol Aquarists' Society Standards and that ruthless culling is necessary in order to maintain the very high standard required. It follows that there are very few fish available for distribution amongst beginners and, in my own opinion, those that do find their way to other fish houses are extremely reasonable in price.

Now what persuades a breeder to part with his fish? Certainly not monetary reward, for the care, attention, patience and hard work cannot have a price put on it and so we must assume that other reasons must prevail. I feel that the breeder must be satisfied that his fish are going to enthusiastic aquarists who will not only do well with the tiddlers but also do well with the hobby through a society. I, for my own part, cannot claim to be unable to obtain fish (shubunkins) in the Bristol area, having had gifts of good-quality stock fish and have bought yearling babies at a maximum of £1.25. I must not complain—I have been fortunate—but I must defend the persons whom Mr Wilson tells us are not kind to the coldwater side of the hobby.

I now feel a little plea to the Goldfish Society of Great Britain should be published, and this, I might add, is a personal supplication to their Standards Committee. They have recently supplied line drawings of a fish that is to be known as the Bristol-type shubunkin or goldfish, according to scale formation, which was accepted by the Bristol committee, on which not one coldwater fancier was present to state his views. I would request that you drop Bristol from the name of this fish; just call it shubunkin and/or goldfish, for I

fear that should this far more easily obtained fish be accepted as a National Standard then the Bristol Standard Shubunkin will be set back some 40 breeding years. I discarded most of last season's fry of similar outline to the Bristol-type shu designate, claiming that I had 'lost the tails', and have now bought new stock (from a Bristol A.S./GSGB member from a nearby town) in readiness for next season.

Finally I must express my admiration to the GSGB who, backed by the FBAS, are revising goldfish standards instead of 'letting the world pass by'; with certain reservations they have my approval.

Eastville, Bristol 5

JOHN H. PHILLIPS

Breeder's Merit Unrecognised

WE are not writing this as disgruntled losers. When we went to the Midlands with a party of aquarists from London to enter fish in the Nuneaton Show in May we were, as always, fully prepared to accept the judges' placings of our fish. However, as the result of comments we heard about our entry of a breeders team of green kissing gouramis, which suggested that aquarists in the Midlands think that these fish are not being bred in this country, we would like to ask just what breeders are supposed to do to have their breeding successes with hitherto unbred species recognised? Breeding of the green kissing gourami was reported in an article in PFM in February of this year. Our request for information about the judges' pointings in the class was not taken up by the Show Secretary, and this is another matter about which we wish to make a protest. In our party was a very experienced FBAS judge who agreed that there were grounds for a moan.

Are Midland judges quite unprepared for a species that the books say is not being bred turning up on the bench from a breeder who is successful with it? We would like to add that from our latest spawning 500 fry have resulted!

London

MR AND MRS S. FAGAN

Jobs for This Month

● If you are rearing this season's youngsters in tanks do not overlook regular partial water changes (about one-quarter of the tank per week for average conditions). First selection of the best fish should have been made by now and the chosen ones can be reviewed for a second opinion. Keep spacing the youngsters out as tank space is available so that best growth is obtained.

● Heavy rains in June made many ponds stay cloudy longer than they might have done under other conditions. Although this state is not harmful

to fishes, if you are worried about cloudiness of this kind you can try using a pond-clarifier of the type advertised in PFM.

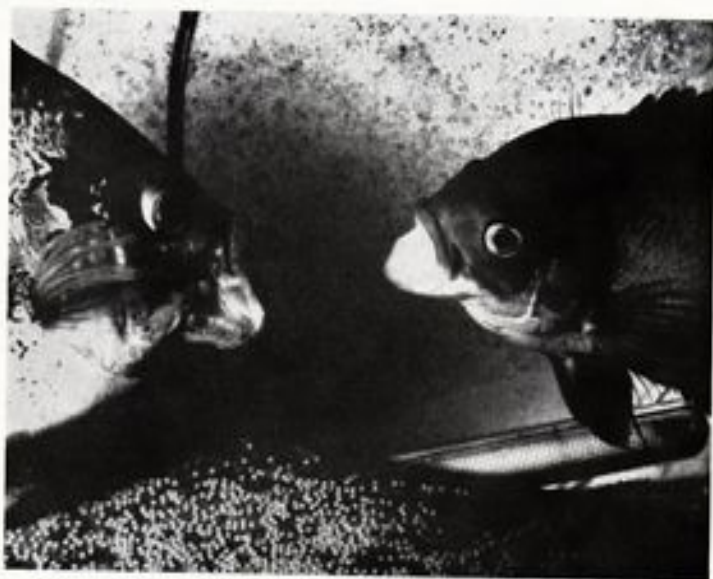
● Can you see your pond from the living room? If you can, or if you like to sit in the garden on summer evenings, the installation of underwater lighting in your pond, which is a simple job with the kits available today, can be undertaken. The illuminated pond can be properly enjoyed as the evenings start to draw in. Garden lighting sets may also be used with effect among the plants in the pool's surrounds.

Experiences in Keeping and Breeding Red Oscars

By F. T. GRAY

Hemel Hempstead A.S.

Photograph by
ROY SKIPPER



AT the beginning of April, 1970 my regular meandering round my favourite local shop was arrested by the sight of two beautiful fish in solitary state, with the caption 'New—Red Oscars' accompanied by a price which somewhat horrified me (not having previously paid more than two or three pounds for any single fish, though I was quite used to seeing the sort of prices now facing me on the discus tanks in the same basement!). These two 5 in. specimens were part of the first small consignment to arrive in this country from Bangkok, which event was announced in *PFM* for April, 1970. It took me until the 11th April to pluck up courage enough to purchase these two fish, to the delight of my young son, though my wife felt that it was only confirmation of her fears that fish mania had really got me.

They were housed in my dining room (as are my other fish) in a 36 in. by 15 in. by 12 in. tank, with a few flat rocks and two small internal filters but, of course, no plants. The fish settled down very quickly and immediately accepted earthworms, in considerable numbers and up to about 6 in. in length, which they engulfed whole. They both also took liver in large chunks but were not interested in raw beef, ox heart or tinned dog food—which only

The author's pair of red oscars indulge in a mouth display above their eggs seen covering the surface of a stone

goes to prove they had either not read the same books as I had, or they were illiterate!

The first 2 weeks gave me a few anxious moments, not being used to the big cichlid habits of lying flat on their sides after a good meal, thereby giving an excellent impression of being 'on their last fins'. Also, one night after putting the lights out I came back into the dining room to collect a book I wanted and switched on the light without thinking. This startled one of my precious oscars, which rushed up to the surface as they are prone to do—only this time so violently that it hit its head on the metal frame of the tank and knocked itself out. The sight of half my investment sinking slowly and motionless to the bottom rooted me to the spot until an age later (actually about 20 seconds) the fish shook itself, assumed a normal position and swam off as if nothing had happened, leaving me to totter weakly to the whisky bottle for a 'quick slurp'!

The following week the other fish damaged its mouth on the tweezers I was using to pick up strips

of liver. After a few days this wound was clearly getting worse as a result of a certain amount of reasonably good humoured mouth-locking between them, and I decided I ought to keep it disinfected. I placed the fish in a large plastic kitchen bowl in about 1 in. of water and on a pad of cotton wool, with my daughter holding it down with another large pad while I applied 2% mercurochrome solution with a small piece of cotton wool, carefully avoiding eyes and gills. Sounds easy, but including mopping up the dining room and changing into dry clothes afterwards, the 'operation' took the best part of an hour! Anyway it was successful and the damage quickly healed without the need for a repeat performance.

During May and June all went smoothly except that the enormous appetite of two already large and rapidly growing fish for earthworms took some satisfying, especially in dry weather, and I'm sure I dug my garden more thoroughly last summer than ever I have before. The oscars continued to take liver as well and occasionally a few live fish, particularly goldfish, which also went down whole.

I believe a certain amount of live fish is necessary for the well-being of oscars as I understand they need the particular vitamins contained in the liver of live fish which deteriorate rapidly after death so that other animal liver is not an adequate substitute. I do not know whether this is absolutely essential but I continue to give my oscars live fish occasionally just in case and, in any event, they like it.

Early in July they spent some time digging large holes in the gravel, but no more interesting activity than this developed. By this time the two fish appeared to need larger quarters and I had read that large oscars needed very large tanks if they were to be bred. I do not have the facilities for housing really large tanks but they were transferred into a 48 in. by 15 in. by 15 in., which was the largest I had space to fit in.

As our local water is rather hard and alkaline I filled this tank by using one-third from the tap and two-thirds de-ionised water. This achieved nothing and since then whenever I have cleared out the debris from the bottom of the tank I have topped up from the tap, so the water is back to hard and alkaline again. As the oscars are such heavy feeders there is a good deal of algae and excreta, so that I find it necessary to siphon off the bottom practically every week. Although a power filter would doubtless make this chore necessary less often, shooting in a few gallons of cold fresh water each week is probably beneficial and the oscars like it, as they invariably swim straight into the stream of cold, bubbling water.

In the middle of August they developed white spot and must have had thousands of spots all over them—there is plenty of space for spots on two large oscars! This was cleared up in a week

with methylene blue. All was then well for a time until in October one fish became decidedly choosy over its food, flatly refusing anything but live goldfish or earthworms. I did not get over this problem until December, when I cut a piece of liver into a long thin strip and waggled it in the water like a worm, and the fish swallowed it before she realised her mistake! I say 'she' now, although at that time I was not certain of the sex.

Shortly after this I tried feeding them on raw melts, which my wife sometimes bought for our cat and dog, and they took immediately to this and it is now their main diet. I always cut strips of the red meat and do not offer the fatty part. Incidentally I have found frozen imported melts better than that purchased from the butcher, but I can offer no explanation.

During February this year the oscars began to show signs of activity in clearing off a large flat rock on the bottom of their tank, but this was not done very thoroughly or by one fish in particular. Occasionally they would indulge in a little mouth-locking, but again only in desultory fashion.

On 3rd March they were showing no particular activity at lunch time but by 5 p.m. they had spawned on the flat rock—hundreds of large leathery looking eggs. During the evening they circled round the eggs, mouthing them and sometimes eating a few until, by next morning, there were none left. No-one saw the spawning take place and so I still did not know which fish had deposited the eggs nor whether they were fertile.

The 18th April was the next time they spawned and the eggs were eaten again; on this occasion at least I saw which fish had spawned but the other one did not take much interest in the proceedings with the result that I was still not sure whether I had a pair.

Earlier, on 20th March, I had had the opportunity of purchasing two more red oscars, smaller than my original ones but still good sized fish. These had apparently been fed mainly on maggots but this is not a food I use. So we conducted a war of attrition until my new acquisitions agreed to eat what I was prepared to provide. After 2 weeks I won, and they were then so hungry that they absolutely gorged themselves and put on weight very rapidly. These two were occupying the 36 in. by 15 in. by 12 in. tank the others had been in originally and about the end of April I decided to mix them up.

I put the large known female in the 36 in. tank with the new one that I thought might be a male, to give the small fish the benefit of being on home ground so to speak. Whether this was necessary or not I don't know but the smaller one got very rough with the large female and I had to turn the lights out to calm them down. Next day they had settled and, a day or two later, on 2nd May, they spawned. This time I had the opportunity of

examining their ovipositors and I was sure I had a proper pair; they followed the text-book drill exactly in laying rows of the leathery looking eggs with the male following closely behind the female presumably fertilising them. I say 'presumably' because they ate the eggs by next morning! On 11th May I had another spawning and this time I left the lights on overnight so as not to disturb them by suddenly plunging them into darkness. This was only partly successful as they ate the eggs the following evening. The next spawning was on 21st May, and this time I covered the front glass with brown paper so as not to disturb the fish and they guarded and tended the eggs well for 2 days—and then ate them as before.

Then on the 2nd June they spawned again and this time I decided to remove the rock, against violent opposition from both fish, who attacked my hand quite hard. The rock was placed nearly vertically in an 18 in. by 12 in. by 12 in. tank, to which I added methylene blue in sufficient quantity to turn the water a really dark navy blue and also an airstone to keep a reasonable flow of water up the rock face. At last, on 5th June, the eggs began to

hatch—the leathery eggs developed a tail and wriggled off the rock.

The next day I substituted an internal filter for the airstone and incorporated a little activated charcoal to remove the methylene blue. This I think was a mistake, and within 24 hours most of the baby fish died. I took the filter out and put in some more methylene blue and the remaining few fry survived. I do not really know the answer to this one yet and I am waiting for the parents to spawn again.

In the meantime I have half a dozen baby oscars about half an inch long at 3 weeks, and already quite belligerent little creatures they are. At present they are light yellow and brown and do not seem much to show for the trouble, but if nothing else they at least prove I have a definite pair of red oscars.

The other two appear to be enjoying a quiet domesticated existence—the smaller one I think is a male as he occasionally shows a short pointed ovipositor, but the other large one does not appear very interested so far, though I still think it is probably a female.

Small-Tank Fishes that are Ready Breeders

WHEN the fishes to be described here arrived on this earth, Mother Nature really went overboard! They come under the group heading of killifish and are known to aquarists as 'annual' fishes because their short life span covers just about this period of time—with perhaps a little while longer in the aquarium. There are quite a few species within this group but among the best known to us are *Nothobranchius palmpisiti*, *N. guentheri* and *N. rachei*. All these fish are beautifully coloured when in good condition—the most breathtaking probably being the rich, deep colours of *N. rachei*. Having bred a great many of these species, I propose to refer to *N. palmpisiti* in this article, for sentiment's sake really, as this was the first killifish I ever bred.

These are east African fishes. In their native waters the pools and stretches of water teem with these

By J. LEE

vividly coloured fishes, darting about their business on the bottom of the pool, spawning and releasing their eggs in the soft mud.

This spawning goes on relentlessly, for when the dry season comes they are faced with a terrible fate. As the intense sun starts to beat down, the water in the pools soon evaporates. The plant life dies and finally no water at all is left, leaving the fish struggling on the sun-baked mud bottom to die. The bodies of the fish remain stuck in the dried, hard mud. Then when the rainy season comes, the bodies of the dead fish play their part in the production of infusorian life for the millions of tiny fry that will appear from the resistant eggs.

Nothobranchius eggs are small and oval-shaped. They are made up of rubbery-like layers and are very tough—they can be squeezed, rolled between the thumb and forefinger and even rescued from under fingernails without coming to harm. Eggs will hatch on the same day that they are placed in water, provided that the resting period has been completed. Many of the eggs laid are 'delayed' eggs, which the aquarist refers to as 'resting eggs', that hatch out after the main batch—is this Nature taking a hand to ensure that the species does not become extinct no matter what the hazard?

It was once a problem to breed these fish in the aquarium but this no longer applies provided that the right steps are followed. *Notho-*

Continued on page 168

An Economical Garden Fish House

By CLIFF HARRISON

LIKE many other aquarists living in semi-detached houses I found that the small third bedroom served very usefully as a fish room. However, this arrangement has its limitations since care must be taken to avoid spilling water on the floor, and during the really cold spells a certain amount of condensation forms on the surfaces of the outside walls. It was to this latter aspect that my wife took particular exception last Christmas, summarily ordering out of the house my collection of aquaria and inmates! However, in a moment of pity (which I am sure has since been regretted) she did offer to help towards the expense of installing a proper fish house out of doors, and so I quickly set to the task with unaccustomed enthusiasm.

Over the years I have been fortunate enough to be able to study a good number of fish houses at first hand, and had therefore formed some idea of what the priorities were to be in my own case. Probably the greatest single mistake made in a project such as this is to be too ambitious in the early stages and then having to economise later for



The doorway leads to a small garden store/heat trap section into which the white door of the tank section opens



View within fish house to show wooden staging (right and top) used as well as an angle-iron stand

reasons of high cost. The proper frame, heat-insulation and wiring are expensive, and it is far better to settle for a smaller building that you can afford to equip properly. Since I did not intend to keep any very large fishes, and economy of operating costs was a particularly important factor, I thought that a shed giving a floor area of around 6 ft. by 5 ft. would be quite adequate for my purposes and with this in mind the search began for something suitable.

Eventually we settled for a shed 8 ft. by 6 ft., with the extra 3 ft. in length to be used for garden tools and general storage. (This also meant that a door could be included in the partition between the two sections, giving a considerable reduction in heat loss when compared with a single outside door.) The model we chose was the Hall's 'Cranbrook', in red cedar, which comes in the form of 3 ft. modules, 6 ft. high; a number of these modules will contain either a door or a window, the remaining ones being completely clad with cedar. The modules of these different types can be positioned as desired along the sides or ends of the shed to fit in with individual requirements. In my own case the two

window units were included in the garden storage section. (Where the length of the shed is not in 3 ft. multiples, plain 2 ft. units are supplied to make up the correct length.)

This arrangement meant that the fish house section had solid wooden walls, since side lighting is not generally considered to be the most suited to successful plant cultivation, and for that reason I had decided to fit a triple-glazed roof light myself (its installation is described below). Another reason for selecting the 'Cranbrook' was that despite being of ridge roof design it gives a full 6 ft. height to the eaves, thereby accommodating tanks up to eye level all the way round.

Construction

The concrete base for the fish house had to be sufficiently substantial to accommodate a considerable weight of water, and this entails plenty of preliminary work in pounding rubble and old bricks into the site. To save some of the back-breaking work the first 4 in. of the proposed 6 in-thick slab was laid as 'dry' concrete, i.e. without adding water to the mix. Provided that the rubble is hosed down first and the dry mix firmly compacted this is certainly a great time-saver; however, the top 2 in., together with a similar thickness at the sides against the shuttering, must be mixed and laid in the normal way. Whether you are using dry or wet concrete it is absolutely essential to ensure that the ballast and cement are adequately mixed—failure to do this can result in the base eventually splitting

from the load imposed on it, and this could be disastrous.

After the concrete had been left to harden for a week, and the shuttering removed, the shed was delivered in its numerous sections. The tongued and grooved cladding protruded about half an inch below the frame-work on the bottom of each unit, and this means that while the frame sits firmly on the concrete base the cladding overhangs it to prevent rain water seeping in underneath. The wall units quite simply bolt together and can easily be managed by one person; putting on the roof, however, certainly requires an extra pair of hands, but no difficulties were encountered in the assembly.

The roof light was to be 24 in. by 18 in., and a hole $\frac{1}{2}$ in. larger than this was cut between the roof supports at one end of the fish house section. A frame-work of 1 in. by $1\frac{1}{2}$ in. timber was located on the underside of the roof with $\frac{1}{2}$ in. protruding inside the hole all round. The double-glazed unit was made by sandwiching plastic conduit tube (with mitred corners) between two sheets of glass, black Bostik adhesive being used to glue and completely seal the edges. After this had dried completely the upper surface of the wooden frame-work around the aperture was coated with Bostik sealer and the glazed unit lowered into place. The lower surface of the wood frame was also coated with sealer and the third sheet of glass pressed upwards into place, and held by a small brass screw and washer at each corner. When the roofing felt was laid it was trimmed to overlap the glass by 1 in. all round, and firmly bonded to it with the Bostik adhesive to make a completely watertight seal.

A sliding hardboard panel to cover the roof light in exceptionally cold weather was also fitted but experience has since shown that this was quite unnecessary owing to the small degree of heat loss through the triple glazing. A second window, also 24 in. by 18 in., was therefore installed and a remarkable improvement in aquatic plant growth has been noted.

The partition and internal door between the two sections of the shed were made of hardboard on a 1 in. by $1\frac{1}{2}$ in. frame-work, with 2 in. glass-fibre insulation sandwiched between the hardboard sheets. Similar insulation was also used on the remaining walls and the roof, which were then also covered internally with sheets of hardboard; the ample framing of the modules, together with their standard height of 6 ft., makes this a relatively simple matter, though the roof ends did require a certain amount of care and extra framing.

The door to the fish house is 2 ft. wide by approximately 5 ft. 9 in. high and is situated 18 in. from one side of the shed to enable a full-width bank of tanks to be accommodated along each side. To ensure that the door is kept tightly closed against the foam plastic sealing strip, a pair of spring-operated gate catches have been used, located about

Approximate Costs of the Fish House Described

Shed	£60.00
Concrete base	£4.00
Hardboard	£7.00
Softwood	£7.50
Glass	£1.25
(horticultural quality)	
Insulation	£9.00
Wood preservative	}
Evostik Resin W adhesive	
Bostik black adhesive	
Bostik black sealer	
Door fillings	
Screws	
Electrical fittings	£7.50
Total	£96.25

12 in. from top and bottom, and the pressure from these also helps to prevent any tendency for the door to warp or twist. These catches also have the advantage of operating with just a firm push or pull of the door handle—no fiddling around when you are trying to carry a tank of water outside with both hands full.

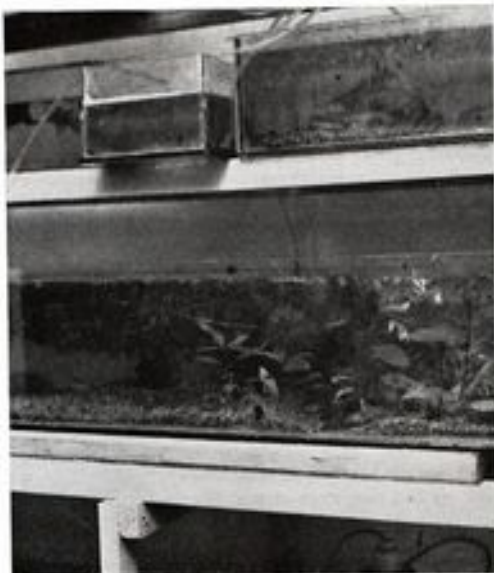
To make maximum use of the available space I decided to incorporate only one of the metal stands I already had and to build a wooden frame-work around this for the other aquaria. To accommodate the side banks of tanks, uprights of 2 in. by 1 in. softwood (running the full height of the shed) were screwed and glued to the shed panels, and were positioned about 12 in. apart. The front surfaces of these uprights were then protected with transparent tape, and the whole of the inside of the shed was sprayed or brushed liberally with a preservative (Cuprinol Golden)—we used an ASL sprayer and results were excellent.

Insulation and Heating

After being allowed to dry for a week or so the interior was ready to take the final layer of insulation— $\frac{1}{4}$ in. expanded polystyrene panels in 6 ft. by 2 ft. sheets. These were fixed to all the surfaces—walls (carefully fitting between the uprights) floor and inside the roof. Timber supports of 2 in. by 1 in. were glued and screwed between the pairs of uprights to take the lengths of timber on which the tanks were to sit. (The Evostik resin W used in the construction does not stick to timber treated with a preservative, hence the tape protection. Although this adhesive is not completely waterproof it seems to still retain its full strength in the damp atmosphere of a fish house.) The central floor area was covered with a sheet of hardboard, treated with a polyurethane varnish on both sides, to protect the expanded polystyrene insulation.

The heating method used is that employed so successfully at The AQUARIUM SHOW in London, whereby the tanks are placed on shallow boxes containing special heating cables. This has in my view considerable advantages over the more conventional systems since the layout and siting of individual aquaria can be altered at will (this is particularly useful with the all-glass tanks I use), the risk of electric shock from water splashing around is minimised, and there is a considerable saving in cost when compared with the purchase of individual heaters and thermostat. A 400 watt heating cable was used for a total of 15 square feet of boxed surface area, and a thermostat maintains a temperature of the aquaria at 76–78°F (24–26°C).

The insulation of the shed ($\frac{1}{2}$ in. expanded polystyrene, $\frac{1}{2}$ in. hardboard, 2 in. glass fibre, plus the $\frac{1}{2}$ in. thickness of the cladding) is sufficient to maintain an air temperature of 68°F (20°C) in



All-glass tanks made by the author and used in his fish house supported on wooden staging

the coldest weather and a small tubular heater can be used to boost this to the low seventies. In this way even the tanks without individual heating are kept at a suitable temperature for growing on most species without the fish house being uncomfortably hot to work in. During May and June on the hottest days the air temperature inside the fish house did not rise above 81°F (27°C), despite the considerable amount of window area, and I think that the success of the insulation in these extremes of temperature has fully justified the considerable expense and effort involved.

An 80 watt 5 ft. fluorescent tube is now placed centrally in the ceiling, replacing a 100 watt bulb in use during construction. The difference it makes to the ease of working on the tanks has to be seen, and I would not hesitate to recommend ample general lighting even at the expense of individual lighting (unless of course it were to be used primarily for growing plants).

I would be the last to claim that I now have a particularly impressive or exceptionally attractive fish house. One of the biggest problems is the variety in tank sizes, acquired over the years, though this is being rapidly solved with the help of Trophix silicone sealer in the construction of new, all-glass aquaria of standard dimensions. However, a number of other aquarists must surely have aims similar to mine, and I hope that they will have found a few tips worth considering when the opportunity comes for them to set up a fish house of their own.

Ready Breeders in Small Tanks

continued from page 164

branchius grow to about 2 in. in length and sexing is very easy because the colouring of the males is so rich whereas the females are a rather drab, dirty brown or pinkish colour. The females fill very quickly with eggs.

For breeding I used an 18 in. by 12 in. by 12 in. tank, but *N. palaequinti* can be bred in much smaller tanks. To have a fair chance with these fish the best water to use is, of course, pure rainwater. On the tank bottom, as a substitute for mud, use a 1 in. layer of boiled and well washed peat moss or peat fibre and place it in a small square container in the centre of the tank (already well scrubbed out and disinfected). I bred all these species in dark tanks, with just the front left clear.

As male *N. palaequinti* are apt to fight amongst themselves, the best course is to use only one male to two, or sometimes I have even used three, females. In their natural environment I believe that one male can serve and take on three females when spawning is in process.

The fish can be left to spawn over a period of 2 weeks or an even better procedure they can be parted after 3 days, then brought together again, then rested again. This way the females achieve a 'breather' as spawning tends to be very concentrated and the males, when in good condition, are very persistent, continually driving the female or hovering over the top of her and then, with a sudden tilt of the body, forcing her down into the peat. At this point, the male will wrap his body and fins around her back and side. As they pause for a couple of seconds the female releases the eggs into the peat.

Nothobranchius appetites are easily satisfied and they will take tubifex worms, white worms, small blood worms, daphnia, ghost larvae and— a wonderful conditioner for them— mosquito larvae. These they will consume greedily; they are a large-mouthed fish with good teeth and a pugnacious look for such a small size. In colouring, the male *N. palaequinti* is brilliant: a rich red on the body with scales carrying a greenish-

yellow tint, very similar to the *N. guentheri* though lacking the black edge to the tail. The females, in comparison, are a drab, dirty brown.

The *Nothobranchius* are hardy, easy to keep, live at a low temperature and spawn at 70-75°F (21-24°C). They are not particularly susceptible to disease and can be kept in small volumes of water; they have been known to spawn in square toilet jars. The incubation period of the eggs varies quite a bit. Like *N. guentheri* eggs, *N. palaequinti* eggs are dried out for 3-6 months. By 'dried' I do not mean completely bone dry; just slightly moist ('tobacco moist' as it is known). This is quite simple to do. The peat moss is removed from the spawning tank, excess of water is squeezed out and the peat placed in a clean plastic bag which is left open for a day or two before it is closed up. This procedure can then be repeated for a while until the peat is just barely moist. Then the bag can be finally closed and hung up in a dark corner of the fish house—it is advisable to keep the eggs dark and shielded from the light.

The eggs should be inspected from time to time during the storage period and any showing fungus growth weeded out. A note should be attached to the bag giving the date of storage with dates 3 months and 6 months in advance (though the eggs, if inspected regularly, may be seen to be ready for hatching in between these two dates).

When the time comes to add the water to the peat and eggs, you can use the soft water they were bred in or clear, pure rainwater at a temperature of 70°F (21°C) or so. I found that a good method by which to add the water was to spray it steadily on the peat from a clean watering can to a depth of about 1 in. This gives the effect of rainfall and although I do not know if it really made any difference to the hatching, I did achieve some pleasing results; with 80 fish from this first spawning (the percentage of males in this first brood was surprisingly small—there were only five males out of 80 fish; the second spawning

produced 160 fish with a good percentage of males).

Once the water has been added, if the eggs are ready they start to develop and after 24 hours burst open. One can look into the tank and see small eggs on the peat with two small black eyes looking back at you—then, a moment later, there is a tiny fish flitting around. You could say these fish were almost 'instant fish'. When the water is added a rich Infusoria culture should also be put into the water. If you have no Infusoria a good alternative is to use a pinch of dried skimmed milk, or a skimming off a microworm culture or Liquifry food. The baby *Nothobranchius* grow at an amazing rate and with good feeding are ready to spawn within 8-10 weeks. Feeding can be started with brine shrimps and micro worms and the yolk of a hard-boiled egg. Before long they are able to take Grindal worms and sifted daphnia; I found small crushed snails were appreciated in the diet.

Partial changes of water are a must with these fish. This stimulates growth. It's a good rule when keeping and breeding the various species of *Nothobranchius* never to mix them in the same quarters. Being very persistent breeders they will interbreed with each other and will spoil your true strains. So, if breeding is done on a large scale, you need plenty of room and tanks to keep the different species apart. After every spawning, females should be rested away from any male for at least 12-14 days as they are driven very hard during the spawning procedure and such exhaustion will shorten their already short lives.

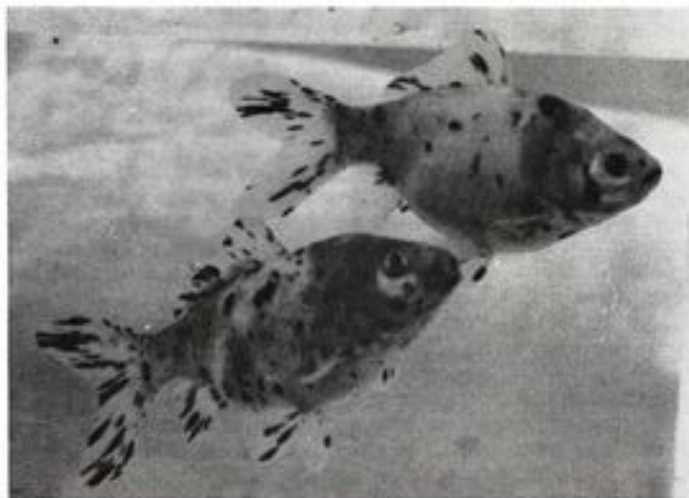
You might say 'all this is a lot of trouble to go to when they live less than 12 months and you have to wait so long for the eggs to hatch'. But when you have these beautiful little fish in your collection, you forget all the troubles. And once he gets the hang of the breeding sequence there's no stopping the enthusiast. Suddenly he wants tanks full of these brilliant-coloured beauties. The challenge to succeed drives one on and Nature has provided such a fascinating sequence of events in this case—what greater thrill is there in this hobby than to add water to the peat medium one day and see a tank full of fish in a flash—and know a challenge has been well met.

FANCY GOLDFISH VARIETIES

Most Popular Variety of all

By D. SMALLEY

Photographs by the author



Fish such as this can often be found under various names in imported stock in aquatic shops. Resembling the London shubunkin, the fish are hardy but lack the grace of the singletail or Bristol shubunkin.

THE singletail must be the most popular of the fancy goldfish varieties, but unfortunately there is not entire agreement in this country over the standards to which this fish should be bred. Specialist breeders are producing fish either to the GSGB 'singletail' or to Bristol A.S. 'Bristol shubunkin' Standards. Fortunately, the differences between these two standards cannot be considered great, and fish bred to the standards of either organisation are well worth keeping.

It can be said of some varieties that imported stock is a prop and help to our breeders in this country, but I think that with the singletail the reverse is the case. The singletail has been bred here for many years and some strains go back to well before World War 2. Goldfish now being imported into Great Britain have caudals rather like those of the comet, and these fish are very cheap to buy.

The feature of the true singletail is the caudal fin, which should be well held with nicely rounded lobes. At one time, with a little patience, good fish could either be obtained privately or through a dealer, but fewer of the British fish seem to be finding their way into the shops now. This situation

may be due to the fact that breeders in this country just cannot compete on price with the imported fish; if this is the case, it is a pity, as many breeders will in turn feel discouraged and frustrated in not being able to dispose of their stock easily. I hope that in the long run this will not mean that we will lose many of the good strains that have been built up in this country over the years.

The singletail as depicted in the GSGB Standard is not a deep-bodied fish, and this should be remembered when choosing stock; also carefully inspect the shape of the caudal fin. In young fish 1 in. to 1½ in. long the caudal should be short with nicely rounded lobes.

Remember that if a fish has a long caudal when young the tail fin will almost certainly be too long and poorly held when adult, and this should be avoided. The most sought-after fish are nacreous types, with blue/black/orange/red colouring, and I like to see the colouring going well into the finnage.

Young singletails make good active fish for the aquarium but I think that they do have one disadvantage in that they grow into big fish. If you start off with 1½ in. fish, within 2 or 3 years under normal conditions they would reach 6-8 in. in

length. This growth factor must be taken into account when choosing the aquarium.

The singletail is a quick mover and can jump out of tanks very easily. If you don't always keep your tank covered, one day you are bound to find one of your best fish on the floor. If you do happen to be forgetful and find an apparently dead fish lying on the ground, always place it in some well-oxygenated water. It is often remarkable the recovery some fish make from a seemingly hopeless condition.

The singletail must be high on the list for anyone stocking a garden pool. The fish is active, grows to a good size, and brings colour to any garden. As it is able to move quickly, it is not easily caught by cats, birds or even children.

Hardy, but...

There is no doubt that singletails are extremely hardy, but it seems in some respects that this hardiness is over-rated. Some aquarists leave fish outside all through the winter, often in poor conditions, and assume that the legendary hardiness of the singletail will overcome any problems. Often when the pool is inspected in March, after winter is over, dead and badly diseased fish can be found, and the keeper blames everything else except himself.

Pool management is not the province of this article, but to avoid fish losses take care not to allow rotting debris to collect in your pond. Always keep a small ventilation hole open in ice, by heater, air line or by placing a hot bucket on the surface



Singletail goldfish

and letting it thaw a hole (never hit the ice), and make sure that your pond is suitable for wintering fish. This means that the depth in the deepest part of the pool should not be less than about 18 in.

During long sustained periods of cold weather, the weak points in most varieties in ponds will come to light. The singletail is no exception and I think the point to watch for is infection in the caudal fin. This is more likely to occur in fish with long or poorly held, drooping tails, which in some cases droop on to the bottom of the pond. Where fin rot or fungus develops, a saline bath treatment should be given, as described for hood infection of brambleheads mentioned in my article in the July issue of PFM.

Meetings and Changes of Officers

AIREBOROUGH & D.A.S. Change of secretary: Miss H. C. Wilson (45, Gledhow Park Avenue, Leeds LS7 4JL; phone 621212). Meetings: first Thursday of month, 8 p.m., Greenside Hall, New Road Side, Baxendale.

AMERSHAM & D.A.S. New members welcome at meetings held first and third Wednesday of month, 8 p.m., Amersham Community Centre Annex, Amersham, Bucks.

ASSOCIATION OF YORKSHIRE AQUARIST SOCIETIES. Change of secretary to: Mr C. Coles (15, Thornleigh Grove, Leeds LS2 3NR).

BISHOPS CLEEVE A.S. Change of secretary to: Mr Philip Stone, Waverley, 54, Ashburch Road, Newtown, Tewkesbury.

BRENTWOOD A.S. Chairman, Mr B. Pye; vice-chairman, Mr R. Taylor; secretary, Mrs M. Taylor (16, Tollesbury Court, Woodlands Avenue, Hurton, Brentwood, Essex); treasurer, Mr M. Foley; show secretary, Mr L. Dwight. Meetings: first and third Tuesday of month, St Thomas's Church Hall, Eastfield Road, Brentwood.

CLYDE A.C. President, Mr C. Murray; vice-president, Mr D. Fowler; secretary,

Mr W. Logan (51, Glenside Drive, Rutherglen, Glasgow; phone 041-541 4190); treasurer, Mr R. Thomson; show manager, Mr W. Mann. Meetings: first Monday of month, Town Hall, Rutherglen, Glasgow. All welcome.

EALING & D.A.S. Secretary, Mr C. Rainbow (24, Lynton Road, Chesham, Bucks.). Meetings held first and third Tuesday of month, Northfields Community Centre, Northcroft Road, W.13.

EAST NILSBIDE A.C. President, Mr N. Grant; secretary, Mr I. Brown (17, Bursbury Terrace, Westwood 6, East Kilbride); treasurer, Mr J. Livingston; show manager, Mr H. Taylor; show secretary, Mr J. Finlay.

GUILDFORD & D.A.C. Meetings: second and fourth Wednesday of month, 7.45 p.m., The Guildford Trades and Labour Social Club and Institute Ltd., Mount House, Mount Street, Guildford, Surrey. Details from secretary, Mrs West (Ballant, Balles Lane, Nonsandy, Surrey; phone Nonsandy 2281).

HEYWOOD & D.A.S. Meetings held second and fourth Thursday of month, Queen Ann Hotel, Heywood, Lancs.

MID-HERTS A.S. New secretary: Mr D. V. Lander (42 Old Park Road, Hitchin, Herts.). New venue. Meetings now held second and fourth Friday of month, 8 p.m., Church ParLOUR, Faulkner Hall, Victoria St, St Albans, Herts.

NEW FOREST A.S. Chairman, Mr A. Williamson; vice-chairman, Mr C. Kooze; secretary, Mr B. Travers; treasurer, Mr B. Higginson; show secretary, Mr D. Harding; P.O., Mr D. Lane.

NOTTINGHAM & D.A.S. President, Mr G. Wood; vice-president, Mr C. Hill; chairman, Mr A. Saxton; vice-chairman, Mr N. Goodfellow; secretary, Mr P. Carlike (2 Winchester Terrace, Winchester Street, Sherwood, Nottingham); treasurer, Mr K. Brist; show secretary, Mr N. Kenney. Meetings: Tuesdays, 8 p.m., Peacock Hotel, Mansfield Road, Sherwood, Nottingham.

RUNNYMEDE A.S. Secretary, Mrs J. Garrard (Le Rivage, Long Lane, Sturwell, Middlesex). Meetings: first and third Tuesday of month, 8 p.m., Ashford Community Centre, Chestfield Road, Ashford, Middlesex.

TONBRIDGE & D.A.S. New members and visitors welcome at meetings held second Wednesday of month, 8 p.m., Gardeners Arms, St Stephens Street, Tonbridge. Secretary, Mr J. T. Mathison (13 Norriss Way, Fivoss Green, Tonbridge, Kent).

YATE & D.A.S. New reporting officer: Mr M. E. Ridge (45 Fairyln Drive, Kingswood, Bristol BS15 4PU).



Personal COMMENT

by
ARPEE

THE debate on tropical marines is developing nicely, and some most interesting facts and opinions are emerging. I found it a welcome coincidence that Huw Collingbourne's letter about environmental cleanliness and the article 'Starting With Sea Water—Aeration and Filtration' appeared in the same (May) issue of *PFM*. I think many readers will disagree with Huw that 'clinical' and 'strict' as applied to cleanliness mean anything like the same thing. The former is an extreme state, as I see it, in which every living organism but the subject is eliminated by chemical or physical means. The latter state allows the subject to co-exist with other organisms of a benign disposition. Clearly the two terms are fundamentally opposed.

I think, however, that we should not be wasting our energies so wilfully on matters of semantics when the real point at issue is successful husbandry. My interpretation of the cleanliness problem is that what is really of concern to us is the amount of control demanded by the marine situation. Not only are we concerned with the amount of control we need to apply, but how best and most simply to apply it. We have all argued over the years as to what is meant by 'balance' in a non-marine aquarium and we have come up against the same sort of difficulty. It arises because there is no single set of conditions which is right for any given collection of fishes, but a wide range of conditions, at one end of which they will do less well than at the other. Most of these can be controlled by some means or the other, e.g. by adding chemicals to increase softness of water, or by reducing the amount of light to control algal growth. If we lose control by negligence or by over-control, as by applying an overdose of chemicals, the fishes either suffer or die, possibly both.

It appears therefore that our objective is not so much cleanliness for its own sake but controlled dirtiness. In a freshwater tropical aquarium we allow a certain amount of dirtiness in the form of mulm, as a source of nutrients for the plants. Because of higher temperatures, though, we have to

be more watchful on the amount of mulm than would be necessary with a coldwater tank. With marine fishkeeping it seems that the parameters of tolerance are still further reduced—not to the point of clinical absurdity, but to a point at which we allow an approved set of micro-organisms to act as dustmen. How efficient they are in this role cannot be defined very precisely, though experience, as in other areas, would tend to simplify the difficulty of knowing what liberties can be taken or indeed whether any can be taken at all.

The advice given about sub-gravel filters in the May issue, together with a very clear acknowledgment of the micro-organisms which they encourage, reflects the thoughts expressed above, and I was not a little heartened by this particular article since I had only recently ordered a filter such as the one described. It will be my first experience with a sub-gravel filter, as I have not considered this system necessary in freshwater tanks. I shall be especially interested in the degree of reliance one can place on those minute creatures which one must assume are diligently working away for our benefit. In particular I wonder under what conditions they, too, succumb.

Summing up the situation as I see it, the marine cleanliness problem seems in many ways parallel to that of freshwater, the key to success being the facility to introduce oxygen to the areas which require it, continuously and in the required quantities to achieve the desired results. In freshwater aquaria we are, of course, dependent on aeration only to a limited degree and can in fact do without it if need be. It does, however, become of great importance when the inhabitants of the aquarium begin to strain its resources. Since marine situations must always be considered as being under heavier strain we may in the long run be more concerned to maintain the well-being of these microflora than of the fish themselves. It is a most novel and interesting concept.

A point which seems not to have received due emphasis in the discussion on cleanliness is that if you do not employ a sub-gravel filter it would seem politic to use very fine sand on the tank bottom and thus deny surplus food etc. the facility to penetrate this stratum and decompose dangerously. This means a great deal of work with the dip tube or mechanical tank cleaner but many seem to prefer this to the sub-gravel filter method, which still seems to be anathema to so many aquarists. I am inclined to the view that opposition to sub-gravel filtration is not entirely reasonable. In planted freshwater tanks, I would not use this system in case it got blocked (it frequently does, so I am told). With marine set-ups it is a far less difficult job to reorganise a tank interior, if by chance a sub-gravel filter does get blocked—there are normally no plants with yard-long roots to contend with!

Personal Comment

continued from the preceding page

It was an act of great faith and courage, so my dealer said, when I decided to buy a Madagascar lace plant from one of his tanks. However, I have taken many greater risks in my time, and certainly plants take rather longer to die than many a fish that I can think of. It is also a very long time since I have tried my luck with one of these most beautiful and strange of aquatic plants, and I was keen to try and succeed where, previously, I had failed so dismally. In this I would be in good company for very few aquarists can claim to have come to terms with this tantalising species.

Aponogeton fenestratis stems from a rhizome and the young leaves look as do any other elongated ones from the rest of the genus, but as they become adult, interstices appear between the heavy veining and the leaves thus develop into delicately latticed structures which look fragile but are really quite tough. Advice about its culture is about as varied and reliable as that relating to breeding cardinals, so it is not surprising that the results are about as predictable. It does, however, seem that poor light and fresh soft water and a total absence of algae make for greatest success. On the other hand one has seen them apparently doing well under quite different conditions, so it is quite on the cards that our old friend, the factor of locality, has more influence in the long term than a pre-determined formula that is only partly correct.

Granted, the biggest amalgam of the most superficially suitable conditions should keep the plant alive longer than a smaller amalgam of these conditions, but the trace element or condition that makes a specimen flourish and reproduce is something all too elusive for most of us to detect, but it is absolutely vital. I have no means of telling whether the conditions at present prevailing in my small tetra collection will suit it, but we shall see over the next few months.

I was, somewhat gloomily, contemplating the scene in this tank after I had planted the lace plant, and since the cryptocorynes alone can be said to be thriving, at least the light factor would seem to be on my side. As I always top up with fresh rainwater, preferably after a heavy down-pour of rain, the water conditions are probably on the way to being what they should be. The only really menacing thing was algae, which, although it is on a modest scale, does seem to hold many of the plants back. This has to be removed manually from time to time and the operation naturally causes some losses to young leaves and a consequent setback to the plants. Observing that the lace plant is difficult to begin with one wonders whether this particular factor will be its undoing.

This led me to consider whether there was any reliable way of getting round the algae problem. Apart from mollies and *Otocinclus* sucking catfish there are no small algae-eaters, and even these cannot be relied upon to clean precisely those bits of your tank which are in greatest need of treatment. I absolutely reject chemical algicides in circumstances such as these because they can so easily be misused, with disastrous effects on the plants; at their best they simply bring about a temporary regulation of a local process and provide no sort of final answer. I have come to the sad conclusion that regulation of light is almost as difficult to control as the algae itself, so how on earth are we to get to the bottom of this ever-present difficulty?

It suddenly occurred to me that my plants had never grown as luxuriantly as when snails were present, and therefore perhaps my rigid anti-snail measures have brought about a state of affairs that I had deliberately set out to avoid. For some years I have permitted only the burrowing Malayan snails in my tanks, on the basis that they do not attack plants and that their burrowing helps to get the mulm in the tank down to the roots of the plants. Whilst this arrangement seems satisfactory enough it suggested that if I could introduce some other species of snail that removed algae but at the same time did not ravish the more tender plants, I might turn yet another factor in favour of the lace plant.

Transatlantic TOPICS

By JIM KELLY

WORKING on a project in Ghana, Paul Loisel found what he thought was a new species of *Micralates*, and was all set to describe his findings, made in the Volta Basin, when a letter from Dr Trewavas (British Museum) told him that the 'new' fish was but *M. volae* (Roman, 1967). Paul was just 3 years too late!

Still, his fascinating work has its compensations. A chap from the University brought him a *Tilapia* from Kumasi—deep-bodied, almost round in outline, on checking it proved to be Thy's sub-genus

Pelmatolepis. Now the only one that occurs in Ghana is *T. (P.) mariae*, from the Bia and Tano Basins, right over in the western part of the country. It does not exist, according to all the records, in the Offin and Prah Basins where it was discovered!

On examination the fish was significantly different in body proportions and colour patterns; it even lacked the black markings seen on the side of *mariae*. All's well that ends well!

* * *

Those who have struggled with

plastic plants in the aquaria trying desperately to stop them floating to the water surface will be interested in a new range of artificial decoration to hit the American markets. All the plants have canoe-shaped bases guaranteed to fit snugly under the compost; some even have natural-looking veins and ribs on their leaves.

Having examined these new plants I should imagine that once they have become established in the aquarium and acquired a coating of algae they will be hard to distinguish from the real thing... at ten paces!

THE INTERTIDAL AQUARIUM—3

Amusing Marine Tank Inmates

By H. J. VOSPER & G. J. VOSPER

Photographs by H. J. VOSPER

NOT highly coloured, though some forms have blue lines and patterns over the shell, the crustaceans (as crabs and their allies are called) are useful and very interesting inhabitants of marine aquaria. They are characterised by a hard 'skin' (the exoskeleton) that has to be moulted from time to time to allow the animal to grow in size. After the old skin has been shed the animal hides away while it swells up and the new skin hardens, a process that can take many days for a large crab or lobster.

Generally they are fearless (according to size, of course), long-lived, predatory carnivores or scavengers, with senses nearly the same as or better than those of mankind. Sight is good in most species, at least at short range, though one of us was lucky not to lose a finger or two when an adult lobster attacked after spotting a hand nearly 4 feet away in the tank! Many have an excellent sense of touch, enhanced by sometimes extremely numerous bristles over the legs, antennae or other parts. The sense of smell is highly developed, as is often the response to vibration and to chemical stimulation of the bristles of the antennae.

Since many of the crustaceans are so active and inquisitive they are likely to be hard to keep properly confined, for crabs may climb from a tank if rocks are placed suitably (or if there are crevices between the glass at the corners), while shrimps and prawns may leap out by employing the flexible abdomen as a spring. Foods consist of the meat from other crustaceans, fish, molluscs, pieces of lean beef etc.

Care should be taken in selecting inmates for a single tank; small shrimps and prawns might well fall foul of active green shore crabs or swimming crabs etc. though they can usually avoid the attentions of edible crabs and lobsters. It may prove useful to have a rock display

where some of the crustaceans can seek shelter; green shore crabs will take advantage of any rocks that reach above water, using them to 'take the air' from time to time. After moulting all crustaceans are shy and retiring, therefore appreciating a rocky shelter.

Shrimps and prawns make excellent scavengers, their tiny tweezer-like pincers serving as very suitable tools for extracting fragments of food from within crevices or from between pebbles etc.

The following are reasonably common around our shores and are suitable for aquaria: largely the forms are dealt with in groups, individual species being mentioned only as circumstances warrant.

Swimming decapods

(Natantia: shrimps and prawns)

In prawns the body shield or carapace is extended at the front into a pointed beak (the rostrum) that is armed with serrations or teeth: this rostrum and its characteristics are important in identification. Basically, the prawns occur in two main groups, firstly those with antennae at least as long as the body and a rostrum with at least six teeth, secondly those with antennae only about half as long as the body and a rostrum with not more than four teeth. In the former group are such as the common prawn, *Palaeomon serratus* (Pennant), which is transparent but with very beautiful lines and dots of red, blue and brown; it grows to a length of 130 mm and is common among seaweeds of pools on the lower shore. In the second group are such as the members of the genus *Hippolyte*, generally clear green or reddish brown but blue when the light goes or at night. Prawns change colour according to their surroundings, but are less efficient at this than are the shrimps.

In shrimps the antennae are

nearly as long as the body but there is no clearly visible rostrum. The first pair of feelers have noticeably large plates or scales at the base (very easily seen from above), and whereas the prawns are more or less laterally compressed, the shrimps are flattened dorso-ventrally. Members of most species burrow readily and most are probably like the common shrimp, *Crangon vulgaris* Fabr., in that the large scales mentioned are used as shovels. Although prawns change their coloration according to circumstances the shrimps change colour more rapidly: it is often difficult to photograph them because they so speedily merge with the background. Shrimps much prefer sandy shores, but can be found in rock pools.

Although excellent scavengers, these swimming crustaceans will also take living prey, large prawns being able to capture and kill fishes up to perhaps 30 mm long.

Walking decapods

(Reptantia: lobsters, crabs)

Lobster: *Homarus vulgaris* Milne-Edwards. Needing no description, these animals are seldom found in the intertidal zones but lobster fishermen or crabbers might be persuaded to retain a small specimen if they are asked. In adults the crushing or large claw armed with spikes and the smaller cutter armed with sharp spines are both exceedingly dangerous. Large or small lobsters, as well as large crabs, should be approached 'from behind' and gripped with thumb and fingers just behind the legs but with the wrist well bent; in this way the animal cannot reach you though it will wave its legs fearfully.

Feed not more than twice a week on some white fish flesh, and if the animal is alone in the tank or there are no scavengers make sure that all pieces of waste are collected and

removed. The lobster is sometimes reluctant to eat in the light. They are best kept in fully saline water.

Squat lobsters: *Galathea* spp. These animals are very like tiny flattened lobsters (hence the name) but the abdomen (or tail) is carried tucked underneath the body. They are fairly colourful, some being green or reddish with blue lines while others are bright clean red with blue lines and dots. When found (they are not very common but tend to be local in distribution) it is under stones and boulders at extreme tidal recession. The tail is used when they wish to swim quickly, being flapped with great rapidity—the long and slender pincer legs trailing behind them.

Crabs.—The term crab can be used to cover such creatures as the porcelain crabs, swimming crabs, pea crabs, spider crabs etc. The useful aquarium inmates are as follows.

Porcelain crabs. Small (only 10-15 mm across the shell) with abdomen reduced and practically always carried tucked under the body. Fourth pair of walking legs very small and folded tightly against the joint between body and abdomen. Foods are so small as to make them considered as filter-feeders. Often remain hidden under rocks in the tank. Two species, often very common, lower shore zones.

Swimming crabs. True crabs having the abdomen very much reduced and carried tucked tightly under the body except during mating and when the female is 'in berry' (carrying eggs). To this group belong the common or green shore crab, *Carcinus maenas* (L.), which has abandoned its family's secondarily regained swimming ability, also the fiddler or velvet swimming crab, *Macropipus puber* (L.), which can swim well by using its hindmost pair of walking legs because these are flattened like paddles. This species is covered with a fine pile of 'hair' (hence its common name) and is attractively marked with lines of blue at the joints. It is very fierce and fearless: its French name is 'the angry crab'.

Spider crabs. These ungainly looking animals vary tremendously in size, from the tiny 10 mm *Inachus* and *Macropodia* spp. to the spiny spider crab *Maia squinado* (Herbst.) at up to 175 mm across the shell.



Squat lobster (*Galathea strigosa*). Although not normally swift-moving this animal can speedily swim backwards from danger by vigorously flapping its abdomen. Individual members of this group do not seem to have common names and are all called squat lobsters.

Several members of this group like to camouflage themselves with seaweed, and both seaweeds and hydroids will get a footing on the shell of aged adults because the older crabs rarely change their shells and so these passengers get a chance to settle down. In tanks containing gravels of medium or large size the spider crabs might take to endeavouring to put the gravel on to their backs, which is an amusing sight to watch as they patiently and solemnly go through the process of trying to camouflage themselves with gravel.

Spider crabs are not always good tank inhabitants because they might not settle down to take the foods which an inland aquarist can supply. If feeding seems a problem at first some special effort should be made to provide them with fresh gurnard meat for a while, for they seem to take this readily. Once accustomed to the confined quarters of the aquarium they can be weaned on to other foods.

The slow and deliberate movements of the spider crabs, the long and ungainly legs, their comparative inoffensiveness (largely due to the slender pincers), make spider crabs interesting and usually amusing occupants of home aquaria.

Hermit crabs (Paguridae). These well-known animals require no description. Sufficient to say that although they do not settle down very readily and should be isolated or kept with inoffensive animals for a while, they are worth a little extra care. They should be left quietly alone, fed every day or so on tiny morsels of crab or molluscan flesh and allowed to become familiar with their surroundings without interference. Watch to ensure that your specimen has not got a rag-worm, *Nereis fuca* (Sav.), living parasitically in the hermit's shell or you may need to supply food for both animals! Specimens may be obtained with the shell covered by the coelenterate *Hydractinia echinata* (Fleming), like a pale pinkish encrustation, or by the sulphur sponge *Suberites domuncula* (Olivier); these should not be used in ordinary aquaria since the conditions are not suitable for these mutualists.

Either the cloak or the parasite anemone (distinguished by the fact that the cloak anemone literally is



Velvet swimming crab (*Macropipus puber*), an aggressive species here seen moving towards the camera in typical attack stance with pincer legs spread wide and pincers at the ready.

like a cloak) can be employed but one should make sure that the anemone is properly fed in these unnatural conditions.

Feeding tricks

In many respects the crustaceans make the most interesting inhabitants for home aquaria because of their general inquisitiveness and their almost human habits! Unlike, say, anemones, molluscs and the

echinoderms, the walking crabs' antics can be appreciated in human terms and this heightens their attraction, especially for children. Some can be taught 'feeding tricks', such as collecting food from a particular rock or crevice, if placed at a starting point and darkness/light is used as a stimulus. Offer small portions of food every day at regular times, employing the same rock starting point for the crab, until the animal reacts properly—then increase

the starting point-to-food distance slowly.

It is not to be forgotten by the technically minded that barnacles are also crustaceans. However, neither the acorn barnacles (several species are present in the intertidal zones) nor the stalked barnacles (seldom recorded except here and there at extreme recession of spring tides of the vernal equinox) are of any value in ordinary aquaria. They are filter-feeders.



GUPPY

World

THERE is one annual show that I suffer for the sake of marital bliss—the Brighter Homes Exhibition. Whether you call it 'Ideal' or otherwise, it still remains for me a very dull way of spending an evening. Not so my family, they love the show. With the kind of look a swarm of locusts must give a green field, they soon fall under the salesman's spell and decide there and then that change is the 'in' thing.

But I actually enjoyed this year's visit. The secret was that I viewed the show through the eyes of an aquarist and it was very enlightening.

Mind you, it had its moments. There was the chap who spent 15 minutes convincing me that without his central heating system we were enjoying an existence only fit for an Eskimo. Coming to the end of his obviously rehearsed speech he asked: 'Just how big is your house?' Thinking of my fish house I replied: 'Fourteen foot by nine with just one window and one door!'

He beat a hasty retreat muttering that not all the nuts came from Brazil.

Despite that I did find much that was useful to the guppy breeder. Snap-top plastic boxes that would keep my fish food free from uninvited fellow travellers; insulation

that didn't cost the earth; a plastic baster, ideal for brine shrimp. The gadgets one could adopt were unlimited. My *pièce de résistance* was a very comfortable, adjustable chair that will enable me to enjoy my fish without risking a dislocated neck or necessitate Yoga.

By PETER UNWIN

Next time the missus drags you off to one of these shows, why don't you try my formula. But don't fall for one of those glass-cutters that guarantee even 'I' could use one. I did—and I still can't!

When it comes to the subject of disease, fishkeeping, especially for the specialist, can be likened to a game of golf. No sooner are you out of one hole than you are in another.

Latest mystery affliction that is troubling hobbyists has been christened 'Singapore tail', probably because it has been identified with imports from this Oriental outpost.

The disease seems to be caused by

sporozoans, single-celled microscopic organisms belonging to the Protozoa, always difficult to treat because they rarely confine their insidious activity to just one part of the guppy's anatomy. All we can say in simplification is that they are parasites.

The affected fish I received had a slight darkening of the tail and caudal peduncle region and the parasites were identified to be *Lentosporea cerebralis*, first discovered in the nervous system of trout.

In the final stages of this disease the guppies were unable to swim properly, twirling head over heels. One breeder told me that offspring from the affected fish had skeletal deformities. These are caused by the *L. cerebralis* entering the cartilage and thus stopping the process of ossification or bone building.

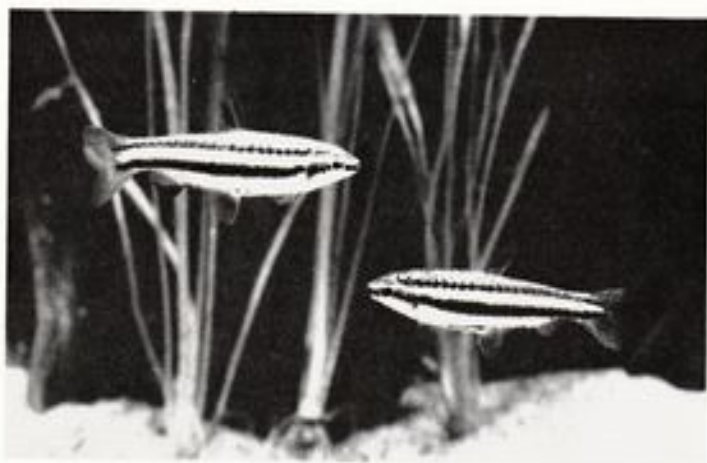
Scientist Fujita described at least seven different types of *Lentosporea* in Japanese fish and I suspect that the parasite arrived at Singapore via Japan. Even if the infected fish recover from the infection, the deformities remain.

• • •
'Out of the mouths of babes and . . .' Whenever I read that quotation I am reminded of a cute story told me by Fred Campbell, well-known northern aquarist who until recently was secretary of the Fancy Guppy Association. Fred keeps his fish in a shed in his garden, a structure that is crammed from floor to ceiling with tanks containing just one species of fish.

Fred is always willing to encourage anyone to start in the hobby and his 'retirement' is often interrupted by

Continued on page 179

Breeding the Dwarf Pencil Fish



Nannostomus marginatus

FROM the lands where the peppers grow—Surinam and W. Guyana—this decorative little fish was brought to Europe in 1928. Countless jungle streams and the shaded waters of many small rivers where the climate is almost always warm shelter these fish, which are only about 1½ in. in length. In the crystal-clear, reddish brown waters of their natural habitat they live in large shoals, often in the company of species of *Nannobrycon*, *Hemigrammus*, *Pristella*, *Hyphessobrycon*, *Copeina* and so on.

The dwarf pencil fish has a short, plump body, without adipose fins. Three dark horizontal bands stand out clearly along its sides, red and gold coloured. The tail fin is colourless but the other fins, particularly in the male, are blood red. Sex differences in the fish are clearly distinguishable: the male is slimmer, with more intensive coloration and a rounded dorsal fin. He is the lower fish in the photograph opposite.

Certain difficulties connected with their spawning and the small number of young obtained means that many breeders consider *N. marginatus* to be unprofitable for large-scale attention, which means the fish is valued the more highly by fanciers. They are undemanding and peace-loving—I keep a shoal of them in a medium-sized tank planted with low-growing plants and filled with normal tap water (mine is neutral, tending slightly to alkaline) at a temperature of 72°F (22°C). Water that is too soft does not suit this fish. I recommend making the water slightly salty and

By RUDOLPH ZUKAL

Photographs by the author

Translation by F. MARSH

Sex differences in the outlines of these fish are clearly visible as the male (on the right) courts the female. At first she avoids him but eventually his butting movements appear to arouse her interest.



introducing a few surface plants to shade the fish from glaring overhead light. Under these conditions their colour can be seen to the best advantage.

Other small, peaceful species can be kept with dwarf pencil fish in a medium-sized community tank. They are active fish, swimming up and down the tank searching in the plants and along the bottom for food. Mating behaviour, and even spawning, may take place in the community tank

itself, but unfortunately these fish are inveterate egg-eaters and their eggs will disappear this way.

Breeding is not really so difficult as is sometimes stated—not so long ago the fish was classed as a 'problem' fish with regard to breeding. To obtain the spawning sequence shown in the photographs I put a tuft of Java moss in a small (12 in.) tank, planted with *Echinodorus tenellus* over the bottom and filled with water that had been left to stand. The temperature was raised to 78°F (26°C) and



Having guided the female to the plants, once she has responded to his courtship, the male presses his body against the female and the eggs are released. Courtship and spawning in this species is long drawn-out.



the male was put into the spawning tank the day before the female. When the female was added the male's colour deepened, the female appearing quite timid and pale.

At once courtship began—with the female being followed by the male while she tried to take

avoiding action from his efforts to ram her. The male swam about in the plants, trying to entice the female into them, and if he did not succeed he would 'attack' again. This hunting and pursuing lasted for nearly 2 hours, but after this the fish suddenly changed their behaviour and became quieter. The female was hunted no longer but the male displayed with outstretched fins in front of her, while she timidly swam nearer. Then the fish, I could see, were making a rocking movement, as though this were a sign of their mutual willingness to spawn.

The female searched for a suitable place and while she lay in the plants the male touched her gently with his jaws in the belly region. The female remained stationary—then the fish pressed together and the eggs were expelled and the fish parted. At each spawning act only a few eggs were strewn into the plants and for this reason the number of eggs is very limited. The whole spawning process lasted some hours; sometimes in fact the mating behaviour can be carried on over several days. Although the spawning place was often changed the behaviour remained constant, and the same procedure was followed each time—the male approaching the female, following her into the plants, gently touching her in the belly quarters and finally, when the chosen place was found, the dropping of the eggs took place.

The fish must be taken out as soon as they have spawned though it is often already too late, for the fish may eat the eggs as soon as they are ejected. Many breeders recommend laying a glass grid over the bottom so that the eggs will fall through the bars and the fish cannot get at them. I don't



In the top picture the pair are shown close to plants in the position in which eggs are released. Sometimes spawning takes place on the tank bottom as shown in the picture on the left, where the male is butting the female before egg-laying commences

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In continuation of the bottom-spawning act commencing in the lower picture on the opposite page, the pair here are seen adopting the spawning position almost on the gravel.



consider this very useful—the eggs hang on the plants and don't in fact fall through the grid as planned.

Before the spawning I keep the sexes apart and as soon as the female is full enough I put the fish into the spawning tank. It is possible to see at once whether it will come to a mating or not. The important one to watch is the male—if he proves unfit he is changed for another one. I wait in front of the tank with a glass rod from Saturday to Sunday morning to suck out the eggs as they land

and put them in another tank at once. The fish are not disturbed by this procedure while mating is in progress. If it is not possible to spend all this time in front of the tank I recommend feeding the fish during the spawning, but very carefully—the fish will snap at any food as if it were eggs during this period.

The tank with the eggs in should be tended in the light. After 36 hours the fry appear hanging on the glass sides; they are free-swimming on the sixth day and can then take live food.

Guppy World

continued from page 175

visitors who have taken him at his word.

Our story commences when he was proudly doing just that for a rather inquisitive schoolboy who had just come into the district. As the lad moved from tank to tank, his question about what fish each contained received the same answer from Fred: 'Guppies!'

About to leave, his inspection completed, the boy turned and with a quizzical look on his 'shining morning face' asked: 'Haven't you got any tropical fish then?'

There is no answer to that—at

least none from a fanatical guppy man like Mr Campbell that we dare to print!

• • •

At first glance the fact that pensioner Arthur Black has had to give up his 20-year-old hobby of breeding budgies might not attract the attention of any aquarist. But the Valuation Court ruling against this 66-year-old, retired engine driver was that an assessment of five pounds had been placed on his 21 ft. by 8 ft. wooden garden shed. In court, the

Chester Valuation Officer said that everyone should be aware that temporary (?) buildings, such as Arthur's aviary, are liable to rating.

I wonder how many readers keep their tanks in an outside fish house that could qualify for the attentions of some 'official'? Don't let that word temporary structure put you off; a shed is a shed, is a shed.

If you think this was an isolated case then hearken to what this particular official said on conclusion of his case: 'In my opinion even a hen house should be rated, providing it isn't on any agricultural land.'

It seems that even our leisure pursuits are not safe from the interference from officialdom, so beware the next time you have a caller at your home who wears a bowler hat—especially if he is carrying a tape measure.

Variation in Guppies

WERE I well versed in the complexities of genetics I would no doubt have used the word mutation instead of variation in the heading of this article. What I am setting down, however, is merely the musings of a layman, offered more as food for thought, so I am adhering to layman's language.

There must be scores of people like myself who were originally attracted to guppies by the brilliance and variety of the colours displayed by the males, and the vigorous, lively nature of their behaviour. Having acquired some, the next thing that strikes one is that with little or no inducement they will produce large numbers of young frequently and regularly. As the young develop, however, we notice that not only are they all different in colour but they have different shaped fins as well. There may be one which takes our fancy more than the rest and we think how nice it would be to have a tankful, all like that one. So we start out on the fascinating yet frustrating art of guppy breed-

By FRED CAMPBELL

ing, and, if we are of a determined disposition, we are hooked for life.

Why is the male guppy so colourful and so full of life? We are led to believe that this is to make him attractive to the female, but I doubt very much if this is the truth. Considering that the average female guppy, from about the age of 7 weeks to death, is carrying young, I should imagine the last thing she is concerned about in a male of the species is his attractiveness, and at the sight of one she is more inclined to make a bee-line in the opposite direction. No; the reason why the male guppy is so colourful and why he constantly swims around the female gyrating and shimmying, is for her protection. She is constantly pregnant and he flashes his brilliantly coloured tail to keep off any enemies, real or imaginary, that may be around.

Here then lies the answer to his colouring and why it is relatively easy for breeders to produce and maintain a strain of fish which are all alike so far as colour goes. When you look at the shape of the fins, however, you are confronted with an entirely different kettle of guppies. It is more than likely that there will be variations, and although specialist groups have formulated Standards based on the shape of the dorsal and caudal fins, time has proved how difficult it is to maintain any particular one.

Whilst I am vaguely aware of the Mendelian principles of heredity I do not think guppies are: either that, or they choose to ignore them. During the many years the little blighters have been kidding me I have noticed that in any particular strain only a certain percentage carry a caudal of the desired shape. Many of the remainder, however, owing to the definition between the Standards being so small, may qualify for some other Standard.

In my humble opinion this diversity is governed by the top and bottom rays of the caudal fin, the development of which can cover a complete cycle, and at any stage, careful selection and mating can result in at least a fair percentage of the desired shape being produced. Until the broad-tailed varieties made their appearance from America, sometime in the 1950s, the earlier fanciers were limited to short-tailed types and many attractive Standards were formulated. These Standards, although having lost much of their earlier popularity, are still maintained mutually by the Federation of Guppy Breeders' Societies and the Fancy Guppy Association.

Close scrutiny of the short-tails reveals a tendency for the top and bottom rays of the caudal fin to force themselves outwards centrally. Commencing with the roundtail, which is probably the nearest shape to the wild guppy, these rays meet in the centre, forming a complete circle; they then start their outward push, giving us, in varying stages, the cofertail, speartail and pintail. Having decided that they have gone far enough the top ray curls upwards and the bottom ray curls

In an Antique Setting



An unusual combination. This Regency display cabinet (about 1810) of Egyptian style, brass-inlaid veneered yew wood, was on view at the Antiques Fair in London with an all-glass tank of tropicals inside. The tank was made and set up for M. Harris & Sons by Tachbrook Tropicals Ltd.

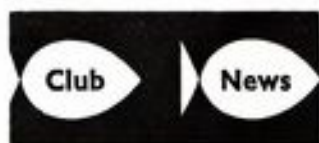
downwards to give us the lyretail. This, I think, is the ultimate in short-tail development and the most difficult to achieve and maintain, an opinion borne out by the fact that the FGBS chose it as their emblem.

It does not appear to be an impossible conjecture that the top and bottom rays could continue their outward thrust on a wider divergence in some instances and give us the scarftail, possibly a starting point

for the divergence to broad-tails. A reluctant divergence, I would say, because of the notable tendency towards inward curving in the extremities of the veiltail, thus presenting the breeder of deltatails with the problem of maintaining the true delta shape. One can easily visualise a neglected strain of veiltails reverting eventually to the roundtail shape, which, as I said, is probably nearest to the wild.

Whether the ever-increasing pop-

ularity of the broad tails, and the consequent decline in the number of short-tailed varieties appearing on the show bench (the lyretail is virtually non-existent), has anything to do with their readiness (or otherwise) to comply with the breeder's wishes, I would not know. It may be, however, that if the earlier FGBS breeders had not been so intent on the lyretail, the first broad-tails would have been produced in England instead of in America.



CONTINUING on their triumphant way, **EALING & D.A.S.** emerged as victors of the second leg of their three matches against **RIVERSIDE** and **RUNNYMEDE A.S.**, but with one match still to go Ealing are not quite ready to count their chickens. However, as a result of their victory Ealing increased their points total in the matches to 59 (Riverside 25, Runnymede 16). An excellent slide show on cichlids given by Mr K. Purbrick, Mr B. Mould and Mr D. Anderson of Hendon A.S. provided the entertainment at the match, and Ealing members are indebted to these three aquarists for stepping into the breach at the last minute and filling it so admirably. Forthcoming attractions at the club include an 'activity' evening and a talk by Mr F. Tomkins, chairman of the F.B.A.S. Judges and Standards Committee. New members are always welcome. Further information from secretary Mr C. Rainbow, 25 Lynton Road, Chesham, Bucks.

THE third Open Show of **DUKERIES A.S.** again proved quite successful, attracting 321 entries from 22 societies, although there were two other shows on the same date.

SECRETARY Mr W. Logan of The CLYDE A.C. writes: 'Mr Tom Boyle, who was the club secretary from its foundation, has left to take an appointment in Uganda. We, and we are sure, every other club in the West of Scotland to whom he gave lectures and slide shows, wish him the best of luck in his new venture.'



Mr D. Sewell, the major award winner at the Derby Regent Open Show, with the awards he gained (see report on this page)

The four judges were Mr J. Skinner, Mr P. Moorhouse, Mr A. Abdy and Mr G. Sibson. Best fish in show was awarded to Mr D. Kennedy of Bradford for his magnificent black knife fish (88 points). Class winners were:

Livebearers, Swordtails: D. & B. Cohen (Castleford). Guppies: Mr B. Whitlam (Dukeries). Mollys: Mr R. Green (Doncaster, section winner). Platys: D. & B. Cohen (Castleford). Barbs, Small: P. & A. Carey (York, section winners). Large: Mr Hubert (Derby). Characins, Small: Paul Reynolds (Dukeries). Large: Mr R. Holmes (Derby, section winner). Egg-laying toothcarps: Mr P. Spillehouse, (Workop A. & Z., section winner). Danios rasboras and minnows: D. & B. Cohen (Castleford, section winners). Sharks and foxes: Mr G. Wilby (Bradford, section winner). Cichlids, Small: Mr M. Hubert (Derby). Large: Mr D. Sewell (Sherwood, section winner).

Catfish: Mr P. Shipley (Selby, section winner). Loach: G. Thickbroom (Castleford). Fighters: D. & B. (Castleford, section winners). A.o.v. anabantid: Mr M. Jackson (Workop). A.o.v.: Mr D. Kennedy (Bradford). Pairs, livebearers: Mr R. Hildop (Swillington, section winner). Pairs, egg-layers: Mr M. Allsop (Alfreton). Breeders, livebearers: D. & B. Cohen. Breeders, egg-layers: D. & B. Cohen (section winners). Juniors: G. Thickbroom (Castleford). Coldwater: Mr E. Fearnborough (Independent).

AT SWILLINGTON A.S. sixth inter-society show, Castleford was the Society gaining most points and Mr P. Carey (York) the competitor whose entry gained the best in show award. Class winners were:

Guppies: Mr P. Reynolds (Swillington) A.o.v. livebearer: Miss D. Stephenson (Castleford). Barbs: Mr P. Carey (York). Characins: Mr G. Thickbroom (Castleford). Catfish and loach: Mr Booth (Leeds). Cichlids: Mr P. Carey (York). Carps and minnows: Mr Bing (South Leeds). Fighters: Mr and Mrs Cohen (Castleford). A.o.v. anabantid: Mr and Mrs Cohen. Toothcarps: Mr L. Greenall (Tadcaster).

Livebearers, pairs: Mr M. Hildop (Swillington). Egg-layers, pairs: Mr Booth (Leeds). Breeders, egg-layers: Mrs S. Harty (Swillington). Breeders, livebearers: Mr and Mrs Cohen. A.o.v. tropical: Mr Hoptonall (Castleford). Furnished jars: Mr B. Megson (Aireborough).

DERBY REGENT A.S. Open Show attracted the largest crowd yet seen at this annual event. Over 2,000 people attended the show, travelling from as far away as Yarmouth, Sheffield and Leeds, and exhibition entries were 50% up on last year, totalling 460. Ald. Mrs E. Wood, ex-Mayor of the Derby Borough, opened the show and presented the major awards to the following: Eric Shaw trophy for the best fish in show, Mr Sewell (Sherwood A.S.); Esme Wilkinson trophy for best large fish, Mr Sewell; tankard for best small fish, Mr A. Thomas (Bedworth); Derby Regent trophy for best a.o.v., Mr R. Harlow (Derby Regent); Terry J. trophy for decorative aquaria, Mrs Kendrick (Derby Regent). Winners of the classes were:

Guppies: Mr R. Holmes (Derby Regent). Mollys: Mr V. Knowles (N. Staffs). Swordtails: Mr Wells (Doncaster). Platys: Mrs Jones (Independent). Barbs, Small: Mr D. Jackson (Dukeries). Large: Mr S. Hill (Alfreton). Characins, Small: Mr G. Goodrich (Grantham). Large: Mr D. Sewell (Sherwood). Fighters: Mr J. Derrin (Dukeries). A.o.v. anabantid: Mrs Jones (Independent). Large cichlids: Mr Hubert (Derby). Angels: Mr D. Sewell. Sharks and foxes: Mr R. Harlow. Corydoras: Mr D. Sewell. A.o.v. catfish: Mr C. Parnall (Creswell). Killies: Mr B. Hughes (Stans & B.K.A.). Minnows and danios: Master N. Cook (Do caster). Rasboras:

Mr B. C. Roberts (Independent). Dwarf cichlids: Mr A. Thomas (Bedworth). Pairs, livebearers: Mr R. Harlow (Derby). Pairs, egglayers: Mr J. Derris (Dukeries). Breeders, livebearers: Mrs Jones (Independent). Breeders, egglayers: Mr Wells (Doncaster). A.O.V. tropical: Mr R. Harlow. A.O.V. female: Master M. Haslop (Sittington). Juniors: Livebearers: Master M. Haslop. Egglayers: K. Brass (N. Staffs). Goldfish and comets: Mr M. Sutton (Atherstone). Shubunkins and fancy goldfish: John and Stella (Sheffield). A.O.V. coldwater: Mr C. Hill (Nottingham). Decorative aquaria: Mrs Keadick (Derby).

RUNNYMEDE A.S. broke into the major show field with an Invitation Show, run on open show lines, which included 23 classes of fishes and aquatic plants. The eight societies taking part were: Bracknell, Ealing, High Wycombe, Hounslow, Riverside, Roehampton, Runnymede and Uxbridge, and between them they benched 410 entries—nearly 500 fishes and plants. The show was a great success and the Society look forward to continued support and friendship in future ventures. A special 'thank you' is extended to the five F.B.A.S. judges, Mr B. Baker, Mr C.A.T. Brown, Mr H. Towell, Mr A. Blake and Mr P. Ginger, who did a splendid job. The best fish in show award went to Mr and Mrs Lambourne of Roehampton A.S. for their black shark, and the award for the society gaining most points was won by Bracknell A.S. Winners of first place awards were:

A.s. barb: Mr C. E. Pike (High Wycombe, checker barb). Characins: Mr and Mrs Lambourne (Roehampton, *Danichthys heussi*). *Hypheosorbus*: *Hemigrammus* and *Chlorodon*: Mr J. Richardson (Runnymede, *H. subvirgatus*). Cichlids: Mr M. Wetherall (Riverside, *Tilapia nilotica*). Dwarf cichlids: Mr P. Newman (High Wycombe, *Nann. anomala*). Labyrinth: Mr M. Goss (Riverside, *Ctenopoma argus*). Egg-laying toothcarps: Mr R. G. Armstrong (Bracknell, *Cynolebias ladiges*). Tropical catfish: Mr J. Batts (Ealing, *Pim. laterispinis*). Corydoras and Brochis: Mr T. Duffy (Bracknell, *Brochis carolinensis*). Rasbora: Mr M. Carter (Bracknell, *Rasbora petenensis*). Danios and minnows: Mr M. Pratt (Hounslow, giant danio). Bala and loach: Mr and Mrs Lambourne (Roehampton, *Bala sudanica*). A.O.V. tropical egg-layer: Mr and Mrs Lambourne (Black shark). Pairs: Mr R. C. Armstrong (Bracknell, *Cynolebias leleupi*). Guppies: Male: Mr M. Wetherall (Riverside). Female: Mr M. Wetherall (Riverside). Mr S. Mason (Roehampton, ruzodo sword). Plants: Mr D. Schram (High Wycombe, red wag plant). Mollies: Mr J. Batts (Ealing, *velifera mollis*). A.O.V. livebearer: Mr J. Batts (*Lilium vittata*). Breeders, egglayers: Mr R. G. Cox (High Wycombe, *Corydoras paleatus*). Breeders, livebearers: Mr L. G. Little (Bracknell, margold platy). Plants: Mr J. Parker (Uxbridge, *Cypr. senilis*).

ARRANGEMENTS made for the **WORKSOP A. & Z.S.** Open Show went particularly smoothly this year. Show secretary Mr F. G. Sibson had the showing area cleared whilst judging was in progress and the four F.N.A.S. judges, Mr A. Abdy, Mr J. Bowers, Mr B. Inman

YATE & D. A.S. sadly record the death of reporting officer Mr Don Smith, after years of suffering bravely borne, and extend deepest sympathy to his wife and daughters. Mr M. E. Ridge, of 46 Fairlyn Drive, Kingswood, Bristol BS15 4PU, has been appointed to succeed as reporting officer and will be pleased to receive magazines and continue correspondence.

and Mr P. Moorhouse, remarked on the fine arrangements and noted that the fishes were not unduly disturbed before judging. There were 401 entries, and the best fish in show trophy was won by Mr and Mrs Cohen of Castleford. Class winners were:

Swordtails: Mr M. Hopewell (Workop). Guppies: Mr T. Morrison (Workop). Mollies: Mr J. Igoe (Siberwood, class winner). Plants: Mr M. Allsopp (Allerton). Barbs, Small: Mr J. A. Whiteley (Aireborough). Large: Mr and Mrs Cohen (Castleford, class winners). Characins, Small: I. & R. Hepburn (Castleford, class winners). Large: Mr D. Kennedy (Bradford). Egg-laying toothcarps: Mr S. Noble (Boscon, class winner). Danios: E. & K. Clives (Castleford). Rasbora: I. & R. Hepburn (Castleford, class winner). Sharks and loaches: Mr and Mrs Cohen (Castleford, class winners). Minnows: Mr J. Derris (Dukeries). Cichlids, Dwarf: Mr J. Derris, Large: Mr R. Muggleton (Workop). Angels: Mr M. Woodley (Dukeries, class winner).

Catfish: Mr and Mrs Gates (Castleford). Loach: I. & R. Hepburn (Castleford, class winners). Fighters: Mr and Mrs Cohen (Castleford, class winners). A.O.V. anabantids: Mr T. Sands (Boscon). A.O.V. tropical: I. & R. Hepburn (Castleford, class winners). Pairs, livebearers: Mr H. Airton (Rotherham). Pairs egg-layers: Mr and Mrs Cohen (class winners).

Breeders, livebearers: Mr A. Chapman (Gainsborough). Breeders, egg-layers: Mr and Mrs Cohen (class winners and best in show). Juniors A.O.V. tropical: Miss J. Sibson (Workop, class winner).

Goldfish: Mr J. S. Hall (Aireborough). Shubunkins and fancy goldfish: Mr E. W. Fairbairn (Independent). A.O.V. coldwater: Mr A. Higginbottom (Sheffield).

MERSEYSIDE A.S. Open Show was very successful, with 394 entries from clubs from all over the north-west. The trophy for the visiting member gaining the most points was won, along with the best fish in show award, by Mr and Mrs Wilkes of Middleton A.S. Merseyside members had some success, with Mr Norman Petersen taking the trophy for the M.A.S.

£25 for the best coldwater and £25 for the best tropical fish are being awarded this year at the MIDLAND OPEN SHOW being held in Bingley Hall on 18th-21st August. Cash prizes are also given for decorative aquaria and the society display entries.

member with most points (Harry Swanson trophy), and Merseyside received the Merseyside Show Shield, gaining 61 points; (2, Belle Vue A.S., 48, 3, Middleton A.S., 33). Class winners were:

Guppies: Mr & Mrs Cobb (Belle Vue, 74 points). Mollies: Mr & Mrs Grimshaw (Sutton, 73). Plants: Mr & Mrs Wilkes (Middleton, 78, section winners). Sword-tails: Master L. Derbyshire (Blancow, 76). Barbs, Small: Mr F. Gorgoy (Oldham, 74). Large: Mr J. Rowbottom (Hyde, 74, section winners). Labros, sharks and flying fishes: Mr N. Petersen (Merseyside, 99, section winner). Loaches: Mr D. Walker (Rushey, 77, section winner). Corydoras catfish: Mr R. Davis (Belle Vue, 58, section winner). A.O.V. catfish: Mr & Mrs Bewick (Middleton, 76). Anabantids: Mr N. Petersen (Merseyside, 79, section winner). Fighters: Mr & Mrs Cobb (B.V., 74). Cichlids, Dwarf: Mr N. Petersen (Merseyside, 75). Large: Mr & Mrs Wilkes (Middleton, 77, section winners). Angels: Mr & Mrs Jackson (B.V., 75). Characins, Small: Mr & Mrs Wilkes (Middleton, 84). Toothcarps: Mr P. Knowles (Northwich, 76, section winner). Rasbora and danios: Mr D. Charlton (Merseyside, 80, section winner).

Breeders, egg-layers: Mr J. Burton (Huddersfield, 76, section winner). Breeders, livebearers: Mr N. R. Gibson (Huddersfield, 76, section winner). Pairs, egg-layers: Mr R. Parkes (Merseyside, 78, section winner). Pairs, livebearers: Mr H. Brown (Northwich, 77). A.O.V.: Mr R. Parkes (Merseyside, 84, section winner). Juniors: D. Moorcroft (Merseyside, 81, section winner). Ladies: Mrs A. K. Jackson (B.V., 75, section winner). Fancy goldfish: Mr S. Walsh (Accrington, 77, section winner). A.O.V. coldwater: Mr C. Whitley (Accrington, 74). Common goldfish: Mr D. Charlton (Merseyside, 71).

JUDGES Mr C. A. T. Brown, Mr F. Tomkins, Mr B. Baker, Mr H. Towell and Mr R. Enson made the best fish in show award at **SOUTHEND, LEIGH & D.A.S.** Open Show to the *Diatichthys lavoisieri* entered by Mr and Mrs Lambourne. Class winners were:

Furnished aquaria: Mr E. Nicoll (Thurrock A.S.). Barbs: Mrs Cowell (Bethnal Green, tiger barb). Characins: Mr and Mrs Lambourne (Dist. Japan). Cichlids: Mr K. Adams (Southend, Leigh & D., *oculata*). Angels: Mr D. M. Dure (Witham, marble). Dwarf cichlids: Mr F. G. Newman (N. anomala). Labyrinth: Mr S. G. Cowell (Bethnal Green, *Ctenopoma anguliferum*). Fighters: Mr D. C. M. Durrant (Thurrock). Egg-laying toothcarps: Mrs and Mrs Lambourne (R. Adonia). Tropical catfish: Mr G. Greenhalf (Pimolida). Corydoras and Brochis: Mr G. Greenhalf (Adonia). Rasbora: Mr M. Carter (Bracknell, *suratensis*). Danios and minnows: Mr and Mrs Balhous (Walthamstow, rebr). Loaches: Mr and Mrs Lambourne (B. *madras*). A.O.V. tropical: Mr R. Kerridge (Harlow, Siamese tiger).

Guppies, male: Mr J. Holt (Thurrock). Females: Mrs Tucker. Swordtails: Mr P. D. O'Brien (Thurrock, blink sword). Plants: Mr S. G. Cowell (Bethnal Green, margold). Mollies: Mr R. Kerridge (Harlow, albino). Coldwater fancy: Mr K. Adams (S.L.A.D., *calico furtiva*). A.O.V. coldwater: Mr D. E. Goodbody (goldfish). Breeders, egg-layers: Mr and Mrs Fagan (green kissing gourami). Breeders, livebearers: Mr S. Mason (red wag platy). Minnows: Mr K. Adams (S.L.A.D., *virgatus major*). Plants: Mr F. D. O'Brien (Thurrock, dwarf cryptocoryne).

A GIANT gourami belonging to Mr R. Ott won the best fish in show award at the **CAMBRIDGE & D.A.S.** annual show, and Mr Ott also won the Breeders Cup. Cambridge themselves won the inter-club furnished aquaria trophy, and the junior Miniature Cup went to C. Smith. First place winners were:

A.v. barb: Mr R. Ott. A.v. characin: Mr R. Ott. A.v. cichlid: C. Smith. A.v. labryinth: Mr R. Ott. A.v. catfish: Mr F. Farrington. Danio: Mr J. McMillan. Loach: Mr P. Sanderson. A.v. egglayer: Mr R. Ott. A.v. tropical pair: Mr P. Martin. Guppy, male: Mr T. Hall. Female: Mr T. Hall. Swordtail: Mr L. Georgan. Mollie: Mr L. Georgan. Single-tail goldfish: Mr D. Hibo. Tri-tail goldfish: Mr C. Smith. A.O.A. coldwater: Mr R. Russell. Tropical breeders, egglayers: Mr P. Martin, livebearers: Mr T. Hall.

REPRESENTATIVES from 17 societies attended the **COVENTRY P. & A.S.** Open Show, which attracted 452 entries of very high quality fishes, five MAAS Gold Pins (80 points and over) being awarded. The best fish in the show, a lemon-finned barb owned by Mr and Mrs Bird of Leamington & D.A.S., won the Society Rose Bowl and a gold pin. The club with most entries, and also the club gaining the most points was Rubery Select; individual competitors with most entries and also the most points were Mr Atwood and Mr Williams of Rubery. Winner of the Rosedale Plaque (best egglayer brood) was Mr D. Eastingwood of Coventry (*Haplochromis burtonii*), and Mr D. Beard of Leamington won the S.O. Memorial Trophy for best Siamese fighter. Class winners were:

Male veiltail guppy: Mr S. Arkwell (Nuneaton). A.O.V. male guppy: Mr T. Fox. A.v. female guppy: Messrs Atwood & Williams (Rubery). Mollie: Mr & Mrs Deakin (Nuneaton). A.O.V. livebearer: Atwood & Williams (Rubery).

Danio and minnow: Mr L. J. Hooper (P.A.S.). Rasbora: Mrs Leigh (Nuneaton). Barb, small: Mr B. Smith. Large: Mr & Mrs Bird (Leamington). Dwarf cichlid: Mr R. Woodward (Rubery). Angelfish: Mr S. Dean (T.K.A.G.). A.O.V. cichlid: Mr S. Dean. Characin, small: Mr L. W. Hooper. Large: F. & J. Pearson. Killifish: Mr A. Cashmore (Staffs). Siamese fighter: Mr D. Beard (Leamington). A.O.V. snub-nosed: Mr S. Blenheim (Nuneaton). Corydoras and Brochi: Messrs Atwood & Williams (Rubery). A.O.V. catfish: Mrs J. Woodward (Rubery). Loaches: Mr & Mrs Aucott (Nuneaton). Pair, livebearer: Miss S. Bird (Leamington). Pair, egglayer: Mr D. Cleaver (Rubery). Livebearer broods: Mr D. Eastingwood (Coventry). Laboer: Mr & Mrs R. Muller (Rubery). A.O.V. tropical: Messrs Whitfield & Massey (Rubery).

Shubunkin: Mr C. C. Cartwright (Leicester). Common goldfish: Mr M. Shilton (Atherstone). A.O.V. fancy goldfish: Mr & Mrs Deakin (Nuneaton). British native: Mr R. Woodward (Rubery). Miniature furnished jar: Mr & Mrs R. Muller (Coventry).

BOSTON A.S. third Open Show again came in for high praise from exhibitors and visitors alike. The show, ranked among the best in the

East Midlands, attracted 373 entries, aquarists attending from as far afield as Yorkshire. The best in show award and trophy for the best tropical fish went to Mr D. Sewell of Sherwood A.S., and coldwater expert Mr J. S. Hall of Aireborough A.S. won the trophy for the best coldwater fish in the show. Class winners were:

Guppy: Mr J. Jones (Grantham). Mollie: Mr J. Igoe (Sherwood). Sword-tails: Mr and Mrs Dearden (Grimsby). Platy: Mr M. Allsopp (Alfreton). Barb, small: Mr P. Jensen (Grimsby). Large: Mr Rawling (Lincoln). Characin, small: Mr J. Goodridge (Grantham). Large: Mr D. Sewell (Sherwood). Killifish: Mr N. Smedley (Alfreton). Minnows and danios: Mr J. R. Rhodes (Scuzthorpe). Sharks and foxes: Mr Whitelore (Scuzthorpe). Rasbora: Mr H. Blades (Worksop). Dwarf cichlid: Mr F. Martin (Alfreton). Large cichlid: Mr Tite (Kettering). Angelfish: Mr D. Sewell. Catfish: Mr D. Sewell. Loaches: Mr D. Sewell. Fighters: Mr J. R. Rhodes. A.O.V. aquarist: Mr E. Kirk and son (Courtside, Grimsby). A.O.V. tropical: Mr G. Kibington (Doncaster).

Breeders, egglayers: Mr and Mrs Wells (Doncaster). Breeders, livebearers: Mr H. Kahn (Lincoln). Pair, egglayers: Mr and Mrs Wells. Pair, livebearers: Mr J. Igoe (Sherwood). Goldfish and comets: Mr J. S. Hall (Aireboro). Shubunkin and fancy goldfish: Mr J. S. Hall. A.O.V. coldwater: Mr J. S. Hall.

THE new CYMRU NATIONAL AQUARISTS' ASSOCIATION

will hold its first General Assembly on Sunday, 12th September at 2.30 p.m. at the Angel Hotel, Cardiff. The secretary of the Association, Mr Dick Richards, invites all Welsh clubs to send two delegates. The Association is an associated member of the FBAS. All enquiries should be sent to Mr Richards at 3 Sherwood, Llynypnia, Rhondda, Glamorgan.

THE SOUTH WESTERN GROUP of the BRITISH MARINE A.A.

held their May meeting at the home of Mr and Mrs A. Carr of Brixham, where Mr and Mrs Carr's tanks were the subject of much discussion and interest, especially their three magnificent specimens of greater pipe fish (*Syngnathus acus*). Also discussed was Mr Lew Doubleday's 'Seafari' to Malta. Thanks to Mr Derek Sanderson and son, BMAA members resident in Malta, Mr Doubleday was able to bring back quite a few specimens, such as *Blennius pavo*, *Tripterygion tripteronotus*, *Sargus sargus* and several others. The June meeting was held in Exeter at the home of Mr James when details of the 'Seafari' to be held on Sunday 1st August were discussed. Member Mr Farr will provide a diving boat and has undertaken to collect specimens with the assistance of two divers. After a commentary by Mr James on his excellent tanks and shoals of *Centro-*

latrus exoletus a general discussion took place on feeding, members indicating that their fish enjoyed a wide variety of food, from cat food to frozen peas. Members propose to give strong support to the marine section of the Torbay A.S. Open Show to which the FBAS have awarded the Marine Trophy.

A TOTAL of just under 1000 fish were benched at the FANCY GUPPY ASSOCIATION'S International Show this year and there were eight A class judges to assess them. There was an excellent selection of entries from Singapore, Germany and California, overseas fish winning many awards including the first six places in the 96-strong delta class. The following are the first-place winners in the various classes. Letters in parentheses denote Club if overseas, Section if home entries.

M, Manchester, B, Birmingham; E, Edmonton; R, Radlett; NM, non-member; SGC, Singapore Guppy Club; SAS, Singapore Aquarists Society; SCGA, Southern California Guppy Association; HD, Bunderepublik Deutschland; GFG, Gemeinschaft fur der Förderung der Guppzyucht (Berlin); O.G.G., Austria.

Delta, 96 entries: Mr Koh Tee Yang (SGC, 76 points). Long dorsal veiltail, 24; Mr J. Hesketh (M, 77). Short dorsal veiltail, 64; Messrs Fowles & Vinal (E, 78). Fantail, 17; Messrs Weinstein and son (E, 74). Topsword, 31; Mr D. O'Brien (E, 74). Bottomsword, 20; Mr D. Crane (E, 78). Doubledsword, 24; Mr Swain (M, 78). Colour male, 21; Mr M. H. Delingpole (E, 77). Original veiltail, 17; Mr Thomas Tan (SAS, 75). Fintail, 19; Mr G. Fletcher (E, 74). Cofertail male, 20; Mr D. Crane (E, 78). Dorsaltail, 21; Mrs L. Myers (E, 73). Scortail, 19; Messrs P. and B. Walker (E, 70). Roundtail male, 7; Mr M. H. Delingpole (E, 74). Spurtail, 4; Mr M. H. Delingpole (E, 66). Lyretail, 13; Mr K. Lee (E, 74). Superbo, 46; Messrs Fowles and Vinal (E, 76). Woodstail, 34; Mr L. Goff (E, 70). Natural female, 37; Mr R. Harper (E, 70). Scalloptail female, 9; Mr D. Crane (E, 77). Cofertail female, 22; Mr Brian Brown (SCGA, 73). Metropolitans, 19; Mr W. Thompson (NM, 73). Roundtail, 4; Mr E. Murrain (E, 72). Colour female, 11; Mr W. Myers (E, 77). Breeders males, 19; Mr E. Murrain (E, 77). Breeders females, 19; Messrs Fowles and Vinal (E, 72). Breeders pairs, 25; Mr Lim Ah Loo (SAS, 80). Master breeders, 5; Mr and Mrs Phillimore (E, 78). Advanced master breeders, 2; Mr D. Curry (E, 74). Junior male, 1; Master P. Harrison (M, 72). Junior female, 2; Master P. Harrison (M, 67). Ladies breeders, 2; Miss P. Harrison (M, 67). Ladies female, 2; Mrs D. Barker (E, 72). Ladies male, 4; Miss Tiffany (E, 73). Ladies breeders, 2; Miss Tiffany (E, 71). Experimental male, 1; Mr and Mrs Phillimore (E, 70). Novice class, 11; Mr D. Cook (NM, 71).

The best fish in show award was made to the scalloptail female entered by Mr D. Crane. Mr Crane also entered the bottomsword that was awarded the best opposite sex. Best breeders award went to Mr D. Phillimore.

In Brief

... **AT NOTTINGHAM & D. A.S.** A.G.M. Mr C. Hill was made vice-president and Mr Adcock was made a Life Member. It was also agreed that honorary memberships be offered to both Mrs Walker and Mrs Oldham. Mr Woodiwiss and Mr Salisbury of the Trent River Authority recently provided members with a most enjoyable and memorable evening when they answered questions about fish in general and in particular described the work of the TRA. Mr W. H. Selby has won the pond competition (75 points, 2, Mr A. Adcock, 74; 3, Mr C. Hill, 72).

... A PRESENTATION has been made to Mr M. Scaife on his retirement as president and treasurer of **ACCRINGTON & D. A.S.**, after 20 years' service.

... A FIRST-RATE coloured slide programme of garden pool plants and a fish quiz have been included among the recent activities of **COVENTRY P. & A.S.** Winners at April and May table shows have been: a.v. livebearer, Mr M. Lewis; pairs egg-layers, Mr E. Sheehy; catfish and loaches, Mr T. Scott; egg-layer broods, B. and F. Hirst, and best in show (rainbow tetras); livebearer broods, Mr T. Manning; danios, rasboras and minnows, Mr M. Lewis. Junior-characins: P. Dewis.

... MR Harry Berger lectured to a large appreciative audience on cold-water fishkeeping, at **ILFORD & D. A.S.**, briefly covering the history of the common goldfish right up to today's more perfected strains, and giving illustrations of correct body shape and colouring with some of his own fishes. Member Mrs Rowe has had great success in recent table shows, winning outright the a.v. fancy goldfish, a.v. platy, and first and third places for a.v. labyrinth. The club is still keen to enrol new members and anyone interested should contact Mr R. Ruth, 103 Heath Road, Chadwell Heath, Essex.

... VISITING members from as far afield as Birmingham and Lancaster joined the **MANCHESTER SECTION OF THE F.G.A.** at their May meeting. Past Chairman of the F.G.A., Mr Jim Kelly, gave a widely ranging talk which was very well received. An auction of guppies and plants, kindly donated by members, enabled a considerable number of new members to take

A new Society (the **ELLIOTT A.S.**) are at present finding difficulty in arranging a full programme for meeting nights and would very much appreciate hearing from lecturers etc., or of any slide or film shows for hire or purchase on all subjects that are relative to fish or aquatic plant keeping. They wonder if there are manufacturers who can supply interesting matter etc., for discussion? Club secretary is Mr E. G. Woods (30 Frittenden Road, Waincott, Rochester, Kent).

home some good breeding stock. Best in show award at the monthly table show was won by Mr Malcolm Delingpole visiting from Birmingham.

... **BRACKNELL A.S.** members were fascinated to hear a first-hand account from show secretary Mr Les Jordan and Mrs Jordan of their experiences on their recent holiday in the United States. Many photographs were also available during the talk. Table show winners were: characins, Mr M. Carter; a.o.s., Mr M. Carter.

... **BRADFORD & D. A.S.** committee members were very pleased to see the large increase in the number of fishes entered and the awards won by members in the Inter-Society table show in May. Well over 100 fishes were benched, and the best in show award went to Mr D. Kennedy for his knife fish. Members also enjoyed a film show given by Mr H. Fletcher. At the next meeting, speaker Mr C. Binns surprised members with a most enjoyable new club competition. Members received one point for each correct answer to the large number of questions and photographs pinned around the room, covering both fishes and plants. Mr Binns also brought a number of fishes, from which members chose one to judge, points being given by a former A.Y.A.S. judge.

... IN inter-club matches with **PORT TALBOT, PORTHCAWL A.S.** were pleased to achieve 454 and 452 points against Port Talbot's 463 and 460, as these matches were the Society's first venture into showing.

... **CROYDON A.S.** members enjoyed a lecture and slide show on barbs by Mr P. Ginger. Members were particularly grateful as Mr Ginger stepped in at very short notice.

... THE newly formed **MID-KENT A.S.** is now on a firm footing and meets every first and third Wednesday of the month, 7.45 p.m., at the

Armstrong Hall, Armstrong Road, Maidstone, Kent.

... **SHEFFIELD & D. A.S.** won the first leg of the inter-societies competition with Worksop, Rotherham and Doncaster. There were 113 entries and results were: Sheffield (15 points); Worksop (8); Rotherham (1); Doncaster (0).

... THE SOUTH WESTERN GROUP of the **BRITISH MARINE A.S.** held its second monthly meeting at the home of Exeter members Mr and Mrs C. Fidoek, who have a splendid display of tanks and fish and have succeeded in establishing in a 4 ft. tank a considerable growth of *Ulva lactuca* (sea lettuce) and *Ryngliya majuscula* (mermaid's hair). Some fine specimens of *Pholis gunnellus* (butterfish) aroused considerable debate as to feeding habits and temperament. Mr John Haynes expounded some interesting tips on photographing fish and fauna and also explained which aids to purchase towards extending this interesting branch of fish-keeping. Members decided to arrange a diving expedition in the Brixham area in late July. Any marine enthusiast who would like to join the Group should contact the secretary, Mr L. Doubleday, 69A Newton Road, Torquay Devon.

... **NEW FOREST A.S.** held their A.G.M. in May, followed by the presentation of trophies for the club annual competitions to: Tropical points trophy, Mr D. Lane; Breeders trophy, Mr R. Mosely; tropical furnished aquarium C. and A. Knapp; Coldwater points trophy, Mr D. Lane. The champion tropical and coldwater fishes were judged by Mr J. Jeffrey, winners as follows: champion tropical fish, Mr M. Aust (combtail); champion coldwater fish, Mr D. Harding (weather loach).

... A WELL-ATTENDED inter-club meeting between **CARSHALTON & D. A.S.** and **CROYDON A.S.** resulted in a win by Croydon (1,214 points to 1,056). F.B.A.S. judge Mr Harry Towell awarded the first places to: characins, Mr A. Smith (Croydon, 80 points); *Corydoras*, Mr J. Begbie (Carshalton, 78); livebearers, Mr L. Wood (Croydon, 78); egg-layers, pairs, Mr K. Dryden (Croydon, 79).

... THE second annual fish exhibition staged by **MID-SUSSEX A.S.** at the Park Centre, Burgess Hill, was a great success, attended by some 1,500 people. At the following monthly meeting members who had set up one of their own aquaria at the exhibition were presented with token prizes, Miss Linda Temple receiving a heater-thermostat for



THE Federation's General Assembly in June at Conway Hall, Red Lion Square, was well attended with delegates and friends from the hobby in general.

This was an important mile-stone in the history of the Federation, for at this meeting was to be decided whether the affiliated societies would agree to the alterations to the Federation Rules (requested by the FNAS and MAAS delegates at recent meetings which have been taking place to try and formulate a plan by which the other organisations could adopt the rules for the judging and showing of fish, aquaria and plants). The Judges and Standards Committee was aware that there was quite a lot of resistance to the alteration of the Breeders' rules the FNAS has requested, and to overcome this the J. and S. Committee has agreed to re-assess the pointings. With this guarantee given I am pleased to say that all the alterations were agreed to, and in the words of Mr Sam Croft, chairman of MAAS, who was an honoured guest: 'This should prove to be a step forward in the hobby'. The setting up of two new Judges Panels was announced, one in South Wales and the other in the East Midlands.

The officers controlling the Federation's other many services,

what was judged to be the most attractive and natural aquarium. As a result of the second leg of the Over-the-Downs Trophy competition held in Brighton on 17th May, Mid-Sussex A.S. are the overall winners on points aggregate and will retain the trophy for a year. Prize cards awarded to M.S. members in this second leg were: Mr D. Soper, third (large cichlids), third (dwarf cichlids); Mr J. Walker, first (swordtails); Mr C. Corbin, first (*Corydoras*).

...MR FODEN of Huddersfield gave an interesting talk to members of KEIGHLEY A.S. and answered queries on plants in the aquarium. Class winners at the table show were: Fish of the month (characins), Mr Barker; a.o.v., Mr D. Taylor;

Championship Class Results and Forthcoming Shows Eligible for the 1971 Supreme Championship

Results Received

Class B Barbs **Corby & D. A.S.** Winner Mrs D. Cruikshank
 Class C Characins **Independent A.S.** Winner Mr G. Greenhalf
 Class Db Dwarf Cichlids **Freelance A.S.** Winner Mr M. Strange
 Class Ea Betta splendens

High Wycombe & D. A.S. Winner Mr P. Shepherd
 Class F Egg-laying toothcarps **Tottenham A.S.** Winner Mr K. Nutt
 Class J Rasboras **Medway A.S.** Winner Mrs D. Mathieson
 Class K Danios and W.C.M.M. **Thurrock A.S.** Winner Mr A. Kinsey
 Class N Pairs of fish **Hendon A.S.** Winner Mr P. Grosvenor
 Class R Platys **Croydon A.S.** Winner Mr A. M. Kinsey
 Class X O-T Breeders livebearers

Yeovil & D. A.S. Winner Mr A. Blake

Forthcoming Championship Shows

Portsmouth A.S.	8th-14th August	Singletailed Goldfish	U
Mid-Herts. A.S.	4th & 5th September	Guppy Female	P
Wellingborough A.S.	5th September	Labyrinth	E
Brighton & Southern A.S.	12th September	Mollie	S
Havant & D. A.S.	18th September	Twintailed Goldfish	V
Bracknell A.S.	25th September	Swordtail	Q
Torbay A.S.	26th September	Marine	Y
Reigate & Redhill A.S.	26th September	Cichlid	D
Ealing & D. A.S.	3rd October	Loach	L
Kingston/S.P.A.S.S.	16th October	A.O.S. Coldwater	W

Winners of Federation Championship Trophies automatically become eligible for the Supreme Championship Trophy Competition (to be staged at The AQUARIUM SHOW '71 at the Royal Horticultural Society's Old Hall, London S.W.1, 29th-31st October).

ties, badges, car badges, books, award labels, bulletin and trophies etc. gave their reports, showing improved distribution this year making for a very healthy organisation progressing along the right lines.

A very gratifying sight were the five trophies donated to the Federation for use at other society's open shows as Perpetual Trophies.

Those societies putting forward cups were Portsmouth A.S., Riverside A.S., Southend & Leigh A.S. and Uxbridge A.S. with Mr Vernon Hunt donating a cup for his favourite group of fish. It is hoped that more societies will make use of this method of getting a yearly mention on someone's open show schedule.

R. D. ESSON

novice a.o.v., Mr Hart; junior a.v., Master P. Cuttings.

...Mr Eric Wells of Doncaster recently gave an interesting talk to **CASTLEFORD & D. A.S.** on the care and breeding of *Corydoras sparacus*. Table show winners at this meeting were: novice, Mrs L. Barret; livebearers, Miss Denise Stevens; native fish, Mrs Asquith; furnished jars, Andrew Barret.

...**TONBRIDGE & D. A.S.** recently held their Club Champions evening, when the current champion, Mr Ron Taylor, gave an interesting talk on his disastrous introduction to aquaria (Dempseys in a community tank) and how he came to choose his favourite group of fishes, the small characins. His talk was highlighted by the examples

from his stock which he had brought along in show jars.

...**BRENTWOOD A.S.** members and guests from Billericay recently enjoyed a talk and slide show on barbs given by Mr P. Ginger from Uxbridge. The table show for egg-laying toothcarps and characins was judged by Mr G. Forrest, who kindly donated a book on the hobby to the youngest competitor.

...THE best in show award at the inter-club show **ALFRETON & D. A.S.** held with **SHERWOOD A.S.** was made by Mr A. Deakin to Miss M. Lindley (dwarf cichlids). 69 fishes were benched, and the home team won a resounding victory over the visitors by 22 points to 8.

... LEAMINGTON & D. A.S. members have been busily and enjoyably occupied both at home and at open shows away from home. Lectures have been enjoyed from Commander Dunn, Warden of Draycote Reservoir near Rugby on the construction and stocking of the reservoir, a demonstration by Mr Smith of Rugby on how to make an all-glass tank and a talk by Mr R. Tedds from Nuneaton on his favourite fishes, the anabantids. Members have also been successful at various open shows, with Mr and Mrs Bird gaining the best fish in show award with a lemon-finned barb at the Coventry Open Show.

Dates for Your Diary

1st August. **BLACKPOOL & FYLDE A.S.** Open Show, Raikes Parade Annex (Old Grammar School), Church St., Blackpool. Souvenir programmes, Mr G. Howard, 56 Stamford Avenue, Blackpool (phone 42676) from mid-June.

4th August. **IRISH FEDERATION OF AQUARIST SOCIETIES.** Open Show 'Aqua 71', The Wellington Hall, Belfast. Show manager, Mr W. McAuley, 43 Benview Avenue, Belfast 14.

7th August. **WALTHAMSTOW & D. A.S.** Open Show, Lloyd Park Pavilion, Forest Road, London, E.17. Schedules: Mr B. Baulson, 132 Wilton Saville Tower, London, E.17 8LJ.

8th August. **GORTON & OPENSIAW A.S.** seventh Open Show. Details: Mrs E. Hodgkinson, 126 Gorton Road, Reddish, Stockport, Cheshire.

8th August. **STROUD & D. A.S.** Open Show. Mid-Gloestershire Technical College, Stratford Road, Stroud, Glos. Show secretary, Mr M. S. Jones, 46 Hillcrest Road, Cashes Green, Stroud, Glos.

9th-14th August. **PORTSMOUTH A.S.** Open Show. Schedules: Mr K. Johnson, 7A Hillside Road, Pauls Grove Portsmouth, Hants.

14th August. **HARLOW A.S.** Open Show. Moot Hall, The Stow, Harlow, Essex. Benching: Friday, 13th August. Schedules: Mr P. Murdoch, 21 Brookline Field, Harlow, Essex.

15th August. **HEYWOOD & D. A.S.** Open Table Show. St Johns Ambulance Hall, Bamford Road, Heywood, Lancs. Details: Mr A. Evans, 15 Blenheim Close, Unsworth, nr. Bury, Lancs.

15th August. **OLDHAM & D. A.S.** Open Show. Werneth Park, Oldham. Schedules: Mr E. Birchwood, 30 Inverness Avenue, Blackley, Manchester 9.

15th August. **NORTH STAFFS. A.S.** third Open Show. Meir Community Centre, M.A.A.S. Rules. Schedules: Mr K. Balch, 28 Courtyard Drive, Soke-on-Trent, ST1 6DU.

15th August. **FALKIRK & D. A.S.** Open Show. Falkirk Ice Rink. Schedules: Mr W. Reid, 41 Barrhill Road, Rosebank, Kirkinloch, Glasgow.

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The AQUARIUM SHOW '71

Friday 29th October to Sunday 31st October

Royal Horticultural Society's Old Hall, London S.W.1

All details from Show Organiser, PFM, 554 Garratt Lane, London S.W.17 01-947 2805

18th-21st August. **MIDLAND OPEN SHOW (M.A.P.S.).** Bingley Hall, Broad Street, Birmingham 1. Schedules: Mr J. Fellows, 18 Woodworth Avenue, Headless Cross, Redditch.

21st August. **RIVERSIDE A.S.** Open show. St Ethelreda's Church, Fulham Palace Road, London, S.W.6. Enquiries to Mr M. Goss, 3 Boulton's Court, Park Place, Plantation Rd, Amersham, Bucks.

22nd August. **SCARBOROUGH & D. A.S.** Open Show. Roscoe Rooms, Roscoe Street, Scarborough. Benching 12.30-2.15. Details from Mr S. Ingamells, Ness Cottage, North Street, Flinton, nr Scarborough.

22nd August. **BEDWORTH A. & P.S.** third Open Show. Nicholas Chamberlain School, Bullington Road, Bedworth. Schedules: Mr K. Edkins, 72 Lister Street, Attleborough, Nuneaton.

28th August. **ANSON A.S.** Open Show. St Andrews Hall, Willenden, London N.W.10. Schedules from Mr D. Thomas, 16 Cornwall Gardens, London, N.W.10 (01-459 2450).

4th September. **F.B.A.S.** Assembly. Conway Hall, Red Lion Square, London, W.C.1. 2.30 p.m.

4th September. **YATE & D. A.S.** fifth Open Show. Christ Church Hall, North St, Downend, Bristol. Details: Mr C. E. Stickland, 20 Burgage Close, Chipping Sodbury, Bristol BS17 6EL.

4th September. **BETHNAL GREEN A.S.** Open Show. Bethnal Green Institute, 229 Bethnal Green Road, London, E.2. Schedules: Mr S. G. Cowell, 26 Dunton Road, Leyton, London, E10 7AF.

4th September. **RHONDDA A.S.** third Open Show. Rhondda Transport Club, Porth, S. Wales. Details: Mr M. Williams, 122 Top Trebanog, Trebanog, Rhondda, Glam.

5th September. **COVENTRY P. & A.S.** M.A.L. Show. Foleshill Community Centre, Foleshill Road (A444), Coventry. Open classes—characins and cichlids. Benching until 2.30 p.m. Details: Mr S. Woodbridge, 32 Ridgeway Avenue, Coventry.

5th September. **WELLINGBOROUGH & D. A.S.** Open Show. The Drill Hall, High St, Wellingborough. Trophy for every class. Show secretary, Mr J. Phillips, 10 Barnwell Drive, Rushden, Northants.

11th September. **HARWICH & D. A.S.** annual Exhibition of Tropical Fishes. The Queens Hotel, Dovercourt, Essex, 10.00 a.m.

-6.00 p.m. Secretary: Mr M. Bird, 8 Macdonough Cottages, Station Road, Harwich, Essex.

12th September. **BARNSELY T.F.S.** Open Show. Mapplewell & Staincross Village Hall, Staincross, Barnsley.

12th September. **CYMRU NATIONAL AQUARISTS' ASSOCIATION** first General Assembly. Angel Hotel, Cardiff, 2.30 p.m. Enquiries to Mr Dick Richards, 3 Sherwood, Llanwynypia, Rhondda.

12th September. **BRITISH KILL-FISH ASSOCIATION (COLLINGHAM GROUP)** third Open Show. Collingham Memorial Hall, nr Wetherby, Yorks. Details: Mr Crowther, 8 Beechwood, Church Street, Woodlesford, Leeds.

12th September. **BRIGHTON & SOUTHERN A.S.** eighth Open Show. The Marmion Centre, Marmion Road, Hove, Sussex. Details: Mr R. Browning, 34 Rowan Close, Portslade, Sussex.

12th September. **WARRINGTON A.S.** third Open Show. Details: Mr J. Higham, 42 Hood Lane, Gt Sankey, Warrington; phone 36959.

18th September. **HOUNSLOW & D. A.S.** Open Show. The Youth Centre, Cecil Road, Hounslow (change of date).

18th September. **HAVANT & D. A.S.** first Open Show. Deverall Hall, London Rd., Purbrook, Hants. Details: Mr V. B. Hunt, 120 London Road, Widley, nr Portsmouth.

19th September. **STONE A.S.** Open Show. Walton Community Centre, Stone, Staffs. Schedules from Mr N. W. Plant, 18a High Street, Stone, Staffs.

4th-5th September. **MID-HERTS A.S.** International Open Show. Major trophies for all classes. Schedules: Mr C. S. A. Withers, 15 Charmouth Road, St. Albans, Herts. (phone 53146).

5th September. **LUCAS A. & P.S.** 1st Open Show. Joseph Lucas Ltd, Shaft Moor Lane, Birmingham. Schedules from Mr G. Roberts, 30 Charles Road, Solihull, Warks.

5th September. **WEYMOUTH & D. A.S.** Open Show. The Small Sidney Hall, Weymouth, Dorset. Details: Mr T. Hatton, 53 Brownlow Street, Weymouth.

5th September. **HUDDERSFIELD T.F.S.** Open Show. The Town Hall, Huddersfield.

10th-12th September. **BRISTOL A.S.** Open Show. St. Michael's Hall, Bishopston. Details: Mr S. Lloyd, 4, Curlew Close, Frenchay Park, Bristol 5. Phone 656532.

19th September. **CLEVELAND A.S.** fourth Open Show. British Legion Hall, West Gate, Guisborough, Yorks. Schedules: Mr Todd, 24 Penland Avenue, Kirkleatham Estate, Redcar, Teesside.

20th September. **FOUR STAR A.S.** third Open Show. Details awaited.

25th September. **G.S.G.B.** Convention. Farrington House, Stonecot Hill, Sutton, Surrey.

25th September. **BRACKNELL & D. A.S.** Open Show. Priestwood Community Centre, Priestwood Court Road, Bracknell (opposite Admiral Cunningham Hotel). Schedules from Mr L. Jordan, 62 Fernbank Place, Ascot, Berks.

26th September. **WEST CUMBERLAND A.C.** Open Show. New Civic Hall, Whitehaven.

26th September. **HUCKNALL & BULWELL A.S.** Open Show. Bulwell Youth Club, Coventry Road, Bulwell, Notts. Schedules: Mr E. Smith, 111 Longmead Drive, Daybrook, Nottingham.

Continued on page 188

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26th September. **TORBAY A.S.** Open Show, Torquay Town Hall, Devon.

26th September. **REIGATE & REDHILL A.S.** Open Show. Schedules from Mr J. Wood, 22 Rickman Hill, Coulsdon, Surrey.

26th September. **MIDLAND ASSOCIATION OF AQUARISTS SOCIETIES** Convention at Dudley Zoo.

2nd October. **EAST LONDON A. & P.A.** 25th Open Breeders Show. (Judges, Mr C. A. T. Brown, Mr B. Baker, Mr F. Tomkina.) Schedules: Mr F. Vickers, 23 Irena Way, Romford, Essex; phone 63533.

3rd October. **EALING & D. A.S.** Open Show, Northfields Community Centre, Northcroft Road, London, W.13. Details, Mr R. Sellers, 3A Lady Margaret Road, Southall, Middlesex.

9th-10th October. **BRITISH AQUARIST FESTIVAL** at Belle Vue, Manchester.

16th October. **KINGSTON & D.A.S. & SOUTH PARK AQUATIC (STUDY) SOCIETY** combined Open Show. Territorial Army centre, Farrington House, Spooncote Hill, Sutton, Surrey. Schedules: Mr G. E. Greenhalf, 39 Garth Close, Morden, Surrey.

17th October. **SHERWOOD A.S.** Open Show. Thorsby Miners Welfare Hall, Edwinstowe, Nr. Olberton, Mansfield, Notts. Schedules from Mr J. Igoe, 25 Marples Avenue, Mansfield Woodhouse, Notts.

23rd October. **CATFORD A.S.** Open Show. Schedules from Mr J. D. Wilson, 130 Paston Crescent, Lee, London, S.E.12; 01-857 4913.

28th-31st October. **THE AQUARIUM SHOW '71.** Royal Horticultural Society Old Hall, Vincent Square, London S.W.1.

31st October. **HALIFAX A.S.** tenth Open Show, Standeven House, Broomfield Avenue, Halifax. Details: Mr J. Grundy, 19 Tower Gardens, Wakefield Gate, Halifax.

6th November. **G.S.G.B.** Quarterly Meeting, Conway Hall, Red Lion Square, Holborn, London.

7th November. **MIXENDEN T.F.S.** Open Show, Mixenden Community Centre, Clough Lane, Mixenden, Halifax. Details, Mr S. Leedham, 74 Clough Lane, Mixenden.

11st November. **CASTLEFORD & D. A.S.** Open Show, Castleford Secondary Boys School, Castleford, Yorks. Details: Mr Eyre, 41 Leatham Crescent, Furston, Featherstone, Yorks.

4th December. **F.B.A.S.** Assembly, Conway Hall, Red Lion Square, London, W.C.1. 2.30 p.m.

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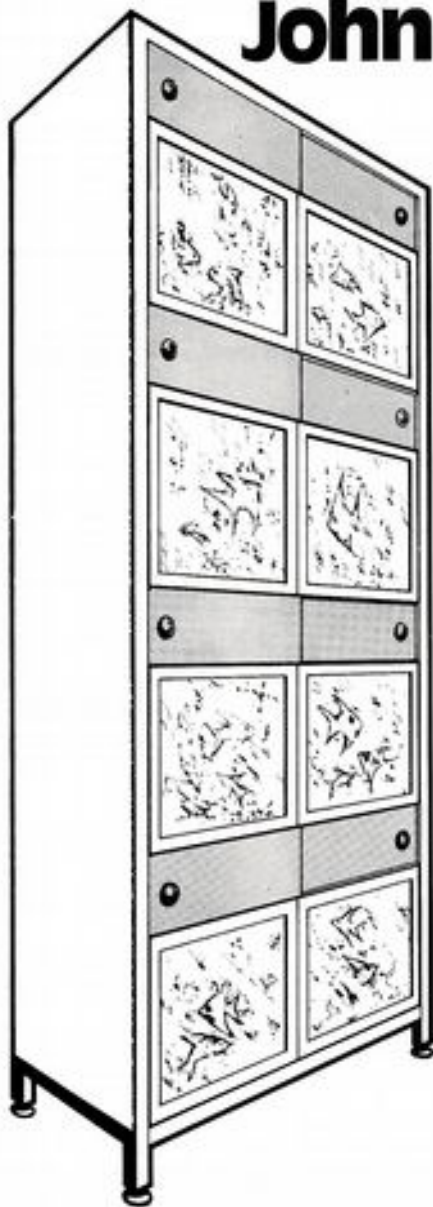
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Continued on page 190



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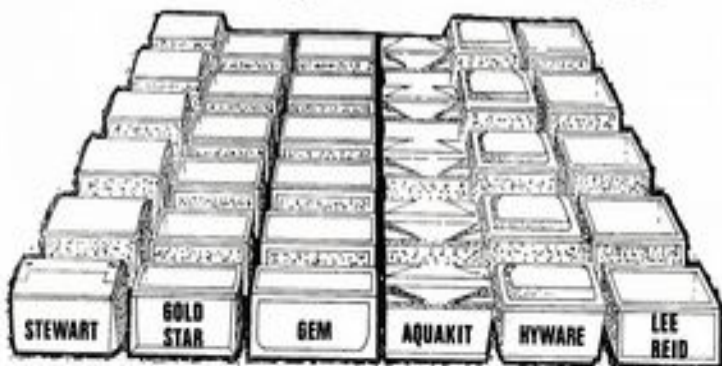
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30 x 12 x 12	11.45	2.75
30 x 12 x 15	12.25	2.75
36 x 12 x 12	11.95	3.25
36 x 12 x 15	14.25	3.25
48 x 12 x 15	19.75	4.25

Gem Aquaria

	Tank	Cover
12 x 8 x 8	£1.50	£0.90
14 x 8 x 8	1.60	1.00
16 x 8 x 8	1.75	1.10
18 x 10 x 10	2.35	1.60
25 x 8 x 8	2.30	1.60
24 x 10 x 10	3.25	1.95

Petcraft Plastic

	Tank	Cover
12 x 8 x 8	£0.75	£0.69
16 x 8 x 10	1.10	0.95

Stainless Steel

	Tank	Half Cover	Full Cover
12 x 6 x 8	£4.00	—	—
16 x 8 x 12	6.30	£1.32	£2.95
20 x 10 x 12	7.35	1.49	4.06
24 x 8 x 12	7.45	1.56	3.96
24 x 12 x 12	7.95	1.56	4.94
24 x 12 x 16	12.30	1.56	—
30 x 12 x 12	12.30	1.92	6.20
30 x 12 x 16	15.10	1.92	—
36 x 12 x 16	15.55	—	6.52

Tachbrook Bow Aquaria

	With scrolled stand and cover complete	Bow bookcase complete
24 x 12 x 15	£18.47	—
30 x 15 x 12	21.60	—
36 x 12 x 15	25.21	£35.14
48 x 15 x 15	36.19	42.13

Neptune Plastic Slotted

	Prices complete with shade	Tank	Vivarium
Small 13½ x 7 x 8½	—	£2.10	£2.00
Medium 14½ x 9½ x 10½	—	3.15	3.05

Grolux Fluorescent Lighting for Aquaria

Tube Length	Tube Diameter	Tube Wattage	To Fit Cover Size	Price
12"	¾"	8	14" to 16"	£1.24
15"	1"	14	17" to 19"	1.33
18"	1"	15	20" to 23"	1.33
21"	1"	13	24" to 26"	1.68
24"	1½"	20	27" to 36½"	1.68
36"	1½"	30	38" to 48"	1.80
48"	1½"	20	51" to 60"	2.00
*60"	1½"	65/80	63" up	2.54

Ballast with Terry Clips, Starter and Leads for above sizes £2.25 complete and ready for use. Ballast units for 8 and 13 watt tubes £1.25. * Ballast for this Tube by order only

Angle Iron

	Tank	Stands	Full Cover	Hinged Cover	Plastic Coated Tank
18 x 10 x 10	£2.65	£2.73	£1.43	£1.54	£3.60
18 x 12 x 10	3.03	2.73	1.43	1.54	3.84
18 x 12 x 12	3.14	2.85	1.79	1.90	4.11
24 x 12 x 12	4.16	3.24	1.96	2.18	5.08
24 x 12 x 15	4.60	3.24	1.96	2.18	6.02
24 x 15 x 15	5.81	3.53	2.58	2.85	6.16
30 x 12 x 12	5.81	3.53	2.58	2.85	6.70
30 x 12 x 15	6.19	3.53	2.58	2.85	7.19
30 x 15 x 15	6.87	3.96	2.69	2.96	8.22
36 x 12 x 12	7.11	3.65	3.07	3.25	8.26
36 x 12 x 15	7.69	3.65	3.07	3.25	9.33
36 x 15 x 15	9.26	4.06	3.42	3.99	11.71
48 x 12 x 12	8.32	5.08	4.17	4.45	10.56
48 x 12 x 15	9.63	5.08	4.17	4.45	11.24
48 x 15 x 15	11.42	6.15	4.31	5.78	12.64

Pressed Steel

	Tank	Cover	Plastic Coated Tank
10 x 7 x 7	£0.80	£0.83	£1.20
12 x 6 x 6	0.86	0.88	1.28
12 x 8 x 8	0.99	0.94	1.43
14 x 8 x 8	1.04	0.99	1.54
16 x 8 x 8	1.12	1.02	1.65
16 x 10 x 10	1.23	1.12	1.91
18 x 10 x 10	1.39	1.12	2.06
18 x 10 x 12	1.64	1.17	2.33
18 x 12 x 12	1.91	1.26	2.59
24 x 12 x 12	2.84	1.68	3.60

Aqua-Lite

Bahama	24 x 12 x 12	£8.87
Atlantic	16 x 9	£4.87

Tachbrook Butterfly

Complete set-up: tank, stand and cover	36 x 15 x 12	£18.26
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Arbe Aquaria (Perspex)

	Bow-fronted	Sloping front
18 x 12 x 11	£8.93	£17.50*
24 x 15 x 12	14.48	* Price includes Grolux Lighting
36 x 15 x 14	25.50	

Any size of tank and stand made to your own specifications—quotations given on request.
BRS and Rail Charges—Aquaria, Stands and Hoods—carriage at cost invoiced after despatch.

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HOURS OF BUSINESS—Weekdays 10 a.m.—6 p.m. Sundays 10 a.m.—12.30 p.m. for sale of plants only (we must adhere strictly to this rule).

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