

APRIL 1973

20p

Pet Fish

monthly

The PRACTICAL FISHKEEPING MAGAZINE



Contents include:

Breeding the Jewel Cichlid

Readers' Queries Answered

Safety-Alarm Heating Control

The Exotic Stickleback

Aquarist in the Low Countries

Glass-Cutting

Marinist's Notebook

Readers' Letters etc.



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Comments and Quotes

- Piranhas beware
- Getting bugged on fish
- Water fleas like calm water

War on Piranha

ZOOLOGISTS in Brazil and at Uppsala University, Sweden, have produced a substance extracted from the Amazon Timbo plant to poison the piranha, a ferocious fish that has caused many fatalities among fishermen in Brazil.—*VIT OBSERVA*.

You Hear Me Calling

MORE from the 'Whatever next?' department. In *NEW SCIENTIST* it was reported that biologists from the Water Pollution Research Laboratory at Stevenage have been making salmon swallow small tubes (6 cm long, 1 cm wide), which each contains 'a piezoelectric transducer, driven by an oscillator, and a circuit to produce a code of pulses', plus a mercury battery. These ultrasonic pulses are used to track the salmon on their journeys up the River Tyne, as the biologists use hydrophones to 'listen in' on the fish. Since each fish can receive a tube of a particular pulse rate the method permits the recognition of movements of a single individual.

Given some smaller versions of this device it seemed that one would have a real time-saver for stock-taking of those fishes that are purchased, put in the aquarium and then seen only at rare intervals thereafter, so that it is never really certain that they are still around. The trouble is the 'bugs' would need to have built-in death switches or else the gadgeteer aquarist would go on entering '30 per min Fred' on the attendance roll long after Fred has passed on and had left his little transducer faithfully belting out ultrasonic identification calls behind a rock somewhere in the aquarium. We know of some snake-

keepers who should certainly be made by law to install these tubes in the insides of their wandering charges.

Daphnia on Tap

A GOOD many aquarists have spent large parts of their lives trying to devise a way of being self-supporting in supplies of the humble water flea. There must have been some quickening of the pulses therefore in any of those who happened to see a recent paper in *LABORATORY PRACTICE* entitled 'Apparatus for semi-continuous culture of *Daphnia*'. Alas, and no detriment to the paper's lady biologist author, the method is not for you or anyone else with a money problem as well as a fish-feeding problem.

Dr Anna Harvey's water fleas are given sterilised glass living conditions that would surely limit their value for any fish used to having his crustaceans flavoured from a duck-pond or a sewage farm. The food carefully metered to these battery-reared *Daphnia* is a suspension (150,000 cells per millilitre) of the green alga *Chlorella vulgaris* (this, too, grown in sterile conditions, of course), and they also receive a sterilised air supply. One practical point about aeration of the culture could, however, be noted by the *Daphnia* collector. Dr Harvey found that strong bubbling with air actually kills the water fleas, and she had to use a device to provide strong aeration without excessive water agitation, virtually a separate air-lift chamber with the lifted water returning below the surface via a fine jet opening. So even if you cannot produce them, you need not kill your collected fleas by keeping them in rough sea conditions.

Next month's issue of PFM will contain an author and subject index to volume 7, completed with this number

PETFISH
MONTHLY

LETTERS

Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt, Lane London SW17 0NY

Living Filters

IN his letter to PFM in January about living filters, Mr J. Burtles mentioned that the *Ampollaria* and *Asodonta* possibly mop-up a so-called 'growth inhibitor' excreted or secreted by the young fish. If he has any references to this substance, I would be pleased to have them to follow up this intriguing fact. One would have thought that any inhibition factor would be detrimental to the fish, emphasis usually being on growing as fast as possible to avoid being swallowed. I am sure that in livebearing toothcarps a growth-stimulating substance is produced by the parents after the observation that mollies seem to grow better in the presence of the mother fish.

Back on the subject of *Asodonta*, I believe that these should not be included in an aquarium containing young fish because, apart from the risk of introducing disease, these mussels have parasitic larvae. The first stage of larval development is as a parasite in the adult female mussel; when the larva, called a glochidium, reaches about 0.2 mm it leaves the parent through the exhalant aperture and sinks to the bottom, where it remains until it comes into contact with a fish swimming over the bottom. The glochidia of *Asodonta*, which bear hooks, immediately clamp on to the fins and other parts of the body surface of the fish. The tissue in

the vicinity of the attached glochidium is stimulated to grow around the parasite and form a cyst, in which the larva metamorphoses into an adult during a 10-30 day period, and then breaks out and drops to the bottom.

A large mussel may produce as many as 3,000,000 glochidia, and in one instance a fish was reported as 'containing' 3000 glochidia! Adult fish are apparently not harmed, but young fry will often die from secondary infection.

So, Mr Burtles, beware your little *Parudotrophia microstoma* living happily with a large swan mussel, it could have been a death trap for them; you have no means of knowing, if it came from the wild, whether your mussel is harbouring millions of larvae; although as they usually breed in the summer, a specimen obtained in early spring might be safe, if one must be included.

A word about the bitterling and mussels: here we have a case of tit-for-tat—bitterling lays eggs in mussel, mussel larvae parasitise bitterling. Such is Nature!

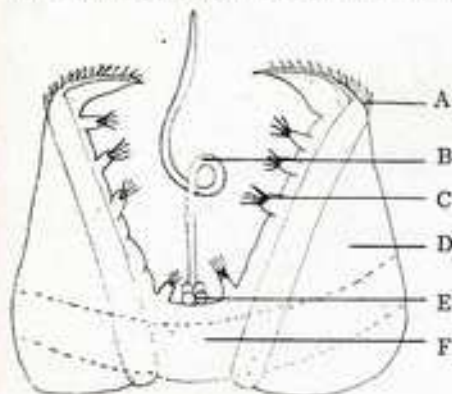
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IAN C. SELICK

Saturday Pandemonium

I BOTH enjoy and mostly agree with Arpee's comments but having worked in an aquatic retail shop I really do think it might be salutary if he were to work for a few Saturdays in such a shop. I am really thinking of his remarks about retailers not getting to know something about their customers before they sell even a guppy. The shop where I worked was pandemonium on a Saturday, for instance. Starting off with with hurried visits of those who wanted only daphnia, tubifex or dried food, through the long consultations with those requiring advice on equipment or replacements of same, to the family parties in the afternoon buying the new addition for the tank or the new set-up, one gave what time one could as the customers seem to need it, but all the time conscious of the serried rows of patient faces all waiting their turn. (I used to think sometimes that if I had to wait in other shops as long as the customers did in that hobby shop I'd burst a blood vessel). And, after all, Mr Arpee, most people who run fish shops love fish—they'd have to, to work so hard—but

Continued on page 590



Glochidium larva of the swan mussel (magnified about 100 times). A, Teeth and B, thread, for attachment to host. C, Sensory bristle. D, Larval shell. E, Byssal gland. F, Adductor muscle.

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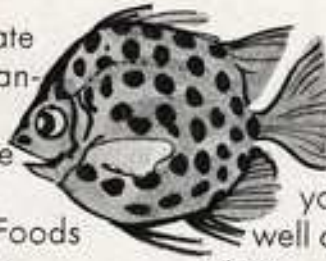
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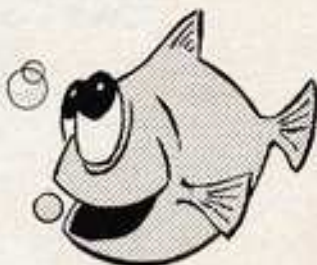
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LETTERS

Continued from page 590

they've got to eat as well as their fish! To get to know your customer before selling a guppy is asking a bit much.

Eastbourne, Sussex

J. LIGHTWOOD

Rate of Discus Growth

AFTER reading A. C. Tufts' letter (PFM, February), all I can say is that to get discus from spawning to 2 inches in body length in 3 months is impossible, and I defy him to prove this statement; and to get them to breed in 10 months—I am at a loss for words! Mr Tufts thinks he has seen good discus. If Mr Tufts wants to see good discus, about 50 from 2 inches upwards, all in marvellous condition, he should come to Fleetwood. I have been breeding the discus for about 5 years—one of the first in the north of England to do so. Dozens of people, including top fish experts, have been to see my fish, and all have left saying they have never seen discus in such large numbers in the conditions I keep them in. I have a list of customers wanting to buy baby discus off me. I would consider myself among the top discus breeders in England at the present time, and I invite anyone to come and see my fish any time. Phone Fleetwood 3972. All are welcome.

Westview, Fleetwood, Lancs.

BON DYSON

'Shelf Life'

I WAS interested to read in Arpec's article on the Coldwater Scene (PFM, March) that he suggests that 'all that is worth having is what has survived in the dealer's tanks as late as the autumn'. This may be true, but how on earth is it possible to find such fish? My dealer, I think, buys small quantities of coldwater species other than goldfish throughout the summer, but there never seem to be any left from one hatch to the next as there is usually a time gap between the arrival of new stocks. The ones in the tanks in the autumn are as likely to be newly imported as they were in the spring, though maybe coming into a climate more

like the one they come from they will survive better anyway.

Camberwell, London, S.E.5 (MDS) D. LAMBERT

Luck, Maybe

IN answer to Mr Adams' letter in PFM (March) on the ease with which he keeps his tanks—I think his good fortune is based on both knowledge and 'luck'. He says that he originally bought books and read the aquatic magazines and the experts' advice on how to start and keep the aquarium going—so he set off on the right foot with the knowledge. He's obviously taken the trouble to purchase or acquire originally a good variety of plants, and he must be supplying them with the correct amount of lighting—possibly pure luck but maybe because his 'experts' suggested a certain basic light requirement. I honestly don't think that with a good stock of varied plants and a varied community of fishes you can go far wrong—a good proportion of the plants and the fishes are bound to like the conditions, even if they all don't. But I do think luck enters into it. I've known two tanks, with water, gravel, plants and fish from identical sources, where one goes like a bomb and one is never quite so good. I suppose even this isn't really luck—some factor must be operating or not operating even if its impossible to tell what it is. The 'luck' is in having hit on the exact balance required between fish, plants, water etc. But you've got to have the initial knowledge which makes the achievement of such a balance even remotely possible. Half a dozen strips of vallis, 100 fishes including predators and a base of, say, marble chippings would never achieve any sort of balance.

Scunthorpe, Lincs.

T. TREHERNE

Catching a Large 'Cat'

I WAS astonished to read in the article by J. Elias in your February edition of his using nets to capture *Pimelodus clarias*, and even more astonished to imagine him using his hands. May I pass to him a foolproof tip which will ensure the safe and quick capture of any cat and larger fish, e.g. cichlids. Immerse a plastic bag of suitable size into the tank, use a net to push the bag open and to the bottom, then gently guide your fish into the bag.

I have never found *P. pictus* a frightened or shy cat; on the contrary, I find them very active. Perhaps this is due to J. Elias's tank set-up—too many caves and hide-aways will encourage cats to shun the light. My favourite 'cat'—a *Pseudoplatystoma fasciatum* (shovel-nose), is active during the day, though if he is given a large rock he will hide away.

Winton, Bournemouth, Hants.

M. J. WALTERS

An Aquarist's Visit to Belgium and Holland

By IAN SELLICK

Photographs by the author



Two of the party (Mr Roy Skipper, left, and Mr Dave Mitchell) examine an ornate hexagonal aquarium shown at the pet fair in Antwerp

ON a trip made to the Low countries at the beginning of January, our party arrived at Antwerp at about 7 a.m. We drove around awhile, parked, had breakfast and then took a taxi to the 'Vispo', a retail pet and angling trades fair in the Antwerp Building Centre. As this had not yet opened for the day we returned to the city centre and found the car after telephoning Antwerp's biggest fish wholesaler, Van de Weyer of Aquarium Antwerp, to arrange a visit. We arrived at Van de Weyer's at 10 a.m., to find that Mr Van de Weyer had just left for the 'Vispo'!

However, Mrs Van de Weyer allowed us to look round the 1000 odd aquaria containing a representative, if not spectacular, selection of tropical fishes, and also the marine section where principally fibreglass and all-glass aquaria were used. On the whole the stock was disappointing compared with what had been seen on a previous

visit 2 years ago, when Belgium had better relations with the Congo and African fishes were very much in evidence. Of note were some very large mud-skippers (*Periophthalmus*) and several different species of large *Leporinus* not often available in the U.K. After this quick look round we returned to the exhibition.

This was only the second such exhibition to be held in Antwerp, and by British standards was quite small, but still of good quality. About one-third of the available space was taken up by angling equipment specialists, one-third by mixed aquarium-general pet dealers and the rest by aquarium equipment wholesalers. No live fishes were on display, except in four large marine aquaria (displayed by Mr Van de Weyer) containing various invertebrates and the more striking fishes, such as *Acanthurus lineatus* (not in the same tank, naturally!) and *Eucyphipops nassarebus*.

'Dry goods' of note not seen in the U.K. were a range of aquaria marketed by the German Vitakraft/Eheim/Juwel consortium, consisting of aquaria built into antique-look cabinets to match such styles as 'Baroque' or 'Old German' woodwork, in walnut and other woods. Other designs are called 'modern', in orange/white or red/white, with built-in cupboards to match the modern trend in furniture. So much for 'normal' rectangular wood-cabinet aquaria. Also included in the range in much the same period styles are hexagonal aquaria on hexagonal cabinet stands with matching wooden hoods. Cube aquaria in the same style are also available. In all, about 40 different combinations of

styles and colours can be obtained. These aquaria are not cheap, none being less than about £100 complete, but to the man who wants to match his collection of eighteenth century German furniture or whatever, this should be no drawback.

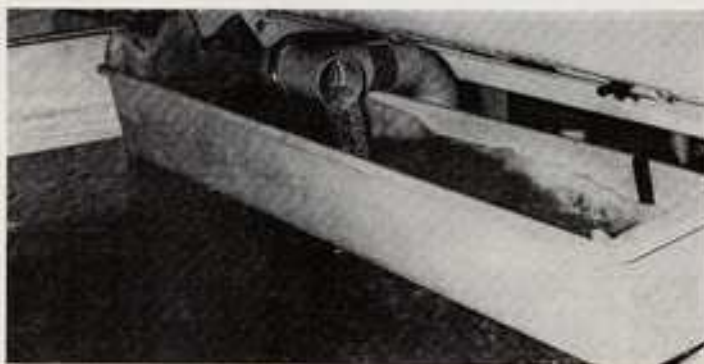
The firm Hilena were showing an undergravel flexible heater 15 feet long—rated at 75 watts, quick tests for permanent and temporary water hardness on the same lines as the existing Nitrite Quick test, a U.V. steriliser and a diffusion filter for plant growth (no details or English instructions).

From the exhibition we headed north to Rotterdam (to visit a non-existent zoo-aquarium) and then to the cheese capital of Gouda, east of Rotterdam for the night. Our stay at the Hotel de Zalm (the Salmon Hotel) was quite amazing, with gigantic double-size double beds each in single

or moulded asbestos water tanks with the fronts removed and replaced by glass panes. All the ponds were about 5 or 6 feet square and also built of asbestos sheet.

The selection of fishes was quite remarkable, with South American species very much in evidence. At an estimate, there were some 10-15,000 cardinals in stock, looking very effective in large shoals in black-painted tanks with very powerful filters. Water draining through a grille in the base of the aquarium was pumped by air-lifts (with a 4-5 foot lift) in 2 in. pipes into a tray above the tank containing foam rubber and activated charcoal. The turnover in a 50 gallon tank is estimated at about 100-150 gallons per hour. Most of the cardinals were kept by this method, as were the marine fishes, with a protein

The filtration unit was used over an aquarium at a Dutch importer's fish house. The tank held 50 gallons and contained about 1000 cardinals. The pipe delivering the water to the filter unit is 2 in. in diameter; water returns to the tank through a grill at the unit's base, with a turnover of about 100-150 gallons per hour.



room with shower and telephone, and only about £3 per night. After a Dutch breakfast of cheese, pork and ham, washed down with coffee and followed by a selection of six types of bread with six types of jams, we paid our bill and went to do some souvenir shopping, only to find that a long weekend is the rule in Holland, no shops being open on the Monday. So we drove to Nieuwerkerk to visit one of Holland's biggest importers, Ruinemans.

Although looking rather dilapidated on the outside, this was one of the largest fish houses I have seen, consisting of some 800 large aquaria, the majority a metre or more long, nearly 50 small ponds for fishes and 70 small plant ponds, all in a greenhouse complex such as is found all over Holland for growing early vegetables etc. The greenhouses were simply blanketed out with asbestos and expanded polystyrene for insulation, with the roof double-glazed in most parts.

All the aquaria were made of painted asbestos—either $\frac{1}{2}$ inch sheets, screwed together and sealed with silicone rubber (a recent addition, no doubt)

skimmer added.

Of note was a selection of odd African lake cichlids as yet unidentified but including the usual species of *Pseudotropheus*, *Labretropheus*, *Melanochromis* etc., all at reasonable prices. Also available were electric catfish, arowanas, *Chiloglanis* catfish, pipefish, checkerboard cichlids and other rarely seen species.

All the tanks had biological filtration of some kind, except the majority of the cardinal and marine tanks: either served by a 2½ in. punched pipe buried in steeply banked gravel, or by pumping water through a partitioned-off section of the aquarium, filled with gravel. On the whole, fairly hard tap water is used throughout, although an extremely large deionising plant was present; discus, and other such fishes were almost certainly kept in soft water.

All water is preheated and stored before use in 2,000 gallon, lined brick ponds with fairly heavy aeration and water-pump circulation. Air is supplied by a battery of six rotary vane compressors feeding into a large pressure-equalising 'kettle'



Arrival of a new batch of fishes from abroad always means extra work—placing the fishes, checking their health and making out record cards

before distribution to the fish house. Heavy aeration is used in all tanks as well as air-operated filtration. The tanks in the fish house are supported on wooden staging and are heated (when necessary) with hot water pipes running beneath the staging.

Rigid, semi-computerised, stock control is practised, with an IBM accounting machine, making records (and VAT, incidentally rated at 16%) much simpler—very necessary for such a large operation. Staff consisted of clerical and 'tank cleaners', amounting to about 10 in all.

Whilst we were there, we were lucky enough to witness the arrival of a large shipment from the Far East, consisting of some 100 boxes of fishes, which arrived from the airport in an insulated Ford Transit and which were all unpacked and floating in clean tanks within about 20 minutes. The next hours were spent releasing fishes, checking for disease and deaths and making out new punch cards for each new tank. On the whole this visit was a most fascinating experience that made the whole trip worthwhile.

Whilst in Rotterdam we visited a small retail

shop, which, although not considered typical in quality, was interesting for a price comparison. For example, neon tetras were priced at 3Fl—about 38p, and cardinals at 3.50 Fl—45p (presumably these prices included VAT).

At Schiphol Airport, Amsterdam, we visited the 'Dierenhotel' or animal hostel, a part of the KLM freight operation. Here we were met by Mr Wigman, who explained the hostel's work. The hostel caters for 3000 boxes of fishes per week (some 36 million tropical fishes per year), 9 million new-hatched chicks, 3000 cats and dogs and 10 tons of live eels (of which a proportion are destined for Japan, where pollution has ruined the eel industry). Each year 20,000 individual shipments are handled, and on average only about 150 complaints are received—a remarkable record for something as difficult to transport as livestock. Rigid quarantine is observed, with all rooms separated and scrubbed twice a day. All animal cages, fish boxes etc. are put on racking to prevent them becoming cold on the floor, each room's temperature being controllable, depending on the livestock stored there. The hostel is used only as a transit centre and does not have its own long-term quarantine facilities.

Mr Wigman estimates that with marine fishes and other wild-caught specimens there can be as much as a 60% death rate before they are exported—a shocking waste of fishes, which is partly due to the 'mushroom' collectors and exporters who have appeared, particularly in the Far East, to meet the ever-growing demand for fishes. For instance, some 10 years ago there were only three exporters of note in Singapore—now there are 67!

From Amsterdam we went to Amersfoort to visit Aquarium de Jongh, a much smaller establishment than Ruinemens, being a wholesale/retail shop—very neatly laid out with all-glass aquaria with corner partition filters. The tanks were also smaller and did not contain such a large selection of fishes, but nevertheless some very interesting species were present—in particular various killifishes not usually seen in quantity—*Epiplatys annulatus*, *Nothobranchius palomquisti* and *Cynolebias whitei*, amongst others, and a good selection of really weird African lake cichlids—all quite expensive but for the cichlid maniac rare enough to warrant the price! One interesting and unusual method of prophylaxis used in some tanks, especially with labyrinth fishes, was the inclusion of banana leaves, which supposedly liberate a quinine-like compound into the water in sufficient quantity to prevent such parasites as *Chilodonella*, *Costia* etc.

After buying as many killies as we thought we

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AQUARIUM TECHNIQUES WITH GLASS—I

Glass-Cutting

By CLIFF HARRISON

THE ability to cut glass accurately and efficiently is one of the most useful skills a hobbyist can have, whether to replace a cracked panel in a framed tank, to build new all-glass aquaria, or to make well-fitting cover glasses. Yet too many people give up trying after a few half-hearted (and therefore invariably unsuccessful) attempts, and resort each time to buying new glass ready cut-to-size. The secret of success is simple—confidence, combined with the use of the right tools.

A visit to your local glass merchant will show you what is needed: an inexpensive wheel-type glass cutter, so often despised by those who mistakenly think that only a diamond cutter will guarantee them success; a good set-square or draughtsman's T-square; a metal ruler, as long as possible; a medium-grade abrasive stone or wet-and-dry sandpaper to remove the sharp edges. If you already have a glass cutter, invest in a new set of cutting-wheels—around 12¢ for a half-dozen, since the old ones will almost certainly have

become blunted or damaged from earlier misuse.

Before you start work, test the cutter on a spare piece of clean glass. By keeping the handle of the cutter upright, a very light pressure during its movement across the glass surface should produce a shallow but continuous cut; if the cut is intermittent, change to another wheel. Professionals often dip the cutter head in paraffin or tucpas to keep the wheels running freely, but this is not generally necessary.

The glass to be cut should be placed on a perfectly flat table, protected with several layers of newspaper. The surface of the glass must be absolutely free of dirt, grease and water, and a roll of kitchen paper is ideal for cleaning purposes. After making careful measurements and positioning the straight-edge on the glass correctly for dimensions and squareness, the cut must be made in one smart, continuous stroke from top to bottom of the sheet; trying to take up again from where it stopped is always risky, and you must never make a second cut over the first in the mistaken notion



A confident approach to making the cut, plus a sharp cutting wheel, a straight edge and the glass supported on a soft pad (e.g. newspaper) produces results

Photo: CLIFF HARRISON

that the deeper the cut is, the better. Having obtained a nice clean score for the full width of the glass, a matchstick is placed at either end directly under the cut and a quick, firm press down on the glass at either side will snap it cleanly. Do not try to break the glass by the age-old method of tapping on the reverse of the cut; this will almost certainly produce cracks shooting out at all angles. Where the glass is very heavy, say over 1 in., something rather thicker than matchsticks will be required to compensate for the springiness of the glass. In this case very considerable pressure may be needed, but the method is exactly the same whether you are cutting 18 oz. or $\frac{1}{4}$ in. plate. This way will leave the minimum of dangerous edges to the glass, although a quick rub-down with the stone or wet-and-dry paper will prevent very nasty cuts when handling. For those who wish to bevel the edges

of thick glass, this can be done quite well with a semi-flexible mesh type of abrasive disc mounted on an electric drill, but the eyes and clothing of the user must be protected from flying glass dust and splinters.

A glass cutter used freehand can produce some fancy curves and shapes with a little practice, but a new wheel must be used whenever the cutter starts to drag or slide—remember that a set of wheels costs less than one square foot of window glass, so using the old ones really is a false economy.

As I said at the beginning, it is confidence that gets the results—confidence to make one quick sweep with the cutter and one firm press down to make the break. That really is the whole secret of successful glass-cutting, and once you have got the hang of it you will find you are in great demand to help out others.

MARINIST'S Notebook

By ROY PINKS

THE complete beginner at freshwater tropical fishkeeping has a huge bibliography on the subject to help him on his way, and thoroughly bad though some books may be, there are few matters on which there is other than broad agreement. Even if the budding aquarist is too sure of himself ever to consult a book, most dealers understand the rudiments and often a great deal more. On the marine side of the hobby the position is very far from satisfactory and it may well be some time before the imbalance is redressed. It is doubtful if there are more than half a dozen books on marine fishkeeping which stand up to really close examination even by inexpert eyes, and I can think of only three on which I would spend my own money. A classic is yet to appear. So long as one is aware of this shortcoming one can anticipate the corollary—that advice from the average dealer is likely to be correspondingly sparse, and will probably be based largely on his own experience. The latter will be greatly enhanced in value if the dealer has his own hobby tanks as well as those in his shop, because the observed behaviour of fishes in transit is vastly different from that of those which have come to stay.

This lack of information makes it necessary for very careful planning of initial expenditure on marine tropicals—they are not cheap by any standards—and all available information on each species contemplated should be studied most carefully. The size to which a fish is likely to grow is highly important, because this may not

only determine species-to-species compatibility but also the ceiling which should be set to further purchases. I think even many quite experienced marinists would be surprised at the sizes reached by some of the commonplace coral fishes, but there is evidence that in most cases the cramping influence of the tank dimensions will tailor most specimens to available space.

The aquarist who likes big fishes can limit his purchases to two or three specimen clowns, perhaps, and with good husbandry can rear them to 6 inches or more, though as they grow larger their compatibility with each other may become less and less. On the other hand the individual who prefers small fishes can almost certainly stock his tank to capacity at the outset with specimens of a size which appeals to him, and rely on the restriction of facilities to inhibit growth. He may be assisted in this by the evolution of the tank's chemical content.

Assuming a closed, undergravel system, there will develop in the water a steadily rising nitrate content. This is not normally harmful to fishes but is considered to be a growth-inhibitor in higher concentrations. With this possibility in mind the seeker of large specimen fishes will find it beneficial to undertake fairly frequent (monthly) water changes of up to a quarter of the tank's contents at a time—an expensive

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by
ARPEE

Personal COMMENT

SOME time ago I read some highly interesting facts which were isolated from certain laboratory experiments undertaken at the De La Warr Institute at Oxford. It appeared that broad bean plants which had human thought directed to them at a set time each day progressed more favourably than a comparable set of plants which went their way unaided. Less remarkable was the proposition that the perspiration on some people's hands contained growth hormones and this might account in some way for the claim that some individuals have 'green fingers'.

I have commented before that, since it is often claimed that old ladies who talk to their plants get better results than those who do not, we might try music or conversation on our fishes and plants in an effort to bring about the situation we aim to achieve! For example, might it be possible to clear our tanks of algae by directing towards them shafts of almost tangible hate, or might we persuade reluctant breeders to enter into suitable family arrangements by lectures on fish-to-fish relationships?

I don't think there is anything particularly new in the notion that emanation from individuals, expressed as frequencies of some sort, can have an effect on targets or receivers which happen to be so constructed as to react to the frequency. The oft-quoted example of the soprano's higher notes shattering a wine glass illustrates the situation rather well. With the broad bean plants it is possible, I suppose, that the thoughts transferred might have caused microscopic dust on the surface of the targets to dissipate, thus allowing the plant systems to function to their best ability. In other words the subject plants were allowed to function much as Nature intended, whereas those whose surface dust remained to clog their interstices were impeded in their progress towards the light.

I have never scoffed at notions of frequency-effect on living things in this general context. Two examples in my own experience give me some food for thought. The first, light-hearted though it may seem, may not be so funny in the final analysis. It is a standing joke between me and my wife that I have to get approval from her for all new fishes I buy. If I disregard this and she happens to take

a dislike to a particular species, it is all the tea in China to a bunch of 'ich' that the fish in question will either die fairly soon or survive with difficulty. It is not that she poisons the things or victimises them. She just expresses her opinion, and that is that. Siamese fighters have never lived here for more than a few weeks and she really loathes them! This is not to say that every fish she approves will prosper, but on the whole they would seem to stand a rather better chance.

The other instance rather in support of this line of thinking is that several years ago, when I was undertaking a lot of fish breeding, almost any species I became interested in came into condition in the community tank whereupon I removed it to special quarters for further conditioning and breeding. I have gradually come to do less and less breeding, by choice, and although most of my fishes are in excellent condition (and many are only recently matured) there has been a marked fall-off in their apparent interest in family life. These seldom seem to be a community tank spawning these days, whereas one a week was not uncommon at one time. Whether my disinclination is linked to that of the fish I do not know. Possibly there has been some change in the environment which completely accounts for the situation.

I still think, whatever might be the explanation for my own experiences, that the significant factor of locality which may dominate a particular situation may be as much man-generated as stemming from any other natural source. It could be that the perspiration from my hand makes it most difficult for a certain species of fish or plant to grow. Even more terrifying and much more likely is the notion that they cannot stand the sight of me, but whether this will drive me to the use of various forms of disguise will remain to be seen!



I have often urged readers to widen their interests within the hobby, not just because specialists can turn into such bores, but because beginners seldom see their most fitting objectives in their early days: faced with the disappointments and failures which are just part of apprenticeship they turn away to other activities that seem more straightforward and less possessed by mystery than fishkeeping. It is quite true that it requires both method and application as well as patience to get results, but most worthwhile things call for a similar approach.

One may well ask why hobbies like fishkeeping have such a high membership turnover when, judging by the available literature, no one could possibly offer as an excuse the plea of lack of guidance. I have come to the conclusion that a

high percentage of beginners either cannot or will not read what is written before they commit themselves. Consequently one must consider whether exposure to the experience of activities similar to aquatic work will somehow condition the approach of newcomers in such a way that greater long-term success might be achieved.

For example, the child brought up on music and literature is much less likely to have an aptitude for the hobby than one who has found satisfaction with chemistry. On the other hand, once having got there, the chemistry student would quickly leave the hobby if his sole interest centred around just the H and O aspects of water: he needs to look at the biological aspects, as well as many others, and possibly also human psychology, too. It depends on his ultimate aims, of course. The majority of fishkeepers are not students, but they can do quite a lot for themselves by consciously extending their reading and part-time hobbies to areas which will supplement the main interest and ultimately sustain it.

My own experience has been that I am closer to my hobby when there are other things competing for my time, and that on the occasions when I have most been tempted to give all my fish away I have been deepest in some of those disastrous involvements which may have entertained readers from time to time. I have also noticed that after holiday periods or the busier times out of doors during our so-called summers, when my fish have suffered a certain amount of neglect, I have returned to the scene with fresh ideas and a completely different outlook on what had become a too familiar scene. I may have become complacent about a wretchedly indifferent tank or have worried unduly about the problems of inducing a difficult species to spawn, but whatever the trouble, the breathing space proved its worth and enabled me to slip back into a known technique, applied in a different direction.

If, then, the gentle art of gardening or the watching of birds or the reading of the NEW SCIENTIST take your mind off the hobby for a few

hours a week I think this is time very well spent. The wanderings into the realms of science are especially rewarding, even if the reader cannot really fathom what it's all about, because some of the basic facts and truths and untruths rub off and remain in the subconscious, wherein they come in handy more often than one would perhaps think. By exposure to wider issues the convinced failure will often come to see his difficulties as normal rather than as exceptions and seek a more scientific approach to their resolution. He will learn, for example, that if he buys a fish and it dies it could just be because his wife likes yellow curtains. None of the books on aquarium keeping will tell you this—it may, of course, be complete rubbish—but the cultivation of an open mind which will accept the possibilities over a very wide range will in the long run be greatly more valuable than the dogmatism one so often hears across the counter.

On the purely practical side, a study of external tendencies will often help the fishkeeper, because some things are common to quite wide fields of natural activity. For example, any gardener knows that certain side-shooting plants like climbing roses and clematis will not thrive unless bent parallel with the ground. The fishkeeper will find a similar tendency with *Basops* and *Myriophyllum* but not with *Fallisoria*. Stopping or pinching out the growing tips of the two former and similar species will result in thickets of growth which can prove most attractive.

The collector of rocks will have useful insight as regards what underwater environment will sustain his fish and what will kill them. The part-time artist will achieve a style of layout which few others can emulate, and so on. It could, of course, so turn out that all this mind-broadening might seduce some from the hobby altogether. To my mind this would be an acceptable situation because the transfer of allegiance could be seen to be for a particular reason, and not just on account of some of the trivia which we have all seen terminate otherwise quite promising enterprises.

Visit to Belgium and Holland

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could accommodate we travelled back to Gouda and spent another night in the Hotel de Zalm. We did some shopping in the morning and then went back to Ruinemens to load up the car with fishes. We then drove like bats out of hell to Antwerp (partly to avoid Belg/Dutch customs and to ensure catching the ferry from Zeebrugge). In Antwerp we bought some dry goods at a large

wholesaler and then caught the ferry home with a minimum of fuss from Belgian customs.

At Dover, however, the customs officer was obviously no aquarist and was not prepared for a car-load of tropical fishes from Holland—so, possibly to avoid any trouble, he charged us 10% forgot to ask for our import licence and let us through to drive home the wrong side of traffic islands to Hemel Hempstead. We arrived home at about 1.30 a.m., tired, Volvo-seat sore, but happy and 1000 fishes better off after 700 miles of European motoring during which we actually saw a few tulips, some windmills and dozens of daphnia-filled canals!

A PROPOSED ALARM—SAFETY SYSTEM

Have You Ever Assessed the Value of Your Collection?

HAVING recently acquired a 10 ft. by 12 ft. garden shed for conversion into a fish house I have spent a lot of time considering the various alternatives with regard to such things as insulation, windows, tank sizes, type of heating etc. My previous fish house—a tiny one, 6 ft. by 5 ft.—had held only 10 tanks and each tank had been individually heated and thermostatically controlled. Being interested mainly, but not exclusively, in killifishes, I will have many more than 10 tanks in the new fish house and have come to the conclusion that my requirements would be met by space-heating. Several of my acquaintances have fish houses that are, without exception, space-heated.

A short while ago I tried to estimate the value of the fish in an average fish house. I was staggered. If you have a fish house try it for yourself. Apart from those fish you could replace at a price, what value do you place on that strain you are line breeding, which may have taken you a couple of years? They are not cheap, then, are they? Or, if you are a killie-keeper, it's more than likely you have some species which are just not replaceable. What value do you place on those?

If your fish house is space-heated I'd like to bet that the heating relies upon one thermostat costing a few bob and one heater costing a few pounds. Is this good enough? I would suggest that it is not. If you are able to visit your fish house morning and evening every day then you may consider that this system is not necessary for you. On the other hand, if you are able to visit your fish house only in the evenings and have the occasional weekend away from home then a certain law will apply. This law, well known to engineers and the like, is jocularly known as 'Sod's Law' and briefly states that if anything can go wrong, not only is it certain that it will go wrong but it will go wrong so as to cause the maximum inconvenience.

We have all heard of the chap who boiled his fish because the thermostat stuck in the closed position, or whose fish froze to death when either the thermostat stuck in the open position or the heater 'went open-circuit'.

By W. B. PEARSON

It was thoughts along these lines that led me to design the following proposed system, which, as well as having the normal control thermostat, has double high-temperature and double low-temperature protection with the added advantage of a mains-failure alarm.

The materials required, besides the existing space heater and thermostat, are: four fish tank thermostats, one neon indicator lamp, one mains-operated relay, one battery-operated buzzer or bell, one switch, one battery, a long length of twin-core cable and miscellaneous bits of wire.

Basically the system consists of two separate circuits. One is an active, three-level, non-alarming circuit and the other is a non-active, two-level, alarming circuit only. The 'active' and 'non-active' terminology refers to the fact that the first circuit initiates action to limit the effect of breakdown whereas the second takes no action and is designed purely to give an audible warning of breakdown.

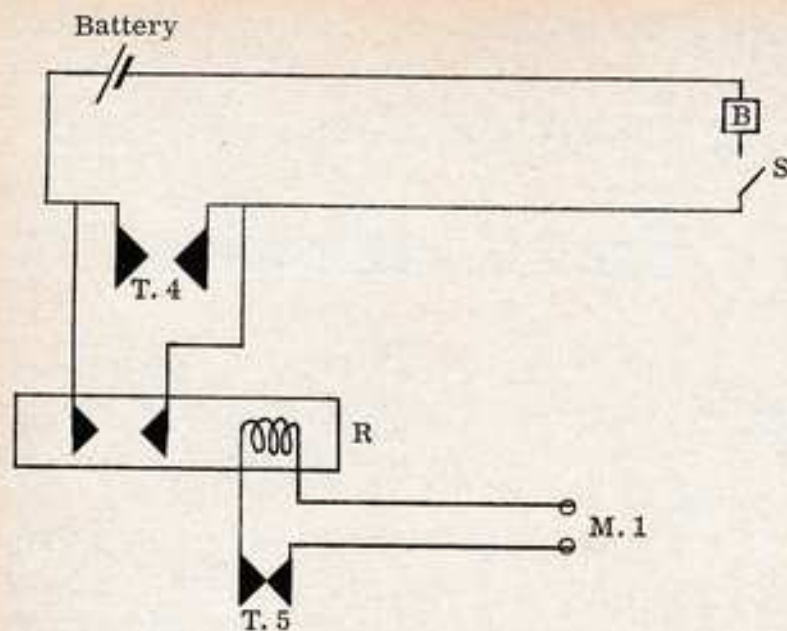
Details of Operation

Under normal operating conditions the various contacts are as shown in the diagram and the only variable is thermostat T.1, which opens and closes as required by the heating demand in the fish house.

We will now consider various suppositions and determine what will be the outcome of the failure of each separate device in turn.

(1) If T.1 fails in the closed position the heater will remain switched on and the temperature will exceed the desired temperature until a temperature is reached at which T.3 begins to operate. Control is therefore re-established but at a slightly higher temperature.

(2) If T.1 fails in the closed position and T.3 also fails to operate then the temperature will continue to rise until T.5 in the alarm circuit



In the circuit diagrams shown on this page:
 M.1 and M.2 are mains supplies.
 Other abbreviations used are:
 T.1, normal thermostat (open or closed as required);
 T.2, low-temperature emergency thermostat (normally open);
 T.3, high-temperature emergency thermostat (normally closed);
 T.4, low-temperature alarm thermostat (normally open);
 T.5, high-temperature alarm thermostat (normally closed);
 B, buzzer or bell;
 S, alarm cancel switch (normally closed);
 R, mains failure alarm relay low duty, continuously rated (de-energise closed, energise open, normally energised open)

opens. This breaks the current to the relay, R, the relay de-energises and allows the contacts to close thus initiating the alarm signal.

(3) If T.1 fails in the open position the temperature will fall until T.2 begins to operate, thus re-establishing control but at a slightly lower level than the desired temperature.

(4) If T.1 fails in the open position and T.2 also fails to operate the temperature will continue to fall until a temperature is reached at which T.4 closes. This activates the alarm circuit.

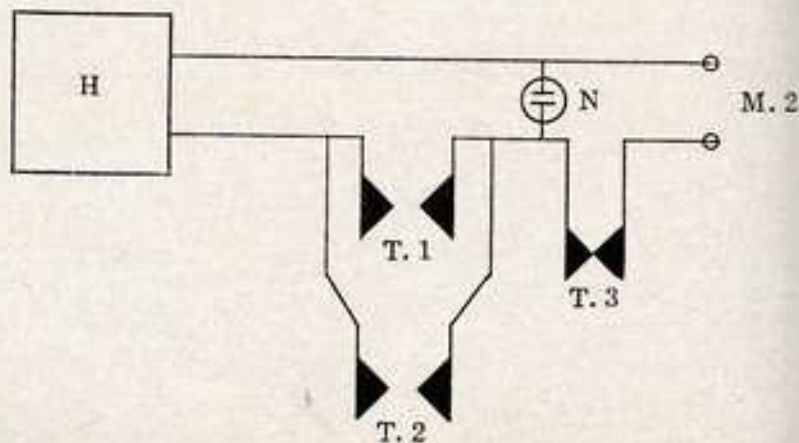
(5) If the heating device fails, i.e. 'goes open-circuit' (which is probably the most likely source of heating failure), the operations occurring will be those detailed in (3) and (4) above. The thermostats' operations will have no effect on rectifying

the fault and the alarm will eventually be activated.

(6) If the mains fails for any reason—main fuse blows, electricity board fails to deliver or the wife switches it off accidentally (which they are prone to do), the mains (M.1) to the relay, R, is cut off, the relay is de-energised and the alarm is activated.

Setting the Thermostats

It is obvious from the foregoing that the settings of the various thermostats are quite critical and the choice of setting is largely a matter of personal preference. From observation I know that a normal aquarium thermostat used out of water without its glass tube will control to plus or minus 1.5–2.0°F; i.e. if it is set to 75°F it should control between 73°



H, Space-heating system including a heavy duty relay;
 N, neon indicator (on—O.K.; off — high-temperature emergency system in operation)

and 77°F or better. Therefore if the required fish house space temperature is 75°F, I would suggest the following settings for the various thermostats: T.1, 75°F; T.2, 71-72°F; T.3, 78-79°F; T.4, 68-69°F; T.5, 81-82°F.

Having decided on the thermostat settings how do we actually get them set up at these temperatures? This is a matter for extreme care and patience because it is on the assumption that the settings are correct that the reliability of the whole system depends.

As I stated above, a normal aquarium thermostat without its glass tube will control to plus or minus 1.5-2.0°F. I do not know what the limits are with the glass tube on but I would assume them to be greater than 1.5-2.0°F. A friend of mine uses a system without the glass tube but care must be taken in the siting of the uncovered thermostat, which carries mains and is capable of killing an unwary aquarist. Covering the thermostat with a non-conducting cage, letting air through but not fingers, would be safe. The siting is also important from the point of view of draughts as well as safety. Since the tube is removed to reduce the response time of the thermostat, it will therefore respond rapidly to draughts or extraneous sources of heat.

To set up the thermostats, put a small light bulb and a fan (to stir the air and ensure an even temperature) into a large, well-lagged box and hang the thermostats in the box with an accurate thermometer. As the temperature in the box slowly rises set each thermostat at its particular temperature. Cool the box down and repeat the heating up, checking each thermostat as the temperature rises. Mark each thermostat so that they don't get mixed up.

It's no good having an alarm system if it does not work when it is needed. It is therefore a good idea to check the alarm circuit say once a week by switching off the mains, M.1, and checking that the alarm rings. This checks that the battery still

has life in it.

One point I must clarify is the heating system. H. Aquarium thermostats should not be used for currents much above 1 amp. How, therefore do we use them to control a 1 kilowatt heater? Standard practice is to use the thermostat to switch the current to the coil of a relay, which in turn has heavy-duty contacts for switching the heater.

Why is this system any better than a normal, one-thermostat system? We must first ask the question, 'Why does a thermostat fail?' It can fail because the bimetal gets 'tired' and then a very wide range of temperature is required before it will open or close, or it can open and still conduct because it 'whiskers' across the contacts or it can close and not conduct because the contacts have oxidised. T.1 will be subject to such failure because it is in constant use but the others are not in constant use and should therefore not wear. It can be argued that T.3 may oxidise because it conducts current each time T.1 closes, but provided that the contacts are good to start with and the current is not large, due to the use of a relay in the heating circuit, the life of this thermostat should be much longer than that of T.1. This is where the neon indicator lamp can be helpful. If that neon light is ever off, a high-temperature emergency is in operation. Unfortunately I cannot think of a similar system to indicate a low-temperature emergency in operation, and I would urge that a frequent inspection of the position of the contacts of T.2 be made (say twice a week). As soon as T.2 or T.3 operate, T.1 should be replaced to preserve the reliability of T.2 and T.3.

I must end by stating that everything I have written in this article is based solely on theory and that I have not yet got such a system in operation. I hope to have my fish house, complete with the alarm and emergency systems, in operation within a couple of months and will then report on its effectiveness.

Marinist's Notebook

Continued from page 604

operation if you are using artificial seawater. It is a matter for experimentation with collections of smaller fishes, and it may well prove unnecessary to change any tank water if conditions within are obviously in good order. If the water becomes yellowish in colour, however, it is probably time to carry out some degree of change, though I have no doubt that numerous readers will, from personal experience, aver that this is totally unnecessary.

At this stage I would commend to any marine beginner the British Marine Aquarists' Association, the annual subscription to which is £1.50. The secretary, John Vickery (26 Rosalind Avenue, Bramford Estate, Woodsetton, Dudley, Worcestershire) will, I know, welcome all enquiries. I know from first hand that this Association consists of some very helpful people indeed, who will go to great lengths not only to make you feel welcome but to pool their bright ideas in the common good. Their publication 'MARINEWS' makes me feel really at home, because it contains, *inter alia*, confessions from much better fish-keepers than I am that they have their troubles, too! Ever hopeful, but in excellent company, they nevertheless press on.

The Exotic Stickleback



Photo:

Morse

THESE fish may not be 'tropical' but at the present time, during the breeding season at least, the brilliantly coloured male sticklebacks can most truthfully be called 'exotic'. As well as being found all over this country, the Gasterosteidae range from the Atlantic coastal waters of North America from Labrador to Virginia, across Europe and the Baltic to the Black Sea and Korea. The ventral fins of these fishes carry an erectile spine, but it is the spines carried on their backs in front of the dorsal fin from which their common names are derived—three-spined stickleback (*Gasterosteus aculeatus*), four-spined (*Apeltes quadracus*) and ten-spined (*Pygosteu pungitius*). The American or four-spined stickleback is largely restricted to brackish water but the three-spined and the ten-spined sticklebacks are found in both fresh and brackish water.

Sticklebacks are nest-builders and their nest-building methods resemble those of birds. The nest is formed of leaves, twigs, bits of plant or floating debris, roots or anything that may be around. When construction is finished the nest is cemented together with mucous secretion, and a hole left running right through the centre of it. The nest-building is undertaken by the males and the females play no part in this. If there are a number of females within the nest area, the male

By J. LEE

does not select one partner but relentlessly and vigorously drives any female towards it, nudging, forcing her like a bulldozer at work, until he gets her body right through the nest. Then he quickly squeezes in alongside her. For a few moments they lie perfectly still, then a violent trembling takes place, as the eggs are released, that almost seems about to destroy the nest.

The whole exercise is repeated over again with another female, or even with three or four. Fertilisation takes place as both fish lie side by side through the nest after the eggs have been expelled. After hours and hours of this rough treatment the spawning site looks very much the worse for wear, but since the nest usually rests in a depression in the sand or compost and is cemented together so well by the male, it is able to withstand the savage battering. The female or females swim away to a safe distance and the male takes over the nest and eggs.

The protection of the nest is undertaken by the male with positive viciousness and the intention to attack and kill any intruder venturing within the nesting site.

Hours of painstaking work are then put in by the male, who frequently approaches the nest and blows water through the hole with a vigorous puffing action. Also occasional repairs have to be carried out to the nest to keep it all together. The four-spined stickleback and the ten-spined species are reported to build their nests half-way up plants or roots and not in the sand.

The breeding season in this country occurs in the spring when the males take on their dazzling, vivid colours. The whole of the male's underparts, from his throat, across his bony belly, to his tail and halfway up his sides becomes deep orange-red or scarlet. The top half and back has a warm greenish to bluish sheen. The ventral fins turn brilliant red and the green iris to the eye shows up vividly. It is a beautiful sight that competes with

the colouration of any exotic tropical fish. The female is drab in comparison, but not unattractive, suffused all over with a mixture of olive to green-tinted and mingled blueish sheen, with a silver to whitish stomach.

Sticklebacks may be a danger to other fish since they can inflict serious injuries with their spines and they are very pugnacious, so it is preferable to keep them on their own. Breeding them in the aquarium is simple enough. The fish can be caught before the spring and allowed to settle in a 2 ft. or 3 ft. tank, with a base of sand or compost and with plenty of plants such as *Vallisneria*, *Sagittaria*, hornwort, *Myriophyllum*, *Cambomba*, *Riccia* and Indian fern. With the spring, the males soon begin to colour up into their breeding condition. Once they are well coloured, in order to avoid fighting between them, the best male should be selected and the other males removed. Three to six females may accompany the breeding male to produce a good spawning. A temperature of about 65°F (18°C) is suitable and it should never rise above 70°F (21°C) as these fish will not tolerate tropical

temperatures. I always add salt to the aquarium and shade the top of the tank from excessive light with a sheet of brown paper. Sticklebacks are carnivorous and must continually have live foods.

Baby sticklebacks usually hatch in about 4-7 days, when the nest starts to break up. The fry are then fairly big (about ½ in. long) and on the second and third day can be started on brine shrimps, fine sifted daphnia and micro worms. For the first two days ideal foods are yolk of an egg. Infusoria or egg powder. Other good fine foods are sieved Bemax and Farex cereals (sifted through a fine nylon stocking). From the age of 1 month into adult life they must be fed continually on live foods or their life span will be very short. Favourite foods of sticklebacks are ghost larvae and daphnia, which they consume greedily; white worms are also taken readily. When fully adult the three-spined stickleback reaches about 2-2½ in. (the four-spined may be rather less at 1½-2 in.) There are many spined species in the family and the numbers of the free spines along the back in front of the dorsal ranges from three to fifteen.

Readers' Queries Answered



Wood for Aquarium Decor

I would like to decorate my tanks with pieces of wood. Could you tell me how to treat it to make it safe. Also is it all right to use any sort of wood, e.g. driftwood, dead wood or living branches from trees?

Not all woods can be used in the aquarium tank. Best of all is petrified wood or wood found at the bottom of rivers, lakes or ponds where it has lain for long periods of time and thus been washed and saturated by the natural waters in which it has been lying. Driftwood from the sea shore is also suitable. All such wood, however, must be sound and not spongy or liable to crumble. The wood must be thoroughly scrubbed, and preferably immersed in a large container to be boiled in water for half-an-hour or so and left in it while the water cools, then rinsed and

transferred to the tank. It is also possible to use interestingly twisted branches and roots (dead) from willow, alder, oak and birch; but it is unwise to use any woods other than these, and it is not advisable to use wood even from these trees that is still full of sap. Here again, such wood must be scrubbed, boiled if possible, scrubbed again and rinsed. Even saturated wood is not easy to keep anchored to the bottom of the tank and in this case it must be wedged or weighted down with heavy stones or strips of lead attached beneath it.

Deformed Angel

I have an ordinary angel fish (about 2 in. long). It has its 'feelers' joined together and it cannot swim straight. Is there any way of parting them, or will it be better to destroy the

fish? Or, if it is not in pain, should I leave it alone?

Although it might be possible to separate the joined fins of your angel fish surgically, it is not easy for us to judge this without seeing the fish. Also it should be done only by a qualified person. It is not likely that this natural deformity would cause the fish pain and there is no reason why it should be killed.

Converting Water Readings

With a view to breeding some of the more difficult fishes I recently purchased a water hardness test kit made in Germany. The test kit gives results in German hardness degrees—how can I change this to p.p.m.?

Multiply by 17.8 (German 1° DH = 17.8 p.p.m.). Alternatively German degrees of hardness can be converted into British (Clark) by multiplying the hardness (DH) figure by 1.24 (1° Clark = 14.3 p.p.m.). (These conversions are given in the PetFish Aquarist's Diary 1973, pp. 12-15.)

Aquarium Rocks

I would like to know whether or not millstone grit rocks from Yorkshire are safe in tropical aquaria.

Rocks used in an aquarium, particularly in a warm-water aqua-

rium, must not be of the kind that will dissolve in water thereby altering the pH and the degree of hardness. For this reason lime-bearing rocks, chalk and marble must be avoided (in fact, any material containing lime can increase the hardness of the water). Care in this respect has to be exercised particularly when the aquarium is used for breeding or rearing or for keeping soft water species of fishes. Other rocks to be avoided are the mineral ores as these can give off soluble metallic compounds. Suitable rock includes granite, sandstone and flint, basalt and greins. Devon black rock, Scaevola stone, Cornish stone, Welsh stone and red white-veined Mendip mountain rock are all suitable, as is millstone grit.

Texas Cichlids

I think I have a true pair of Texas cichlids but there doesn't seem to be a very great difference at present between their fin lengths.

The longer points to the dorsal and anal fin of the male fish will develop in time, but there is another means of differentiating these fish (apart from the fact that the male is usually also the smaller fish of the two) and this is the flattened belly of the male. There is a distinct difference in outline of the two sexes seen in profile when mature and, in fact, with its somewhat hump-back the male sometimes gives the appearance of being a rather poor specimen of fish.

Bony-lipped Barb

Will a large Osteochilus hasselti be a suitable addition for a cichlid tank?

Yes, provided that the cichlids present are not too aggressive. A well-planted tank is preferred by this species, and it is unlikely that your cichlid tank will be well planted! However, rockwork and bark can be used to provide some cover. A cichlid diet of live foods and raw meat is also suitable for this fish but algae or scalded lettuce must be provided as well.

Emperor Tetras

An authoritative author on tropical fish has described the emperor tetra as a 'frustrating' fish to keep and breed. Breeding I haven't tried but I have

had no trouble with my fish and am wondering if I've just been lucky?

It is not very easy to try to assess what the author might have had in mind when he called this fish 'frustrating' to keep. As far as breeding goes, they are not prolific breeders and the fry are initially not fast growers. Also they are inclined to be shy and do not show to their best advantage unless their tank water is reasonably soft and acid. An article on breeding the emperor tetra appeared in the issue of PETFISH MONTHLY dated December 1971.

Willow Moss

I am always having to buy bunches of willow moss for my goldfish but although I force the bunches into the gravel, the goldfish pull it up too quickly for it to root. I would very much like to keep this plant in my tank. How can I get it to grow?

Fontinalis is, as its common name denotes, an aquatic moss, and you will not be able to 'root' it by placing the ends in the gravel. In fact, as it grows mostly in fast-flowing streams, it is not of much use as a permanent addition to a tank. However, the leaded bunches will last for many weeks, and they can be removed and washed frequently. On your trips to the countryside willow moss will frequently be seen growing on stones or tree roots in rivers, and a stone with the plant attached can be removed and put in your tank. Plants and stones from natural rivers, however, must first be very well washed, rinsed in a weak solution of potassium permanganate and examined carefully to see that no leeches etc. are present before being included in your tank.

Handsome Rudd

In view of the problems that can arise with golden orfe I am always surprised that the rudd is not more easily obtainable for garden ponds. It is a very handsome fish and eats surface insects but doesn't seem to be so affected by oxygen requirements as the orfe. Furthermore it is a British fish and presumably easy to obtain.

It is true that the rudd is a very fine fish for the garden pond (though possibly the young fish do not show so much promise of their mature beauty as the golden orfe

does), and it tolerates raised water temperatures better than orfe. The fact is that although orfe appear in the shops whereas rudd are less often available, although the latter are indigenous to this country, orfe are, surprisingly enough, the easier species to obtain. They are bred in the continent in large quantities as ornamental pond fish and can be imported along with the goldfish. Rudd may be obtainable from our natural waters but to catch them would not be economic and it would be a mistake to take them from natural waters without putting them through a thorough process of quarantine.

Pond Surround

I am very dissatisfied with the appearance of my garden pond. It is a small, plastic-lined one, and although the pond itself is quite pretty inside, it's just a hole in the ground filled with water, not a bit like the pictures of a beautiful section of the garden filled with flowers leading by steps to the focal point, the pond. I would like to make a bog garden as I think this might help but I do not seem to have the basic requirement, of boggy ground. Books refer to the muddy area at the side of the pond, but this really does not apply to modern ponds—the area around my pond is perfectly dry. Have you any hints about this?

We agree that many garden ponds seem to bear no relation to any other part of the garden but it does require a little skill and an eye for landscaping to achieve a harmonious effect. It sometimes helps to site a pond, if choice is available, not too far from a side plant bed that can be curved to follow, at a distance, the line of the pond. The intervening area can be paved and rock plants lodged among the paving stones so that the pond is linked with a major part of the garden. The garden bed itself can be used to house taller herbaceous plants to give the pond a background.

If you wish to concentrate on true bog plants, however, they can be grown in the pond surround even though this is not naturally damp. The ground must be carefully prepared, dug really deeply and plenty of leaf mould and peat incorporated. This will prevent the soil from drying

Continued on page 618

Breeding Habits of the Jewel Cichlid



Hemichromis bimaculatus

HEMICHROMIS is one of the genera of African cichlids that, along with *Pelmatochromis*, *Pseudotropheus*, *Tilapia* and *Haplochromis* (with which genus *Hemichromis bimaculatus* appears to have close family ties), inhabit the waters of the Niger, Nile and Congo. *Hemichromis bimaculatus* has an elongated body, with a long dorsal and fairly long ventral fins. The back is dark olive to grey-brown with a greenish gleam. The sides of the body are greenish yellow with a reddish bloom, and the belly has a golden tinge. Along the sides is a horizontal stripe, dark-flecked at the gills and at the root of the caudal. But at spawning time or when excited the fish becomes bright red with glittering blue pearls that seem to 'light up' along its sides and on its fins and gills. Sex differences are easy to recognise in the adult fish—the male is larger and slimmer, rather browner in colour and his ventral fins are pointed.

Jewel cichlids are not fish for the community tank; they are very quarrelsome amongst themselves—indeed they are so pugnacious that it is sometimes necessary to keep older specimens alone; they require a large tank; they tear up plants, and because of this only the toughest-leaved plants, anchored by stones to the bottom of the tank, can be used—if plants are to be considered at all in the same tank with them; finally, they require the largest-sized live foods or a meat diet.

By RUDOLPH ZUKAL

Photographs by the author

Translated by F. MARSH



In this picture and in the one on the preceding page the left-hand fish is the male. Both parents cleaned the stone before egg-laying took place (right)

Jewel cichlids are fish, in fact, that are avoided by many hobbyists. Indeed, aquarists may ask what is the point of keeping such fish? I will not philosophise over the fact that each and every fish is interesting in its own way and that this might be reason enough for keeping them—for with the jewel cichlid this does not have to be the only reason. Their magnificent colouring more than justifies keeping them.

I have tried to describe it briefly but the reality almost defies description. They are vividly red in colour when they are in good condition or spawning. And that is very often. A well-nourished pair spawn a great many times during the year, sometimes at 3 weekly intervals. Also, their brood care is an extremely interesting behaviour study.

Water conditions for jewel cichlids are not critical and a temperature of up to 75°F (24°C) is suitable.



A close-up view of the female jewel cichlid at egg-laying time, the extended ovipositor being clearly visible.

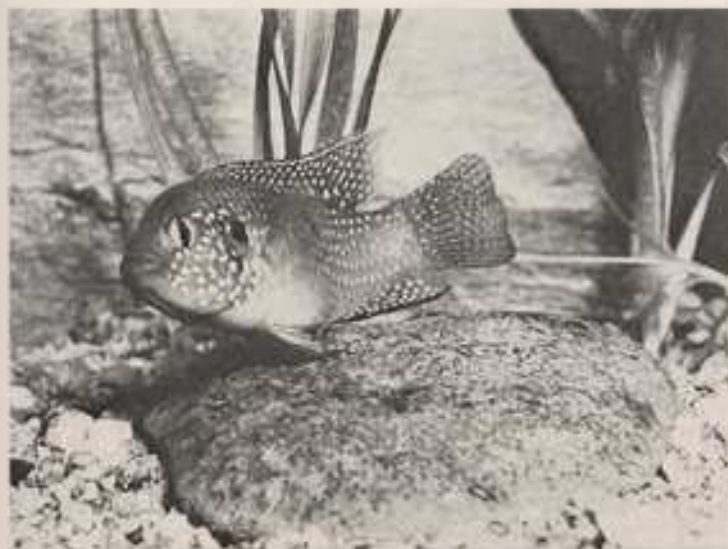
If a job's best done standing on your head then that's the way to do it—stone-cleaning time for the male jewel cichlid



The breeding tank should contain several large, flat stones for the eggs to be laid on. After a display lasting for several days the female chooses the spawning site and cleans it carefully with her mouth, a process which the male may also take part in. Only when the spawning site is considered to be quite ready are the eggs laid, and then fertilised by the male fish. Once the egg-laying is completed, both

parents will tend the eggs by passing fresh water over them with the fanning movements of their fins. Just before the fry hatch the female digs a hole in the gravel and carries the young to it in her jaws.

These parents may be left with their young since they will not, under normal circumstances, harm them. But cannibalism can be exhibited by the



The male jewel cichlid fertilises the eggs laid on the stone by the female, swimming over them and very close to them



The female (left) has just left the stone and the eggs she has just deposited and the male immediately takes up his fertilising position.

adult fish if they become nervous; they may eat the young from sheer 'anxiety'. The young ones grow very quickly and are reared easily enough if provided with plenty of appropriately sized live foods. At maturity they are 4½-5 in. (10-12 cm.) long.

One more point. If a group of young *H. bimaculatus* are reared together in a tank, flower pots and caves made out of rockwork and stones must

be provided so that the weaker fish find it possible to hide. As they mature, the fish will pair naturally. During the process a fair amount of fighting may occur in the tank, an event which often ends in some fish being severely wounded, but when two fish have paired they stay together and remain 'wedded'. With an established pair it is possible to achieve breeding totals of a thousand youngsters a year.

Readers' Queries Answered

Continued from page 612

out completely, and a regular overflow of the pond during the summer months will help to keep the area permanently moist. The whole charm of a bog garden depends on informality and from the wide range of plants available it is advisable to plant in small clumps, rather than singly where the colour effect is lost. Vivid patches of different colours at different heights is the aim. *Primulas*, *astilbes*, *marubas*, and, of course, the *iris*, are just a few of the plants (not too difficult to obtain for this section of the garden. Be careful not to take your bog garden up too close to the edge of your pond, however, or your pond will gradually fill with earth washed

into it. Give a brick or slab edge to the pond and ideally see that the bog garden where it is nearest to the pond is 2 or 3 in. below the pond's level.

Goldfish Breeding

Three goldfish bought last season appeared to be breeding in the pond in late August (I say 'appeared' because although they were exhibiting breeding behaviour, as far as I can judge, there have been no signs of young fish). When can we expect them to start again this year?

It is the water temperature that triggers off the spawning procedure in healthy, adult goldfish, and a

water temperature of 60-65°F will induce spawning behaviour. So it is the vagaries of our climate that control our goldfish stock if natural pond-breeding is involved. Such a temperature could be achieved by late April, though it is more likely that mid-late May, and June, will be the time. The peculiar weather conditions experienced last summer produced their own setbacks in goldfish-breeding programmes and it has been reported that first spawnings normally achieved during late May were 4 weeks late and that peak spawnings were taking place in late August. Once started, the fish can breed monthly while the temperature is appropriate. In view of current prophecies of an early spring in southern England it could be that breeding programmes will be as much advanced this year as they were put back last year—but, who knows?

Book Review

The Goldfish Has Cause to be Grateful

PET LIBRARY GOLDFISH GUIDE. By Dr Yoshichi Matsui. With a chapter on Koi by Takayoshi Kumagai. Edited by Capt. L. C. Betts. 252 pages. Black and white and colour illustrations. The Pet Library Ltd., London and New York. £2.00.

WE have not had a good book on the goldfish for some time now. Hervey and Hems' scholarly work was published 25 years ago and it is quite a while since Anthony Evans gave us the essentials in less-intimidating form. For most of us, after these publications there remained, I suppose, little more to add apart from the interminable wrangles about standards.

However, there remained in the background certain aspects of the subject about which we were lacking information. We knew, for instance, that the Chinese developed the goldfish in ancient times and gave us pictures of some of the varieties they produced; but for the last three hundred years or so they have been pretty cagey about their goings-on and we could only guess at their methods and the genetic mechanism that lay behind them. Every so often something new has become available to us but it has usually come via Japan and until now we had little idea as to what part the Japanese played in the story apart from exporting the products.

It is particularly gratifying, therefore, to have at last a book about the Japanese goldfish scene, by an author eminently qualified to write it. Dr Yoshichi Matsui is well known for his research in genetics and as a practical breeder of goldfish; he is Professor of Fish Culture at Kinki University.

Writing, naturally, from a Japanese standpoint, Dr Matsui nevertheless surveys the whole field, with chapters on Chinese culture and comparison of the Oriental preference regarding varieties with those of Britain and America. The book is,

indeed, remarkably comprehensive. The beginner who merely wants to keep a goldfish indoors as a pet or in a garden pool will find all the information needed in Chapters IV to X, while the specialist will find the simplified account of the genetics of the fish very useful, as well as the advice on selection and culling.

The first part of the book gives a most interesting account of the varieties favoured in Japan and the methods used to cultivate them, a subject on which we have been largely uninformed to date. The little incidental glimpses into Japanese life and history are fascinating; there are even instructions for pronouncing the names.

For full measure a chapter on koi, now so popular in the West, has been contributed by Dr Kumagai, who is an Associate Professor at Keio University. The cult of the 'koi carp', by the way, is not as new as some people imagine. Fifty years ago we knew the hi-go in Britain; koi means carp and is modified to goi after an adjective. 'Koi carp' is therefore tautonymous (as is 'pizza pie') and it is better to say 'coloured carp' or 'nishiki koi', which means the same thing. In recent times, of course, a number of new varieties of koi have become available to us, so the present chapter is timely.

Perhaps the most revealing part of the book is that dealing with the large-scale breeding and rearing of the 'common goldfish' or wakin and the shubunkin. These are the mainstay of our dealers' stocks and few will fail to find interest in the account and illustrations of the industry that lies behind the fish in the shop windows. A good many attractive forms have not yet reached us, because: 'Since there is still a sellers' market in Japan, most Japanese producers avoid shipping problems by limiting their activities to the domestic market'.

One could take issue on small points, mainly academic; for ex-

ample, Professor Matsui states not once, but several times, that the goldfish is derived from the crucian carp, but the fish he illustrates is, of course, the wild goldfish (*Carassius auratus*) and not much like the European fish (*Carassius carassius*).

They may possibly have been one species before the Glacial Period but were then isolated, with 3000 or so mountainous miles and ten degrees of latitude between them. The crucian carp has not thrown mutations the way the goldfish has. With destruction of original habitat and artificial distribution by man this is difficult to prove today, but if Professor Matsui examined the old collections in European museums he might change his opinion.

The book is excellently produced in the usual Pet Library GUIDE format, with beautifully printed illustrations in the copy before me. How good it is to see a real red in a book of this kind; goldfish call for good reds and in this book they have been 'done proud'. Not all the pictures have been happily chosen, however. The fish shown on p. 93 are not comets as stated, but 'common goldfish' like hibuna. The only comets shown in the book are cowering at the bottom of the picture on p. 62, about to be mauled by a couple of infants. If you know Caravaggio's 'Boy with basket'—a work that must surely belong to his student days, you may be amused to find Toen Caravaglia trying to live up to it on p. 244: the little girl and the kitten are sweet, if cloying. But there is too much water in the bowl, too many fish in the water and a heap of gaudy marbles to cause trouble—all countering the author's advice.

A certain amount of material has been integrated with the text to increase its appeal to western readers. The editor, Capt. Betts, had a difficult task here and has managed it pretty well, though the difference in style is noticeable here and there. As former president of the Goldfish Society of Great Britain it is understandable that he should include the Society's Standards as an appendix, but it was rather a pity as they are, inevitably, already out of date. As it is, they suggest, when compared with the pictures, that goldfish which do not conform with the Standards may be more beautiful to look at than those that do.

I could fall for the lady Ranchu with her red nose, on p. 29, and am

intrigued by the caption to her photograph: 'The Ranchu or Lion-head does not have a dorsal fin. This characteristic is enhanced by selective breeding'. How, I wonder, does one enhance something that isn't there?

Quibbles apart, this book can be strongly recommended to the beginner and specialist alike. It should have a place on every aquarium bookshelf. The greatly ill-used goldfish would be grateful if it could read it, for it should right many wrongs.

A.F.B.

is safe and simple—the author's method (without an anaesthetic, since this could hardly be suggested for use by a child) will distress the fish and be most difficult to accomplish.

The suggested learning tests and training procedures for goldfish are

more likely to attract the bright child, however, and these are practical enough. Much of Mr Simon's text is devoted to showing that there is more to a goldfish in a tank than a goldfish in a tank—an aim that must be applauded.

A.E.

AquaGLOSSARY

No. 8

A PFM guide to the meanings and accepted pronunciation of the scientific names of aquarium subjects, arranged by word-roots in alphabetical order

DISCOVERING WHAT GOLDFISH DO. By Seymour Simon. 47 pages. Illustrated. World's Work Ltd., Tadworth, Surrey. £1.10.

THIS little book makes an interesting attempt to stimulate the experimental approach and powers of observation in the young readers to which it is directed. It seems very likely that the book could succeed in this, for a child with the latent instinct to experiment and having already an interest in goldfish. Some experienced goldfish specialists, even, might be interested to try some of the suggested investigations—for example, counting daphnia consumption by isolated fish and groups of fish to determine what effect group-living has on food consumption by goldfish.

One of the most wonderful experiences yielded by a microscope is the sight of blood corpuscles moving along small blood vessels, and observing the tail of a living goldfish is one way of showing this. However, this is the one experiment for which I would query the wisdom of its inclusion in this book; by use of a simple anaesthetic the procedure

Caudo (Latin): tail. Pronounced 'kor-doh'. For example, tail features characteristic of two species of *Otocinclus* ('ott-oh-sink-luss') occur in the trivial names: *O. maculicauda* ('mack-yew-lee-kor-dah') has a dark blotch (*macula*, Latin: spot) on the tail, and *O. nigricauda* ('nee-gree-kor-dah') has a blackish (*niger*, Latin: black) tail. Also *Gephyrocharax atracaudatus* ('jef-f-row-kar-racks at-rah-kor-dah-tuss'), *Hemigrammus caudocittatus* ('hemmy-gram-uss kor-doh-vee-tah-tuss'), *Limia caudofasciata* ('lim-mee-ah kor-doh-fash-ee-ah-tuss') and *Phalloceros caudomaculatus* ('fal-low-ker-ross kor-doh-mack-yew-lah-tuss').

Nanno (Greek): dwarf. Pronounced 'nan-oh'. For example, the genera *Nannacara* ('nan-ah-kar-ah'), *Nannaethiops* ('nan-neeth-ee-ops'), *Nannochromis* ('nan-no-krow-miss') and *Nannostomus* ('nan-nos-stom-tuss').

Oligo (Greek): few. Pronounced 'olly-go'. In the trivial names of *Barbus oligolepis* ('bar-buss olly-go-lep-iss') and *Moenkhausia oligolepis* ('monk-how-see-ah olly-go-lep-iss') where 'few scales' (*lepis*, Greek: scale) is denoted.

Phil (Greek): loving, fond. Pronounced 'fill'. The water plant genera *Hygrophila* ('hy-grof-fill-ah') and *Limnophila* ('lim-nof-fill-ah') utilise this work-root to indicate the plants' aquatic habitat (*hygro*, Greek: wet; *limno*, Greek: pond).

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PLANS for 1973 made by the **SOUTH PARK AQUATIC STUDY SOCIETY** include table shows, talks by many prominent people in the fish world, a further combined Open Show with Kingston & DAS and, of course, their own highly successful Invitation Show to be held on 5th May. Visits to fellow clubs are also planned and to quite a number of Open Shows throughout the country. "Come on show secretaries, let's have copies of your Show schedules," says P.R.O., Mr G. Herring. Mr Herring continues: "As a point of interest, it would be nice to know how many coldwater fishkeepers throughout the country will read this article and wonder how they can get in touch with the only known coldwater club in the country; well, this can easily be remedied by contacting Mrs M. Dudley, 163 South Park Rd., London, SW19, 01-540 1664. You will be very welcome at any of our meetings. The next meeting is on Tuesday, 17th April."

APOLOGIES are proffered to **WEYMOUTH AS** for stating that their Open Show, to be held on Sunday 27th May at the Small Sidney Hall, Weymouth, would give particular emphasis to furnished aquaria. This is not so. It will be an Open Show with the usual classes, 77 members of the Society thoroughly enjoyed the lecture given by the chairman, Mr Derek Rogers, on general tank maintenance and fish diseases. The table show results for furnished aquaria were: 1, Mrs Brooks and Mrs Manels; 2, Mr E. Warbridge; 3, Mr P. Stimpson. Mr D. Mullen won the aquascap class.

IN order that **PORTSMOUTH AS** may keep to their usual Open Show dates (6-11th August) this year a new venue has had to be found and this is to be St. Patrick's Hall, Winter Road, Southsea. A further class for Aquascapes has been added making 48 classes in all. Benching will take place on 4th August and judging on the 5th. The show will be open to the public from 6th-11th. The society's usual Spring Bank Holiday interclub competition will be held on Sunday 27th May at the usual venue. Winners of annual trophies are: Mr F. Willis (tropical breeders, best plant, highest total points); Mr W. Evans (coldwater breeders, twin-tails); Mr J. Lamboll (aux coldwater fish); Mr J. Stifford (best labyrinth;

home furnished Taqunia tropical); Mr D. Stokes (best shubunkin); Miss W. Ryder (home furnished aquaria, coldwater); Miss J. Lamboll (best junior entry, tropical); Master R. Bryant (best junior entry, coldwater).

AT the end of the second leg of the inter-society competition between **ALFRETON & DAS** and **BULWELL AS**, Alfreton were overall winners with 48 points against 36. The judge was Mr B. Izman and he made the best fish in show award to a cichlid entered by Mr Freeman (Hucknall & Bulwell). Results were:

Stewards and molliés: 1 & 2, Mr Maghala; 3, Mr Simpson. *Minors, daisies and rubens:* 1 & 2, Mr M. Foster; 3, Mr S. Dooley. *Large characins:* 1, Mr B. Hill; 2, Mr J. Wright; 3, Mr Maghala. *Cichlids (small):* 1, Mr Freeman; 2, Mr Maghala; 3, Mr Back. *Burbs (small):* 1 & 2, Mr J. Wright; 3, Mr S. Hill. *Catfish and loaches:* 1, Mrs V. Wright; 2, Mr Maghala; 3, Mr Wood.

DETAILS of the new class, to be introduced for the first time at this year's INTERNATIONAL OPEN SHOW of the FANCY GUPPY ASSOCIATION to divide the FGA World Guppy Champion 1973, together with entry forms for this class and show schedules, are now available. Please send i.c.s. to the Association's show secretary, Mr D. R. Bouchan, 17 Peabroe Close, Woodrow, South, Redditch, Worcs. Basically, each entry will consist of five matched males and five matched females (all from the same strain), which will be judged in two 6 in. by 4 in. by 4 in. tanks, all males in one tank and all females in the other. The entries will be judged to FGA standards by at least one 'A' class, non-competing, FGA judge. Entries for this one class must be notified to the Show secretary, on the proper form supplied from him upon request, at least 1 month before the date of the Show (21-27th May). This is so that the correct number of tanks may be supplied.

PRIVATEERS AS (Shipley) fourth inter-society show was a great success, and an enjoyable evening and supper was had by all who attended. The judge was Mr P. Moorhouse of Huddersfield. There were 84 entries and best in show award was won by Mr D. Greenwood (Nelson).

Results were as follows: *livebearers:* 1, A. & C. Collinson (Airedale); 2, Mr Derek (Huddersfield); 3, Mr G. Robinson (Keighley). *Burbs:* 1, Mr B. Whittaker (Privateers); 2 & 3, A. & C. Collinson. *Characins:* 1, A. & C. Collinson; 2, Mr R. Stanfield (Bradford). *Cichlids:* 1, Mr J. A. Whittaker (Airedale); 2 & 3, Mr G. Poole (Mossley). *Anabantids:* 1, Mr J. A.

Whittaker; 2, Mr R. Turner (Mossley); 3, Mr G. Robinson. *Catfish and loach:* 1, Mr D. Greenwood (Nelson R.I.S.); 2, A. & C. Collinson; 3, Mr Hodgson (Mossley). *Carp and Minnows:* 1, Mr D. Greenwood (Nelson). *Sharks and trout:* 1, Mr H. Whittaker; 2, Mr Hall (Privateers); 3, Mr Hodgson. *Tetraodon:* 1, Mr J. A. Whittaker. *Acc:* 1, Mr J. S. Hall (Airedale); 2, Mr B. Tate, (Nelson); 3, Mr G. Robinson. *Av. gurn:* 1, Mr J. A. Whittaker; 2, Mr D. Greenwood (Nelson); 3, Mr Downer (Keighley). *Coldwater:* 1, 2 & 3, Mr J. S. Hall (Airedale).

A recent talk by Mr P. Robinson of Bradford on importing and breeding fish proved very informative and was enjoyed by the audience.

PRESIDENT OF ILFORD & DISTRICT AQUARIST'S & PONDKEEPERS' SOCIETY, Mr Harry Berger, presented the Society's annual awards at their February meeting. The Special Award, an engraved tankard, for services to the Society was presented to Mr M. Perry. The large cup and replica for the furnished jar competition was awarded to Mr D. Seaman. The large cup and replica for the pond competition was awarded to Mark Nott (2, Mr H. Berger, shield; 3, Mr W. Row, medal). The large cup and replica for the home aquarium competition was awarded to Mr J. Hartam (2, Mr D. Seaman, shield; joint 3rd, Mr L. Smith & Mr M. Perry, medal each). The large cup and replica for the table show competition was awarded to Mr W. Rowe (joint 2nd, Mrs P. Reade & Miss J. Frostick, shield each). All classes table show: best egg-layer in show, Miss L. Smith (shield); best livebearer in show, Miss J. Frostick (shield); best novice entry, Mr L. Smith (shield). Mr D. Seaman was also awarded a large cup and replica as winner of the Festival Cup competition.

Following the President's remarks on the various achievements of the past year a very interesting programme on the theme of judging techniques was given by Mr M. Brill and Mr D. Seaman. This was coupled with a table show for two popular groups of tropical fish, burbs and molliés, which served to illustrate the points made during their talk. Members were invited to take part in judging the entries and their marking was afterwards compared. Anyone interested in fish-keeping, tropical or coldwater, will

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FISH FOOD

be welcome to come along to meetings of the Society at the Fullwell Cross Library and details are available from secretary, Mr R. Ruth, 103, Heath Road, Chadwell Heath, Romford.

THE results of AIREBOROUGH & DAS's Open Show are as follows:

Furnished aquaria: 1, Mr M. Fryder (Hullfax, 76); 2, Mr Silk (Independent, 75); 3, Mrs Vary (Blackpool, 66). Av Livebearers: 1, Mr Williams (Swillington, 75); 2 & 3, Mr P. Hornshaw (Harrogate, 74 & 70). Av Barb: 1, Mr Vaise (CAS, 74); 2, Mr D. Foster (Don Valley, 71); 3, Mr R. Foster (Creswell, 70). Av Cichlid: 1 & 2, Mr D. Taylor (Harrogate, 73 & 72); 3, Mr D. Foster (71). Av Characin: 1, Mr M. Cook (Harrogate, 71); 2, Mr Williams (74); 3, Mrs R. Foster (Creswell, 70). Av Anabantid: 1, Mr B. Lydon (Keighley, 72); 2, Mr & Mrs Povey (Blakeborough, 71); 3, Mr & Mrs Dickinson (Creswell, 70). Av Carps and minnows: 1 & 3, Mrs Moss (Independent, 75 & 70); 2, Mrs R. Foster (72). Av Catfish and loach: 1, Mr P. Hornshaw (Harrogate, 73); 2, Mr J. P. Baker (Wellbeck, 72); 3, Mrs M. Povey (Blakeborough, 70). Aov: 1, Mr & Mrs Holmes (Wellbeck, 77); 2, Mr D. Lawson (Aireborough, 76); 3, Mr D. Barrett (Wellbeck, 75).

Breeders. Guppies: 1, Mr B. Tate (Aireborough, 55). Platys: 1, Mr. A. Moss (Huddersfield, 70); 2, Mr Toyne (Sheffield, 68); 3, Mr T. Douglas (Hull, 65). Swordtails: 1 & 2, Mr T. Douglas (Hull, 65 & 65); 3, Mr G. Andrews (Hull, 68). Mollies: 1, Mr H. Hubbard (Peterlee, 74); 2, Mr J. Igoe (Sherwood, 72); 3, Mr & Mrs Blades (68). Aov Livebearers: 1, Mr A. Moss (72); 2, Mr & Mrs Dames (71); 3, Mr S. Hall (Aireborough, 69). Barbs: 1, Mr S. Clark (Independent, 71); 2, Mr B. Tate (Aireborough, 70); 3, Mr & Mrs Toyne (69). Characins: 1 & 2, Mr Sonley (Independent, 76); 3, Mr & Mrs Cohen (Cusltford, 71). Cichlids: 1 & 2, Mr J. Abbott (Swillington, 75 & 77); 3, Mr R. Dyson (Fleetwood, 75). Anabantids: 1, Mr A. E. Whitelack (Doncaster, 60); 2, Mr & Mrs Swinson (Grantham, 67). Carps and minnows: 1 & 3, Mr Sonley (71 & 70); 2, Mr A. Moss (72). Catfish, loach & aov egglayers: 1, Mr & Mrs Cutting (South Shields, 77).

Guppies: 1, E. Kirk & Sons (Cleethorpes, 75); 2, Mr J. Peterson (South Shields, 74); 3, Mr & Mrs Ruffell (South Shields, 73). Platys: 1, Mr H. Hubbard (Peterlee, 77); 2, Mr G. Kaye (Top Ten, 73); 3, Mr D. Povey (Blakeborough, 72). Swordtails: 1, Mr G. Batch (Hull, 73); 2, Mr T. Douglas (Hull, 72); 3, F. Kirk & Sons (71). Mollies: 1, Mr J. Igoe (76); 2, Mr J. S. Hall (74); 3, Mr L. S. Hunter (York, 74). Av Female livebearers: 1, Mr G. Thickbroom (76); 2, Mr & Mrs Kilvington (Doncaster, 74); 3, E. Kirk & Sons (70). Aov Livebearer: 1, Mr & Mrs Toyne (74); 2, Mrs A. Hyslop (Swillington, 73); 3, Mr A. Moss (71).

Siamese fighters: 1 & 2, Mr & Mrs Cohen (76 & 74); 3, Mr Gillespie (Wellbeck, 75). Aov Anabantid: 1, Mr & Mrs Cohen (CAS); 2, Mr A. E. Heap (76); 3, Mr J. Jones (Grantham, 73). Dwarf cichlids: 1, Mr & Mrs Hyslop (Swillington); 2, Mr J. S. Hall; 3, Mr P. Baker. Angels: 1, E. Kirk & Sons (72); 2, Mr & Mrs Toyne (71); 3, Mr & Mrs Blades (70). Aov Cichlids: 1, Mr & Mrs Gilding (Gainsborough); 2, Mr H. Hubbard (Peterlee, 70); 3, D. & R. Standen (Loyne, 78). Small barbs: 1, Mr & Mrs Cohen (75); 2, Mr & Mrs Waring (Leyham, 74); 3, Mr & Mrs Dickinson (CAS, 73). Aov Barb: 1, Mr Gillespie (74); 2, Mr & Mrs Cohen (73); 3, Mr J. Igoe (72). Small characins: 1, Mr J. Cartwright (Huddersfield, 76); 2, Mr & Mrs Blades (74); 3, Mr J. Wright (Alfreton, 71). Aov Characin: 1, D. & H. Standen (76); 2, Mr R. B. Booker (Morecambe, 75); 3, Mr T. Smith (Sheffield, 73). Toothcarps: 1 & 3, Mr & Mrs Blades (72 & 70); 2, Mr Sonley (71). Flying fox & sharks: 1, Mr K. Phillips

FEDERATION First



NEW
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Championship
Class Shows are
Announced

Federation Officers

Chairman, Mr F. T. Tomkins; vice-chairman, Mr H. Towell; secretary, Mr Ken Pye (35 Steeles Road, London, NW3); treasurer, Mr D. Dove (5 Farm Close, Crowthorne, Berks.); secretary, Judges & Standards Committee, Mr C. A. T. Brown; Trophies, Mr T. Glass; Publications secretary, Mr M. Carter; Ties & Badges, Mr A. Blake; Bulletin editor, Mr Dick Mills. Council: Mr S. Applin, Mr L. Jordan (assistant Publications Secretary); Mr D. Lambourne; Mrs P. Lambourne (secretary to Federation Show Committee); Mr R. Esson (chairman, Judges & Standards Committee).

Forthcoming Championship Class Shows

7th April	Thurrock AS	Eb	
8th April	Uxbridge AS	Xo-t	Breeders
14th April	Independent AS	H	Corydoras
29th April	Medway AS	L	Loaches
6th May	Rochampton AS	G	Catfish
12th May	Port Talbot AS	J	Rasboras
13th May	Corby & DAS	Db	Cichlid
13th May	Croydon AS	Cb	
19th May	Southend & DAS	Dc	Rift Valley cichlids
20th May	Kettering AS	Dz	
9th June	Havant & DAS	Mz	
9th June	Vauxhall AS	Ea	Siamese fighters
17th June	Bishops Cleeve AS		
23rd June	Dunmow AS	P	Guppy, female
30th June	Basingstoke & DAS	T	Livebearers
1st July	Exeter AS	No-t	Egglayer pairs
4th-11th August	Portsmouth AS	Xo-p	Breeders
5th August	Tonbridge AS	Ba	
30th August	Northampton AS	Ca	Hypnessobrycon etc.
2nd September	Bethnal Green AS	Cz	
2nd September	Wellingborough AS	O	Guppy, male
8th September	Reading-Didcot-Bracknell	K	Danios & minnows
9th September	Harlow AS	Q	Swordtails
9th September	Newbury AS	Bz	
15th September	Hounslow & DAS	R	Platys
23rd September	Torbay AS	W	Native & foreign
23rd September	North Kent AS	Xb-m	Breeders
6th October	E. London A & PA		
7th October	Ealing AS	S	Mollies
28th October	Newcastle Guppy & L/BS		

*Winners of Federation Championship Trophies in classes for single fish automatically become eligible for the Supreme Championship Trophy Competition (to be staged at The AQUARIUM SHOW '73 at the Royal Horticultural Society's Old Hall, London, S.W.1., 2nd-4th November). Six awards are made at this Competition.

(Blackpool, 80); 2, Mr R. S. Thompson (Hendon, 70); 3, Mr T. Smith (Sheffield, 75). Rasboras, danios & minnows: 1, Mr Gillespie (70); 2, Mr & Mrs Gilding (67); 3, Mr & Mrs Dickinson (65). Corydoras & Bristles: 1, Mr J. Moseley (Keighley, 70); 2, Mr & Mrs Clarke (Independent, 78); 3, Mr Edwards (Wellbeck, 72). Aov Catfish: 1, Mr J. S. Hall (77); 2, Mr & Mrs Kilvington (75); 3, Mr P. Baxter (70). Loaches: 1, Mr

V. Wright (Alfreton); 2, Mr W. Wornell (Peterlee, 78); 3, R. & B. Booker (Morecambe, 77). Av Female egglayer: 1, Mrs Igoe (Sherwood); 2, Mr & Mrs Hyslop (Swillington); 3, Mr Gillespie (Wellbeck). Aov Egglayer: 1, Mr A. Bebbington (Peterlee); 2, Mr G. Thickbroom; 3, R. & B. Booker. Pairs livebearers: 1, Mr & Mrs Toyne (73); 2, J. & M. Bosser (71); 3, Mr H. Hubbard (69). Pairs egglayer: 1, Mr Son-

ley (76) 1; Mrs Kirk (77) 1; Mr A. Biddings (78) (2).

Catfish: 1 & 2, Mr S. Hall (74 & 75); 3, Mr & Mrs R. Foster (86). Fancy goldfish: 1 & 2, Mr R. Hall (71 & 72); 3, Mr C. H. Whitney (Accrington, 73). Aesop: 1, Mr L. P. Greenham (72); 2 & 3, Mr S. Hall (71 & 69). Shubunkins: 1 & 2, Mr C. H. Whitney (72 & 69); 3, Mr S. Walsh (72). Av. Marine: 1, Mr J. Igoe (78); 2, Mr F. Martin (Aldershot); 3, Mr S&R (Independent). Moss: 1 & 2, Mr & Mrs Jackson (Worsnop); 3, Mr M. Will (Accrington).

The Best in Show award went to Mr A. D. Bebbington (Peterlee).

DURING the first two meetings of 1973, **WELWYN GARDEN CITY AS** has enrolled 30 members and looks forward to increasing its membership further. Average attendances, including guests, is 45. Two recent lectures have been of great interest. When Mr Alan Tufts visited the society to talk on livebearers he took along a variety of fish to illustrate his talk and discussed in detail some of the breeding habits of the blue limia. Among the many interesting points raised, Mr Tufts mentioned the shortage of good quality livebearers and the advantages of buying stock from a good source. Home-produced fish were strongly recommended since, it was stated, a large number of livebearers were imported. In order to transport more fish and thus reduce costs to the buyer water pollution had to be reduced to the minimum so that the fish had to be underfed and treated with antibiotics. A high mortality rate resulted, the manifestations of which might not be apparent until well after the time of purchase. Not all stock was treated in this way, but careful buying was urged. The table show was won by Mr D. Fitts with a fine sunset platy.

A comprehensive talk on 'Electrics and the Aquarist' was given by Mr Brian Hancock. Broad guidelines were given for applying safety measures illustrating some of the dangers and traps the less well-informed might fall into. Mr Hancock illustrated ways of calculating for correctly rated switches, wiring, fuses and general equipment most in use. The table show was won by Mr R. Noble with a kuhli loach and by Mr D. Fitts with a pair of thick-lipped gouramis.

WHEN **LINCOLN & DAS** held an inter-club show with **GRANTHAM AS**, Mr W. D. Giddling of Gainsborough AS was the judge.

Livebearers: 1 & 2, Mr Jones (G); 3, Master Dorell (L). Cichlids: 1, Mr & Mrs Shipman (G); 2, Mr & Mrs Sellers (I); 3, Mr Kohn (L). Characins: 1, Mr Patterson (G); 2, Mr Goldson (L); 3, Mrs Woodliffe (L). A. v. v.: 1, Mr Patterson (G); 2, Mr & Mrs Sellers (L); 3, Mrs Randon (L). Mr & Mrs Shipman of Grantham presented the best fish in show.

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RESULTS of the **FANCY GUPPY ASSOCIATION, BIRMINGHAM SECTION** Points Cup trophy competition for March 1972-February 1973 was won by Mr G. Steadman (Kingswinford, 314 points); 2, Mr M. H. Delingpole (Alvechurch, 253); 3, Mr G. Fletcher (Pelsall, 226); 4, A. C. & J. Truman (Bristol, 208); 5, Mr D. O'Brien (Bristol, 166); 6, Mr W. J. Ewart (Leamington, 162); 7, Mr D. Steadman (Kingswinford, 156); 8, Mr B. Beacham, Snr. (Birmingham, 133); 9, Mr E. Morgan (Birmingham, 126). At the February meeting, Mrs J. Croft gained Best Male honours with a cofer tail. Best Breeder, Best female, Best in Show was won by Mr W. Ewart. Mr Don Curry of London gained a gold card for Advanced Master Breeder.

MR R. Richards, secretary of **RHONDDA AS**, writes: 'It is with regret that I report the death on 4th March of Des Hailey, vice-chairman of Rhondda AS. He was, without a doubt, one of the most well liked members of the committee. He will be missed by the committee, members and all who knew him. Although Des had been ill for many years, he was always bright and cheerful, living life to the full. He worked hard to make the Rhondda Club a success, visiting shows throughout Wales and the west of England. He leaves a wife and a young son.'

IT is reported in the Newsletter of the **BRITISH ICHTHYOLOGICAL SOCIETY** (secretary, Mr D. Mansborough, 60 Newfields, Welwyn Garden City, Herts) that a 48-page booklet entitled 'A Directory of Lecturers in Natural History and Nature Conservation' is available from the Council for Nature, Zoological Gardens, Regent's Park, London, NW1 4RY, price 25p post paid. A second edition of the first booklet in this same series entitled 'A Directory of Natural History and Nature Conservation Films' and containing details of over two films from many different sources is also available from the same address, price 30p post free.

In Brief . . .

... **WREXHAM TROPICAL FISH SOCIETY** have been enjoying a variety of lectures recently. Mr E. Jones's lecture on electricity in the aquarium included a number of interesting features that helped members with their problems. A talk on the breeding of killifish illustrated by slides was given by Mr C. Pritchard. The winners of the fish shows to start the season were: *Corydoras* catfish: 1, Mr A. Stevenson; 2, Miss V. Jones; 3, Mr E. Jones. Characins: 1, Mr J. Pound; 2 & 3, Miss V. Jones. Fish diseases were the subject of a talk by Mr M. D'Arcy. Mr R. Mathers won the quiz with only one incorrect answer.

... **BRACKNELL A.S.** started February with a slide show on exotic marines given by the programme arranger, Mary Morgan. The slides were hired from a firm in Leeds and were followed by some personal slides of Guernsey and Kew. Later in the month a very informative talk on water pollution was given by Mr Morley of the Thames Conservancy. Mr L. Little won in both the seniors and senior nov classes at the table show. Mr D. Jeffrey won in the novice class.

... **THE WISBECH & DAS** has recently been formed. Meetings are held every 2nd and 4th Wednesday, Trinity Community Centre, Wisbech. Talks, given by experts, cover marine, freshwater, tropical and coldwater fishkeeping. After the lecture and discussion, coffee break and question time are followed by members' exhibits for which prizes are given. An auction of fish and equipment is also held. New members are welcome. Secretary, Mrs F. Hooks (47 Setton Avenue, Wisbech, PE13 3QW).

... **BEST** fish in show at the February meeting of **KIDDERMINSTER & DAS** was a *Labotropheus fuelleborni* entered by Mr P. Allen. Mr G. Lawrence was second and Mr W. Nixon third in this cichlid class. Anabantids: 1, Mr J. Barefoot; 2, Mr W. Nixon; 3, Mr & Mrs P. Mullan. Rasbora: 1, Mr G. Lawrence; 2, Mr P. Allen; 3, Mr & Mrs P. Mullan.

... **AIREBOROUGH & DAS** are to hold their inter-society show on 17th April at Greenacre Hall, Rawdon, nr. Leeds, 8 p.m. For information please ring Mr B. Megson, Rawdon 3775. An auction of fish and plants will be held. The entry fee of 20p (juniors 10p) includes refreshments.

... **WHEN NEWBURY & DAS** welcomed BRACKNELL AS for a 12-a-side plus breeders team match (judge, Mr A. Bale), although Bracknell took first and second in the 12-a-side section they omitted to take along a breeders team leaving Newbury rather fortunate winners by 11 points to 7.

... AN appreciative audience at the **GKN POND & AQUARIUM SOCIETY** had many questions to ask Mr Frank Matthews when he gave an authoritative talk on showing fish, and loud applause showed the audience's pleasure. Mr W. Bird won the catfish class in the table show, and Mr T. Saunders the aov.

... MR Jack Jeffery devised an intriguing crossword puzzle for the entertainment of **NEW FOREST AS** members. At this meeting the monthly table show was for aov tropical and av rasbora and minnow. Mr A. Williamson took the first three places in both sections. Visitors are always welcome and should contact Mr R. Travers of 7 Auckland Avenue, Brockenhurst.

... **BISHOPS CLEEVE AS** enjoyed a very explicit talk on angels and breeding procedure by Mr T. Collier, which amused much interest since several members had successfully bred them. At this meeting the slides of the Christmas Fancy Dress Party were shown. Mr J. Hawkins won the table show for sexed pairs.

... **MID-SUSSEX AS** annual Fishkeeping Exhibition—a non-competitive display of interest to the whole family—is to be held on 27th May at The Park Centre, Burgess Hill, Sussex. Featured for the first time will be the Crab Derby in which a select band of shore crabs will be running for the blue riband of the rock pools.

... **UXBRIDGE & DAS** inter-club matches against **AMERSHAM** and **HIGH WYCOMBE** resulted in a win against the former and a beating by the latter. Both events were well supported and enjoyed, and plans are in hand for return matches. Other very popular club events have been lectures by Mr Roy Skipper on discus and their breeding habits, by Mr Alan Tuffs who took along many specimens to illustrate his lecture on livebearers, and a lecture on fish photography. A well-handled bring-and-buy sale, auctioneer Mr Brian Funnell, helped to swell club funds.

... AT a recent meeting the members of **BRIGHTON & SOUTHERN AS** were given a very informative talk on loaches and botias by Mr J. Burtles. Mr A. Blake (FBAS) judged the table show and the results were: labyrinth: 1, Mr D. Steer; 2, Mr

D. Vaughan; 3, Mr V. Aldis. Characins: 1, Mrs J. Dawes; 2, Mr V. Aldis; 3, Mr H. Maddison.

... MR G. Churchill gave a very enlightening talk to **BRISTOL TFC** on furnished aquaria, illustrated with coloured slides. Plans are in hand for a social evening on 3th May at the British Railway Social Club, Temple Mead, Bristol, when all members and friends will be welcome.

... THE class for mollies at **STOCKTON AS** table show in February was won by Mr R. Walker (2, Mr D. Keithly; 3, Mr Q. Watt) and for scavengers by Mr J. Greenley (2, Mr R. Alder; 3, Mr Q. Watt).

Badge of the Month



THE design of the Roehampton AS badge shows a *Ctenopoma* superimposed on the map of Africa. It is the work of Mr Furniaux, the Society's treasurer. Secretary of the Society is Mrs P. Lambourne, 7 Wheeler Court, Plough Road, London, SW11 2AX.

... A BRING-and-buy sale held by **SEVERN SIDE IS** resulted in £10 being made for club funds. At the second February meeting a crossword quiz conducted by Mr. M. Price and a 20-Questions quiz compiled by Mr L. Brain kept members happily occupied and raised some very interesting points on fishkeeping.

... ANNUAL awards have been presented to the following members of **LEAMINGTON & DAS**: Show

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SPUN-GLASS SILK

PLEASE note! BASINGSTOKE & DAS have changed the date of their *Open Shows* from 14th July to 30th June. Also, **DUKERIES AS**, owing to circumstances beyond their control, have had to cancel their *Open Shows* scheduled for 6th May.

trophy, Mrs Pat Stoodley; Furnished Aquaria trophy, Mr B. Chitterden; Breeders trophy, Mrs Pat Stoodley; Member of the Year trophy, Mr Dennis Hawkins; Jack Clarke trophy, Master Ian Alderman.

... AT the **BASINGSTOKE & DAS** February meeting, Mr M. Carter of Bracknell, ably assisted by Mr A. Blake, attempted to find the 'Quiz King' of Basingstoke Club. They found him at length—vice-president, Mr T. Errey. Table show results (judged by Mr J. Batts) were: class D cichlids: 1, Mr M. Strange; 2, Mr A. Marshall; 3, Mr R. Peck. D.o.s.: 1 & 2, Mr T. Taylor; 3, Mr J. Jackson. Novice: 1 & 2, Mr J. Jackson; 3, Mr R. Onslow.

... **COVENTRY POOL & AQUARIUM SOCIETY** celebrate their 'silver anniversary' this year. The Society was originally formed in May 1948.

... 24 members of **STEVENAGE AS** and three visitors enjoyed a very interesting talk by Mr Tuffs on fish houses. The April meeting of the society will be held on 4th April, Bedwell Community Centre at 8 p.m.

... MR J. T. Edwards, show secretary of **LLANTWIT MAJOR AS**, reports 'Llantwit Major go from strength to strength. After defeating Port Talbot AS in a very close contest by 480 points to 471, they went on to defeat Rhondda AS by 780 points to 771. We now look to any other club who may feel able to challenge us. It says much for the enthusiasm of all members when such large numbers of fish are benched on nights when the weather was so bad. Our thanks to the two judges, Mr W. Gorwell and Mr D. Wameant, for their support at the February show'.

... THE fish of the month class (pairs) at **KEIGHLEY AS**'s February meeting was won by Mr D. Bowers (2, Mr D. Mosley; 3, Mr D. Ibbotson). Other results were: aov: 1, Mr S. Gear; 2, Master P. Barton; 3, Mr D. Bowers. Novice aov: 1, Mr B. Lydon; 2, Mrs Taylor; 3, Mr D. Mosley. Junior av: 1, Master Jones; 2, Master Barton; 3, Master Hollingsworth.

Meetings and Changes of Officers

AIREBOROUGH & DAS. President, Mr S. D. Lawson; vice-president, Mr J. V. Bell; secretary, Mr E. C. Ackford (43 Gavelton Avenue, Yeadon, nr. Leeds; phone Rensden 5664); treasurer, Mr P. Jones; show secretary, Mr B. Meggan.

BISHOPS CLEEVE AS. Officers unchanged. Secretary, Mr A. K. Viner (10 Epney Road, Lower Tuffley, Gloucester).

BLAKEBOROUGH AS. Chairman, Mr D. Price; treasurer, Mr A. E. Hoar; secretary, Mr T. Barker (201 Bradford Road, Bingley, Yorkshire; HDM 458); show secretary, Mr J. Brown.

COVENTRY POOL & AS. Chairman, Mr T. Sheehy; assistant, Mr F. Hunt; secretary, Mr D. Eastwood (7 Cardale Court, Coventry; phone 457355); assistant, Mr B. Patterson; treasurer, Mr F. Watts; secretary, Mr C. Hands; show secretary, Mr S. Woodside; editor, Mr C. Hinde; assistant, Mr R. Parsons. Meetings: 2nd Tuesday of month, 7.45 p.m., Foleshill Road Community Centre.

DONCASTER & DAS. Chairman, Mr M. Hadden; treasurer, Mr S. Copple; secretary, Mr G. Kivington (81 Archer Road, Bally, Doncaster; DINA 481); show secretary, Mr E. Maise.

HARLOW AS. Chairman, Mr R. Kerridge; vice-chairman, Mr P. Allen; secretary, Mr John Duncan (113 Little Pyburn, Harlow, Essex); treasurer, Mr L. Harvey; show secretary, Mr S. Jordan (48 Whitewash, Harlow). P.R.O., Pat Hynes. Meetings: fortnightly, Wednesdays, 8.00 p.m., Pomer Street Community Association Centre.

HUDDERSFIELD TROPICAL FISH SOCIETY. Chairman, Mr N. B. Gibson; vice-chairman/treasurer, Mr J. Brook; secretary, Mr C. Woolfough (1687, Manchester Road, Lashwaite, Huddersfield, Yorkshire); show secretary, Mr M. Jessop (18 Ryedale, Kildale, Huddersfield, Yorkshire); magazine editor, Mrs J. Walker; catering officer, Mrs S. Gibson. Meetings: alternate Wednesdays, 8 p.m., Vemar Furnery Hall, Alfred Street, Huddersfield.

LEAMINGTON & DAS. Chairman, Mr W. H. Gunthorpe; vice-chairman, Mrs J. K. Smith; secretary, Mrs P. N. Stoddley (7 St Margarets Road, Leamington Spa, Warwick); treasurer, Mr P. N. Thomas; show secretary, Mr D. Hunt; assistant, Mr K. Russell; editor, Mr D. W. Hawkins; librarian, Mrs D. A. Hawkins; social secretary, Mr F. Stoddley. Meetings: 1st and 3rd Tuesday of month, 7.45 p.m., Trinity Hall, Trinity Street, Leamington Spa.

LEWISHAM & DAS. Secretary, Mr A. Jamison (59 Hook Lane, Walling, Kent). Meetings: 2nd & 4th Mondays, 8 p.m., St Lawrence Church, Club House, Bromley Road, Catford. New members welcome.

LOUGHBOROUGH & DAS. President, Mr D. Slack; chairman, Mr T. Parry; secretary, Mr D. Keeley; show secretary, Mr J. Parry (10 Cleveland Road, Loughborough, Leics.); show manager, Mr D. Lindsay; librarian, Mr D. Tyler. P.R.O., Mr R. Parry.

MID-SHERTS AS. Chairman, Mr D. Lander; secretary, Mr B. Grace (54a Knolls Road, Welwyn Garden City, Herts.); show secretary, Mr A. Lashy.

PORTSMOUTH AS. Chairman, Mr J. Lambell; secretary, Mrs J. Sellwell (34 Salcombe Avenue, Copner, Portsmouth); treasurer, Mr A. Furnedge; show secretary, Mr J. Sellwell.

SOUTHAMPTON AS. Chairman, Mr D. V. Jones; vice-chairman, Mr R. Bock; secretary, Mr A. J. Lines (21 Holden Close, Great Woodley, Hants.); treasurer, Mr N. Mosker; show secretary, Mr T. Newbarr.

SOUTH PARK AQUATIC STUDY SOCIETY. New venue. Wimbledon Community Centre, 50 George's Road, London, SW19. 1st Tuesday of month. Chairman, Mr D. Pearson; secretary, Mrs M. Dudley (153 South Park Road, London, SW19; phone 01-849 2562); treasurer, Mr B. Trigg; show secretary, Mr G. Strain; P.R.O., Mr G. Herring (54 Penwith Road, London, SW18).

TONBRIDGE & DAS. Chairman, Mr Frank Miles; treasurer, Mr Dick Baker; secretary, Mrs J. Bellingham (change of address: 38 St Marys Road, Tonbridge, Kent).

WELWYN GARDEN CITY AS. Secretary, Mr Barry Stephens (24 Maers Walk, Welwyn Garden City; phone 279711); librarian, Mr Andy Margetson. Meetings: 1st & 3rd Mondays of month, 8 p.m., The Scout Hut, Great Dell, Welwyn Garden City.

WELBECH & DAS. Chairman, Mr C. Edwards; treasurer, Mr C. Hasley; secretary, Mrs P. Hoods (47 Sefton Avenue, Welbeck, PE12 2QW). Meetings: 2nd & 4th Wednesdays, Trinity Community Centre, Welbeck.

WREXHAM TROPICAL FISH SOCIETY. Meetings: 2nd and 4th Thursday each month, Fellowship Hall, Bradley Road, Wrexham.

Dates for Your Diary

Note your special dates in the PFM Aquarists' Pocket Diary 1973, now available (99p post free from PFM, 524 Garratt Lane, London SW17 6NY).

1st April. **HOUGHTON & DAS** Open Show, Philadelphia Welfare Hall, Houghton, Schedule: Mr C. A. Ewing, 47 Long 177, Houghton-le-Spring, Co. Durham DD4 4PT.

7th April. **THURROCK AS** Open Show Arthur Swan School, Arthur Street, Grays Essex. Schedules: Mr A. L. Siddons, 2 Pym Place, Grays, Essex.

7th April. **YATE & DAS** 7th Open Show, Newman's Canteen, Yate, nr. Bristol. Schedules: Mr M. Emery, 134 Sandridge Park, Yate; phone Chipping Sodbury 215443.

7th April. **GSGB AGM**, Cossasy Hall, Red Lion Square, Holborn, London, 8.30 a.m.

8th April. **UXBRIDGE & DAS** Open Show, GPO Social Club, Willow Tree Lane, Yaxley Lane, Hayes, Middx. Schedules: Mrs S. Whithead, 31 Barberie Walk, West Drayton, Middx.

8th April. **WARRINGTON AS** Open Show (GNAS Rules), St Benedict's Y.C., Ball Hall, Oxford Lane, Warrington, Lancs. Show secretary: Mr J. Haham, 42 Hood Lane, Bankers, Warrington, Lancs; phone 26426.

14th April. **INDEPENDENT AS** Open Show, The Public Hall, Ilington Town Hall, Upper Street, Ilington, London, N1. Schedules: Mr R. Mason, 70 Myddleton Square, London, EC1.

15th April. **COVENTRY POOL & AS** Open Show, Foleshill Community Centre, Foleshill Road (444), Coventry. Details: Mr S. Woodbridge, 24 Ridgeway Avenue, Spsychale, Coventry or Mr D. J. Grant, 22 Cecil Road, Chelmsmore, Coventry.

15th April. **SHEFFIELD & DAS** Open Show, Granville College, Granville Road, Sheffield 4 (nr. Midland Station). Schedules: Mr T. Smith, 170 Woodhouse Road, Sheffield 4.

15th April. **RUNNEMEDE AS** Open Show. Schedules: Mr S. Garrod, Le Rivage, Long Lane, Sturwell, Staines, Middx., or phone Mr N. Smith, Ashford 25270.

15th-16th April. **SCOTTISH AQUARISTS FESTIVAL**, Motherwell Civic Centre. For details see page 616 of March issue.

16th April. **YORK & DAS** Open Show, The Folk Hall, New Lampwick, York. Schedules shortly: Mr P. Rees, 29 Don Avenue, Dringthorpe, York.

22nd April. **SOUTHAMPTON AS** Open Show, Avenue Hall, Bursling up to 12 o'clock, 7 judges. Details: Mr P. J. Brown, 215 Spring Road, Staling, Southampton.

28th April. **TROWBRIDGE & DA & PS** Open Show, Nelson Haden Boys School, Trowbridge, Wilt. Schedules: Mrs J. A. Burton, 17 Poleham Road, Trowbridge, Wilt.

29th April. **BLAKEBOROUGH AS** Open Show, J. Blakeborough & Sons Ltd Cannon, River Street, off Birds Road Lane, Biggleswade, Yorks. Booking 14 noon-2 p.m. Details: Mr E. J. Brown, 8 Garden Field, Wyke, nr Bradford or Mr T. Barker, 20 Bradford Road, Biggleswade.

29th April. **LOYNE AS** Open Show, Priory Hall, Chis Street, Lancaster. 3 large car parks. Details: Mrs H. Birchall, 12 Lythall Avenue, Dalton-on-Lane, Lancaster; phone Dalton-on-Lane 624.

29th April. **MEDWAY AS** Open Show, New venue, Kent Alloys Ltd, Restaurants, Priory Road, Strood, Kent. Schedules: Mr J. Marshall, 27 Dargers Road, Walderslade, Chatham, Kent.

6th May. **ROEHAMPTON AS.** Open Show, Rushampton Boys' Club, Holbourne Avenue, Alton West End, Rushampton, London, SW15. Details: Mr D. Lambourne, 7 Whorler Court, Plough Road, London, SW11 2AN; phone 01-232 2520.

6th May. **MIDLAND ASSOCIATION OF AQUARISTS SOCIETIES** Inter-Society Show, Drayton Manor Park. Details: Mrs D. A. Roberts, 39 Charles Road, Solihull, Warwick B31 7TS.

6th May. **OSRAM AS** Open Show, Queen Recreation Hall, Redgate Street, Shaw, Oldham, Lancs.

14th May. **PORT TALBOT & DAS** Open Show, VMAA, Port Talbot. Show secretary: Mr A. E. B. Furness, 3 Cross Street, Valletta, Port Talbot, Glamorgan, SA11 1AZ.

15th May. **GLOUCESTER AS** and Open Show, Gloucester Education and Leisure Centre, Patwick Road, Gloucester. Schedules: Mr M. Brooks, 124 Melbourne Street, Gloucester from February on.

15th May. **CHYDON AS** Open Show, Sir Phillip Green Recreation Centre, Moorland Avenue, Chydon, Surrey. Schedules: Mr U. Smith, 3 Hindhead Way, Wallington, Surrey.

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24th May. **CORRY & DAS** Open Show. Carby Civic Centre, FRAS rules. Schedules: Mr A. Glass, 175 King Street, Kettering, Northants.

27th May. **DEBRY REGENT AS** Open Show. Spymond Fisheries Recreation Centre (Nonsuch), Buntingford, Cambridgeshire. Details: RAC, Department Road (A1111) Debry, BAC, Department Road, Secretary: Mr B. G. Harlow, 48 Mansfield Road, Derby, phone 48124.

19th-20th May. **SECOND NATIONAL WILSH** Open Show. The Central Hall, Tregowen, Rhondda. Booking: 17th May 10.30 p.m. to 12.30 p.m. 18th May. Details: Mr M. Williams, 124 Top Trethorn, Trethorn, Rhondda, Glamorgan.

20th May. **SOUTHEND, LEIGH & DAS** Open Show. St. Clements Hall, Rectory Grove, Leigh-on-Sea, Essex. Details: Mr D. C. M. Dutton, 112 Tynon Road, Southend-on-Sea, Essex; phone Southend 54974.

20th May. **KETTERING AS** Open Show. St. John's Ambulance Centre, Fuller Street, Kettering, Northants. 11.30 a.m.-4.00 p.m. FRAS rules. Schedules: Mr S. Vickers, 142 St. John's Road, Kettering, Northants.

20th May. **MERSEYDEK AS** Open Show. British Legion Hall, Commercial Avenue, Liverpool. Details: Mr Brian Hall, 125A Broughalpe Hey, Condit Farm, Liverpool L4B.

20th May. **YEOVIL & DAS** Open Show. The School Hall, Church Street, Marlton, 17 Yevill, Southgloucs. Mr M. Fisher, 64 Meadow Road, Yevill, Gloucesters.

20th-27th May. **TOTTENHAM & DAS** Open Show. Old Drill Hall, High Road, Tottenham, London, N17. Schedules: Mr K. Nutt, 30 The Avenue, Tottenham, London, N7.

27th May. **MID-SUSSEX AS** Annual Fishkeeping Exhibition. Non-competitive. The Park Centre, Burgess Hill, Sussex.

27th May. **MIDDLETON & DAS** Open Show. Details: Mr R. Foxworth, 82 South Lane, Middleton, W. Yorkshire.

27th May. **WEYMOUTH AS** Open Show. Small Nature Hall, Weymouth. Details: Mr A. C. Wood, 67 Queens Avenue, Dorchester.

27th May. **FANCY GUPPY ASSOCIATION WORLD INTERNATIONAL** Guppy Farm Community Centre, Southfield, Birmingham. Open to public 10.00-6.00. Schedules: Mr D. B. Brackley, 17 Pinfold Close, Woodrow South, Bedfordshire.

27th May. **BOSTON AS** Open Show. Backfords Theatre, Boston, Lincolnshire. Mr S. Smith, 175 Wood Farm Road, Boston, Lincs.

2nd June. **FRAS Assembly**. Conway Hall, Red Lion Square, London, W.C.1, 4.30 p.m.

2nd June. **LOUGHBOROUGH & DAS** Open Show. The Sports Centre, Grange Street, Loughborough. Schedules: Mr J. Purdy, 10 Cleveland Road, Loughborough, L.F.11. 25P; phone Loughborough 91774.

2nd June. **BOURNEMOUTH AS** Open Show. Bournemouth Centre, Puffins Park, Bournemouth. Details: Mr J. V. Jeffrey, 20 Brunton Avenue, Bournemouth, Bournemouth, BH3 4JF.

2nd June. **SUDBURY AQUATIC CLUB** First Open Show. St. Andrews Church Hall, Harrow Road, Wembley, Middlesex. Schedules: Mr L. Brewer, 26 Ormsley Way, Kenos, Middlesex.

2nd June. **HAVANT & DAS** 2nd Open Show. St. George's Hall, Waterlooville. Details: Mr V. B. Hall, Virginia, 124 London Road, Witley, W. Portsmouth, Hants.

2nd June. **VAUXHALL MOTORS AS** Open Show. Details: Mr A. Philp, 17 Holford Road, Luton, Beds.

2nd June. **LLANTWIT MAJOR AS** Open Show. Show secretary: Mr J. Edwards, Glanmorfa Mill Park, Llanthomas, Carmarthen, Glam.

27th June. **CHELMSLEY AS** Open Show. Details: Mr R. J. Harty, 2 Lawrence Close, Chelmsford, Essex. B49 1BS.

27th June. **BISHOPS CLEEVE AS** Open Show. T.A. Centre, Acton Road, Cheltenham, Glos. Schedules: Mrs J. Hawkins, 44 Barton Street, Cheltenham, Glos.

27th June. **SALISBURY & DAS** Open Show. The City Hall, Fishers Street, Salisbury.

27th June. **NORTHWICH & DAS** Open Show. Harford Secondary Boys School, Church Road, Hartford, Northants. Details: Mrs D. J. Thomas, 28 Whingate Road, Winstanley, Chelmsford; phone Winstanley 7126.

27th June. **FANCY GUPPY ASSOCIATION LANCASTER SECTION** Open Show. Gopson Institute, Moor Lane, Lancaster. Details: Mr J. F. Peck, 9 Ridge Street, Bala, Lancashire.

27th June. **FREELANCE AS** Open Show. Avonham Community Centre, Dunbar Street, London, S.E.17. Details: Mr J. Stapp, 75 Redmond House, Lamb Street, Borough, S.E.1.

27th June. **SWELLINGTON AS** Open Show. John Beaton's School, off Hurwich Road, Leeds 14. Show secretary: Mr K. Stanley, 28 Goodwood Avenue, Kippax, 10 Leeds, Yorks.

27th June. **DUNSMOW & DAS** Open Show. Fookes Memorial Hall, Great Dunsmow, Essex. Details: Mr D. McMorris, 27 Chapel Road, Barry, W. Gloucesters, Essex.

24th June. **BILLINGHAM AS** Open Show. Billingham Community Centre, Billingham Town Centre, Schedules (incl. May): Mr J. Atwell, 34 Harfield Place, Peterlee, Co. Durham (phone 4154) or Mr A. Crowley, 21 Stobcock Road, Billingham.

24th June. **GOSPORT & DAS** 7th Open Show. Southdown Community Centre, Southdown, Hants. FRAS Rules. Details: Mr K. L. Ayling, 32 Forester's Way, Basingstoke, Gosport, Hants. PO11 5LR.

24th June. **ALBERTON & DAS** Open Show. Adult Education Centre, Alberton Hall, Alberton. Details: Mr B. Hocking, Parkview, 13 Coppice Drive, Eastwood, NG16 2PA (phone: Langley Mill 1514).

24th-26th June. **BRISTOL TFC** Open Show. Congregational Hall, Stapleton Road, Bristol. Details: Mr M. Elliot, 1 Berrington Close, Nailsea, Bristol.

24th June. **BASINGSTOKE & DAS** Open Show. Copwood Hall, Basingstoke. Schedules: Mr R. Rich, 92 Pickerton Road, Basingstoke, Hants.

24th July. **CHELSEA AS** Open Show. Details: Mr R. J. Harty, 2 Lawrence Close, Chelmsford, Essex. B49 1BS.

22 July. **EXETER & DAS** Open Show. Barnford Village Hall, Kersford, Exeter. Details: Mr A. J. Wainwright, 28 May Street, Exeter, EX4 5LL.

DIARY DATES

This month we have included all the show dates notified to us up to the time of going to press. Remote dates may be omitted temporarily for reasons of space in coming issues. Societies notifying us of show dates are asked to inform us immediately if any change to published details becomes necessary, and particularly if a show has been cancelled.

25 July **BOREHAMWOOD & DAS** 1st Aquascope and Fossilised Aquaria Festival. Schedule: Mr D. J. Crocker, 54 Milton Drive, Borehamwood, Herts, WD7 2JH.

27th July **GSGB** Quarterly Meeting. Curlew Hall, Red Lion Square, Holborn, London, 2.30 p.m.

29-31 July **ROSFORD & BEACON-TREE** AS Open Show. (Dagenham Town Open Show.) Central Park, Dagenham, Essex. Director: Mr D. G. Rapp, 74 Lywood Drive, Collier Row, Romford, Essex, RM7 4QT. phone Romford 9794.

29th July **OLDHAM & DAS** Open Show, Westgill Park, Oldham, Schedule (when available): Mr E. Hylwood, 30 Inverness Avenue, Blackley, Manchester 9.

4th-11th August **PORTSMOUTH** AS Open Show, St Patrick's Hall, Winter Road, Southam, Portsmouth. Setting up Saturday 4th August, judging: 9th; open to the public: Monday, 6th to Sunday, 11th. Schedule: Mr J. Stowell, 14 Salisbury Avenue, Copner, Portsmouth, Hants, PO2 6LD.

8th August **TONBRIDGE & DAS** Open Show, Tonbridge School, Tonbridge, Kent. Schedule: Mr L. T. Mahanori, 21 Norrism Way, Five Oak Green, Tonbridge, Kent.

12th August **NORTH STAFFS** AS Open Show. Details later.

13th-15th August **MIDLAND OPEN SHOW (MAPS)**. Rugby Hall, Broad Street, Birmingham. Details: Mr T. Grier, 25 Priory Street, Winton Green, Birmingham, 171 phone 223-214 0964.

18th-24th August **HARWICH & DAS** Open Show. The Queens Hotel, Doversport, High Street, Harwich. Details: Mr A. Green, 21 The Ridgeway, Doverport, Essex, CO12 4AL.

19th August **HUDDERSFIELD TES** Open Show. Details to follow.

26th August **FLEETWOOD** AS 5th Open Show. Fleetwood Grammar School. Details: Mr N. Ward, 48 Moorberry Road, Fleetwood. phone FWD 2923.

29 September **FRAS** Assembly, Curlew Hall, Red Lion Square, London, WC1, 2.30 p.m.

29th September **THORNE** AS Open Show. Details: Mr B. Binks, 49 Warren Road, South Common, Thorne, Doncaster.

29th September **BETHNAL GREEN** AS Open Show. Show Secretary: Mrs Selig Bergin, 150 Ardourton Avenue, Seven Kings, Essex, Essex.

2nd September **LUCAS AQUARIUM & POOL SOCIETY** Open Show, Spring Road, Birmingham. Schedule: Mr H. Thomas, 11 Alton Road, Solihull, Warks.

9th September **Cosham BRACKNELL AS, DICOT AS & READING & DAS** Open Show. Venue Kosgrove, Stoddard Road, Reading. Details: Mr John Honey, 4 Richmond Close, Woodley, Berks. (phone) Reading 666977.

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PFM, 554 Garratt Lane, London SW17 9NY Phone 01-947 2805

9th September **HARLOW** AS Open Show. Show House, Harlow. Schedule: Mr S. Jordan, 45 Whitway, Harlow, Essex.

9th September **NEWBURY & DAS** Open Show. Details later.

9th September **NUNEATON** AS Open Show. Details later.

10th-11th September **Bristol AQUARISTS SOCIETY** Open Show. Details: Mr E. N. Bunch, 22 Stoughton Way, Knowle, Bristol, BS4 2BL.

12th September **MID-HERTS** AS Open Show. Details later.

14th September **WESTON-SUPER-MARE & D TFC** Open Show. St John's Hall, Dakers Street, Weston-super-Mare. Details: Mr J. Clark, 70 Jakes, North Street, Clevedon.

16th September **STONE** AS Open Show. Full details later.

16th September **BUXTON & DAS** Open Show. The Pavilion Gardens, Buxton. Schedule: Mr A. Holford, 8 Milland Terrace, New Mills, via Stockport, Cheshire.

22nd September **TORBAY** AS Open Show. Torquay Town Hall. Details to follow.

LEAMINGTON 22. **DAS** now have a slide quiz for sale. Interested societies should contact Mrs P. Stoddley, Newnham Craig, 7, St Margarets Road, Leamington Spa, Warks.

12th September **NORTHAMPTON & DAS** Open Show. The Dell Hall, Northampton. Schedule: Mr G. Skitt, 30 Chiltern Avenue, Northampton.

9th October **EAST LONDON & PA** Open Show. Show. Schedule: Mr F. Vicker, 12 Iron Way, Collier Row, Romford, Essex.

29th October **HEINCKLEY & DAS** Open Show. Heathfield High School, Belle Vue Road, East Shilton, Leicestershire. Details: Mr T. Saunders, 29 Breering Drive, Lutter.

10th-14th October **FNAB BRITISH AQUARISTS FESTIVAL** at Belle Vue Gardens, Manchester.

10th October **DONCASTER & DAS** Open Show. Bradworth Miners Welfare Hall, Welfare Road, Woodlands, 20 Doncaster.

2nd November **GSGB** Quarterly Meeting. Curlew Hall, Red Lion Square, Holborn, London, WC1, 2.30 p.m.

2nd-4th November. London's 6th Annual Exhibition of Fishkeeping. **The AQUARIUM SHOW '73** at the Royal Horticultural Society's Old Hall, Vincent Square, London SW1. Location to show (Organiser): PFM, 554 Garratt Lane, London SW17 9NY.

4th November **MIXENDEN TES** Open Show. Venue and details later.

17th November **1973 HENDON CONGRESS** (professional show).

3rd December **FRAS** Assembly, Curlew Hall, Red Lion Square, London, WC1, 2.30 p.m.

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FBSA Show Fish Guides and Technical Information. Booklets nos. 1, 2 and 3, 24 pages each; 16p each post free. P.F. Publications, 554 Garratt Lane, London SW17 0NY.

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