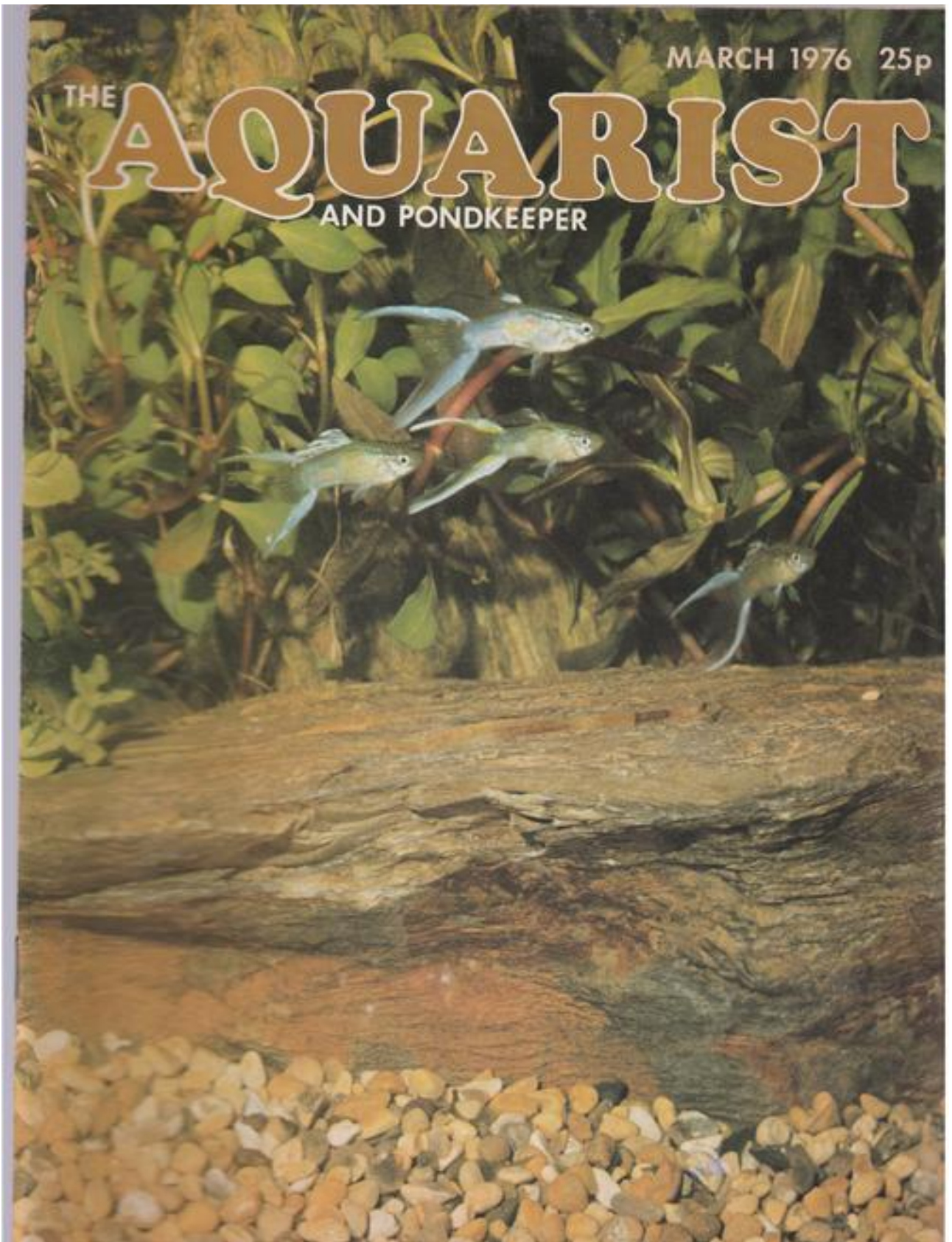


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THE **AQUARIST**
AND PONDKEEPER





THE AQUARIST AND PONDKEEPER

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March, 1976

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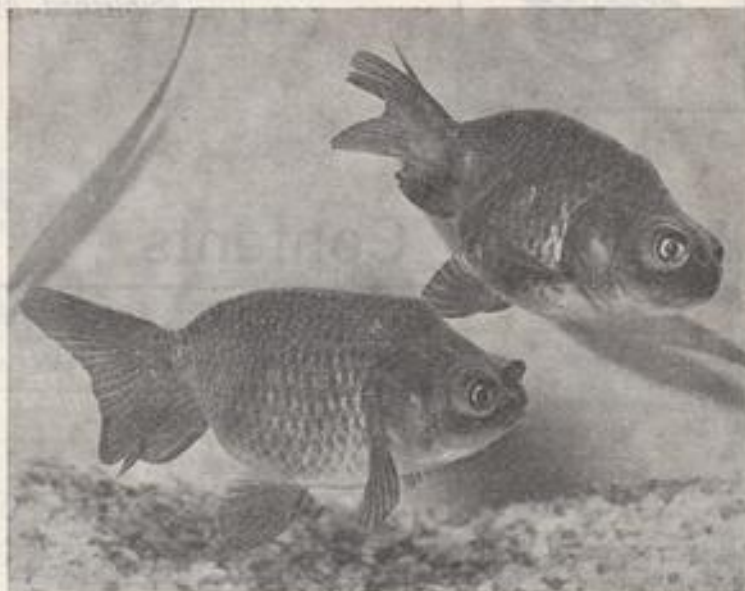
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Coldwater Fishkeeping

by Arthur Boarder

BREEDING FANCY GOLDFISH



THE breeding of fancy goldfish does not achieve the popularity it deserves today. Few breeders appear to specialise in some of the varieties and this is a pity as a great amount of satisfaction may be obtained when a few very good fish are produced. Not that it is an easy branch of the hobby by any means as one has to have plenty of patience and not a little skill to be able to breed even a few really good specimens. There are certain disadvantages in keeping coldwater fish as usually they require more swimming space than do many of the tropicals but they do not need so much fussing with heaters, aerators and filters, as do many tropicals. Also a garden pond, although perhaps not a necessity, is an advantage. The number of attractive fancy goldfish around gives the aquarist a good selection from which to choose.

It appears that the more popular varieties are the shubunkin and moor, at least I have seen more of these at some shows than other kinds. However, such fish as veiltails, fantails, orandas and lionheads are most interesting and challenging to breed. It must not be thought that it is possible to pair up any varieties of

fancy goldfish to obtain scores of specimen fish of that type. Nothing is further from the truth. From most spawnings from good fancy fish it would be very optimistic for the breeder to expect more than a small percentage of good fish among the fry.

The vast differences between fish from the same spawning have to be seen to be believed but it is when one does get a few really excellent specimens from a hatching that one can get the satisfaction rarely obtained by the tropical fish breeder who has reared his first batch of danios or many of the easier to breed tropicals. The fact that the varieties of goldfish have all been bred from the original goldfish means that they are so far removed from their antecedents that it is only reasonable to suppose that many of the fry will revert back. The extent to which some of the youngsters will revert can differ, not only from pair to pair but even from one spawning to another from the same pair.

This irregularity in producing perfect specimens means that it is a much longer task to stabilise a certain strain of fancy fish. Very often it may be

found that the fish will not breed until they are two years old. This makes it so much more difficult for the breeder to be able to tell what kinds of fish the home bred youngsters are likely to produce. It can take a breeder many years before he feels that his strain is up to the standard he requires. Therefore this hobby is not for the impatient one. Such an aquarist will try to obtain show specimens for a start and then be disappointed if he does not breed winners in the first year. He may be lucky but so much depends on the quality of the parents and not only that, but what lies behind the strain.

Let us take for example, a pair of fancy goldfish which have been bought for the purpose of breeding. If the purchaser knows little or nothing about how this pair were bred then he may have got hold of a pair of fish which may never again produce a single fish as good as themselves. For instance, it is possible to obtain a good looking fantail from a direct cross between a fantail and an ordinary goldfish. The fish may have been one in a hundred but the buyer does not perhaps know this. His youngsters from this pair can contain almost every conceivable shape of fish from single tails to tri-tails and double tails. This does not end the variety of forms, as some may have paired anal fins, some single and some none at all. Even the length of the lobes of the caudal fin can vary and some might have a dorsal fin like that of a shark. As for the shapes of the bodies, these can also vary considerably.

From the above it may be realised that to make a good start with breeding any particular strain it is essential to obtain some fish from a good stock. This cannot be over emphasised as most of the fish from a good strain are capable of producing at least a few fish as good as themselves and perhaps a few better ones. The fish from a well established strain will carry the genes of inheritance and so be capable of throwing youngsters of a good quality.

So many budding breeders try to obtain show specimens from which to start their strain. This is not only expensive but may be very difficult. Few breeders will want to part with their show specimens and the prospective breeder should be satisfied with some fish from the prize winning strain. Then the patience of the aquarist will be required. After the first year's spawnings the fry should be carefully examined and only those which appear to be of a near perfect shape should be kept. One must be ruthless in this culling as it is easy to let the strain deteriorate but it is far more difficult to be able to keep up a high standard or to improve on it eventually.

Having decided on the particular variety in which to specialise it is up to the aquarist to join a club and then to see that coldwater fishes are given at least a fair chance. It would not be above the capabilities

of any club to have a few shows a year for each variety of fancy goldfish. These could be in the form of table shows and this would give other aquarists a chance to see some of the attractive coldwater fishes. The old grouse of the fancy goldfish breeder is that there are never enough classes at most shows which would enable him to show his particular variety. It is not easy and perhaps often impossible to assess the value as a show specimen when several varieties have to compete in the same class. Also there may not be the coldwater judges available for the fish to be judged correctly. This is not disparagement of the tropical judges, but they cannot be expected to be expert in all fields of aquatic subjects. I used to judge coldwater fishes but would never undertake to judge the tropical classes although I have a fair knowledge of many of them. I do not consider myself to have sufficient know-how to be capable of the task of judging tropicals, and so how can I expect tropical judges to be experienced enough to be able to judge coldwater classes?

I know that it is a big disappointment for fancy goldfish breeders to find that at a show in which they wish to compete there is no class for their particular variety and so the fish, perhaps an oranda, has to compete with veiltails, fantails, moors and lionheads, etc. It is quite impossible for anyone to assess the value of such a mixed bunch and it may even be that the fish which wins could be the favourite of the judge. If it were possible it would be an advantage in such mixed classes for the best fish of each variety to be pointed up so that the owner would be able to tell to what standard the fish was adjudged. I know that this would be probably impossible for lack of time, but it would be such an advantage to the breeder.

I see no reason why the fancy goldfish should not return to their popularity of the years soon after the last war when some fine classes were seen. I remember the last time I showed fantails was in 1950, at the Olympia. The class in which I competed had thirty-three entries, and I have the show cards today to prove my point. Where can you find classes of this stature today? I think that the reason why there are so few really good specimens of fancy goldfish about today is because many of these fish are imported from the Far East and because they have no standards as we have in Britain, it is not surprising that we find many specimens with bad faults and these may take a long time to breed out. Some of the usual faults seen are that most of the orandas have a deeply forked caudal fin and many of the fantails have too shallow a body. Many of the scaled types do not have the deep rich red colouring which is admired in some of the older established strains.

May I appeal to all dedicated aquarists to endeavour to start a strain of fancy goldfish and so try to bring back these fish to their former glory?

THREE POPULAR CRYPTOCORYNES

by Vivian De Thabrew, M.A.N.D.T.F.L.S.

(Director of Suhado Ltd., U.K. & Sri Lanka)

Family: Araceae

Genus: Cryptocoryne

Introduction

Cryptocorynes are a group of swamp and water plants which have gained widespread popularity among aquarists due to their graceful attractiveness and diverse colour and form characteristics. The bog plants are quite accustomed to an amphibious style of growth due to the fact that their natural habitats are subject to periodic fluctuations of water-level.

The leaves of the plants in this genus range from small lanceolate to large ovate ones. The colours, too, range from light green to deep purple. The leaves are in most cases very leathery and full of veination. In their natural habitat most Cryptocorynes grow in swampy conditions or in slow-moving watercourses. Such habitats include rice-fields, ponds, rivers and water-holes. In natural situations, these plants make little demand of water conditions, but as a rule they prefer soft water with slightly acidic conditions. However, they will also do well even in slightly alkaline conditions. They are, except for a few species, extremely tolerant of temperature variation. Those species which grow

in cool mountain streams or watercourses in the cooler parts of the tropics are accustomed to temperatures as low as 60°F., while those which favour warmer regions and often grow nearer river banks and shallow ponds prefer higher temperatures ranging from 70° up to about 80°F.

Cryptocorynes prefer a growing medium consisting of plenty of organic matter, clay and sand. Such a bottom medium provides the essential nutrients and an ideal base for the fine fibrous roots to anchor.

Among the commonest of the *Cryptocoryne* plants available to the aquarist, *C. affinis*, *C. beckettii* and *C. nevillei* are most prominent.

Cryptocoryne affinis

Habitat: This is found in the Indo-Malayan archipelago, in slow-moving or still waters.

Description: It has long and lanceolate leaves which are velvety dark green on the upper surface and pale green to pale mauve on the lower surface. The leaf blade (lamina), which is usually up to 9 centimetres long, is borne on a leaf stem (petiole) which is only about 4 centimetres long. The mid-rib of

the leaf, from which two to three lateral veins spread out on either side, is pale green. The younger leaves bear purple or carmine spots on the base or in the middle area.

Cultivation: *C. affinis* is perhaps the hardiest of all the *Cryptocoryne* species. It is best grown as a submerged plant, thus making it ideal for the aquarium. It is fast growing and sturdy and prefers subdued light. Too bright light is not desirable as under this condition the leaves will rot and the plant will eventually die. Therefore a shady or dark corner in the aquarium is preferred. True to the characteristics of the *Cryptocoryne* species, it is very indifferent to temperature, and will tolerate a temperature as low as 62°F., while, at the other end of the scale, it will survive at a temperature as high as 77°F.

One does not require a tank bottom with much organic material for *C. affinis* as it will grow very well in ordinary unwashed gravel. Ensure that the gravel in your aquarium is at least 2 inches deep, so that the fibrous roots may find easy anchorage.

Ideally the water should be slightly acid, say between 6.8 to 6.9, but neutral or slightly alkaline conditions will not do any harm.

The plant will grow long undergravel stolons or runners, and these in turn will put out plants. If the depth and condition of gravel and water is even slightly favourable, it will spread to form dense tufts in your aquarium. If desired, these plantlets can be removed by snipping off from the runners and planted elsewhere as new plants.

The aquarist will very rarely see *Cryptocoryne* plants in bloom, but they flower regularly in their natural habitat. In my own experimental tanks, several *C. affinis* plants have grown to develop long, spirally, coiled, carmine and greenish coloured blossom borne on a long, purple coloured tube.

It is worthwhile noting that *C. affinis* is sometimes confused with *C. haerteliana*, which is very similar in appearance and characteristics.

Cryptocoryne beckettii

Habitat: Sri Lanka (Ceylon), normally growing in still waters, especially in clear-water springs and shallow pools. It is also found in slow-flowing streams and watercourses.

Description: The leaves are long and lanceolate and the margins slightly undulated. The upper surface is olive-green or brownish, while the underside is purple or brownish-purple. The old or mature leaves are sometimes slightly curled. The leaf stem is purplish or violet. Four to six lateral veins on the upper surface run obliquely towards the tip of the leaf. The entire plant assumes a purplish or reddish-brown hue. The leaves which grow above water are broader, coarser, have longer leaf stems and are of a bronze-green colour.

Cultivation: Another very hard *Cryptocoryne* which is a true marsh plant with a trailing fleshy rootstock. Therefore it requires a good planting medium. The aquarium gravel should ideally contain some mulm and clay. A mixture of washed peat and loam is a good preparation to be incorporated with the gravel. If the gravel is devoid of nutritious organic material, then *C. beckettii* assumes a pale green, small-leaved form. In order to bring about a robust and healthy condition the mulmy base is essential.

It is, like *C. affinis*, indifferent to light conditions. The aquarist will find it worthwhile to note that the stronger the light given the more red or purple it will become. However, too much light should not be given in order to obtain this reddish colour, as it also has the slight disadvantage of forcing the plant to grow larger and flabby leaves which do not stand up to the turbulence of the water in the aquarium very well.

Soft water with a pH value of 6.6 to 7.0 is preferred, though it will grow quite well in slightly hard, faintly alkaline water. A temperature range of 70°–75°F. is suitable to grow this in your aquarium.

When the plant is prolific, its rootstock puts out healthy shoots which grow up to be new plants. These should be transplanted as required. If the water-level is reduced to emerge the top part of the plant, and provided ample humidity is created in the aquarium, it can be induced to flower during the spring season.

Cryptocoryne nevillei

Habitat: Sri Lanka, especially in slow-flowing water and in many areas above the water level on banks of rivers. It is especially found in the central highlands of Sri Lanka.

Description: Undoubtedly the smallest of the *Cryptocoryne* species, it has narrow, ovate leaves about 2 inches long. The base of the leaf is rounded and often wedge-shaped. The leaf blade is pale green on both sides, except in the case of those grown on marshy land, where the leaves are deep green, stouter and wider. Two or three lateral veins spread out from the midrib, which, more often than not, is very insignificant. The rootstock is stout, fleshy and profusely noded.

It does not demand any special water condition and will grow perfectly well in soft water or hard water. But it should be remembered that the water in its natural habitat tends to be either very slightly acid or neutral. It will tolerate a temperature of 60° to 78°F., the ideal being somewhere around 70°F.

The plant propagates vigorously by means of fine and short shoots. These new plants, once well rooted, can be transplanted to a mulmy base.

WHAT IS YOUR OPINION?

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

Photographs by the Author



THE FIRST of this month's letters is about British products. It comes from Mr. M. D. Biggs, of Flat 1, 7 Westbourne Avenue, Hull, Yorkshire. He writes: "May I, through your columns, point out the marvellous position they (we?) are in to support the economy of the country by buying British? In all but one area of the aquarium world British made goods are the best one can buy. To begin with the container: British made tanks, hoods and stands represent incredible value for money, and the increasing popularity of the all-glass tank has meant a considerable drop in prices in many areas, although it is true that the more luxurious tanks are expensive. But what beautiful designs there are!

"As far as lighting and heating equipment is concerned, British items are second to none. Particularly in the case of heating equipment, British manufactured products have an elegance of design, combined with their utter reliability, which beats the best any other country can offer by far. British made fluorescent lighting units are of good quality and reasonably priced, and a whole variety of tubes is available, also at competitive prices. The leading German food manufacturer should be quaking in his boots for we now have the chance to buy a whole range of flake foods and other foods which are of quality comparable to the German product, but at much cheaper prices; not surprising when one considers the higher production and shipping costs incurred by the Germans. Many aquarist, however, are still trapped by the belief that 'the dearest is the best'. This is patently a fallacy which is exploded by British fish food manufacturers. Still on the subject of foodstuffs, Britain achieved a world first in the gamma-ray sterilization of frozen foods, thanks largely to the efforts of Mr. Graham Cox. Incidentally, I hope aquarists realise that the efforts of Mr. Cox and his team have made Britain a clear world leader in the successful and easy culturing of marine life at a cost within the reach of most people. Any sceptics who are doubtful of this achievement should visit Mr. Cox's headquarters. I guarantee an immediate conversion!"

"And the area in which we lag? With the exception of (one very good brand of) filter and one or two others, Britain is behind in the field of filtration.

The best power filters are German or American; the best vibrator pumps are French or Japanese. Can we not improve those British pumps that do exist, or, better still, design new and better ones? We do not lack the knowledge or the technology. With this one drawback, then, we aquarists cannot only buy the best equipment that money can buy, at reasonable prices, but also can have the satisfaction of backing Britain at the same time. Do your bit!"

On now to a letter from Mr. R. Muston, of Meadow View, Colchester Road, Widl, Manningtree, CO11 2RT. He states: "Recently you made an enquiry in your column regarding fish euthanasia. U.F.A.W. recommends 1-2 per cent solutions of urethanes. I have used, with success, the following compound: $\text{NH}_2 \text{CO OR}$ where $\text{R} = \text{CH}_3$, giving the compound $\text{NH}_2 \text{CO OCH}_3$." (What is the U.F.A.W.? A wholesale group?)

Mr. P. Hickey has the following to say about the same subject: "I have always used MS 222 Sandoz—or ethyl M-aminobenzoate. This chemical is an anaesthetic and tranquillizer for fish and other cold blooded organisms and is simply dissolved in water. It enjoys wide usage in fishery biology where it is used to anaesthetise fish prior to marking or tagging. Fish return from the MS 222 solution, to fresh water, recover almost immediately. By not retrieving the fish from the solution, death follows painlessly. The most recent address I have is Sandoz House, 23 Great Castle Street, London, W.1." Mr. Hickey's address is 25 Quest Hills Road, Malvern, Worcester.

I would like to remind those who write to me, expressing their opinions, to PRINT clearly their names and addresses. This helps to avoid errors. My apologies for the errors in last month's feature—in particular to Mr. I. G. Bave whose name appeared incorrectly spelt on two occasions. As the errors did not appear in my typescript I assure you they were made by those who set up the type to print the magazine.

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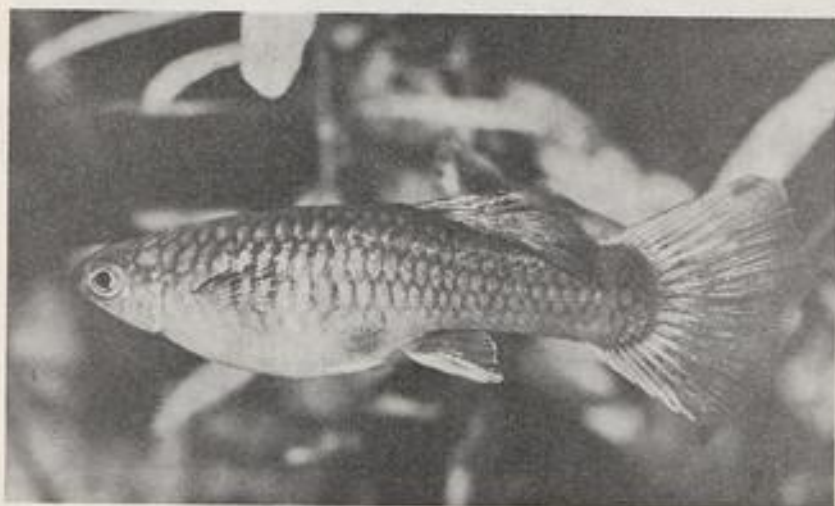
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as I have never before seen aquatic bulbs so well packed and presented to the aquarist. Within three days of planting, these bulbs started sprouting; and in two weeks my tank was really a pretty sight, full of beautiful and healthy plants. There was one *Aponogeton crispus* which appeared to be slightly different from the others. I wrote to enquire about this bulb and asked for more information. I was pleasantly surprised to receive a lengthy letter from Mr. Vivian de Thabrew, the managing director of the company. It was packed with scientific information about the *Aponogeton* species and many practical hints on cultivation and propagation. The botanical information was so comprehensive and helpful that I feel that the sooner other aquarium plant distributors follow this company's practice of employing qualified botanists, the better will be the deal for aquarists. Then we will not only learn how to grow these plants but also how to appreciate

light on, 'stat goes out—and Mr. Bave did not notice it. If the 'stat is external, the light comes on when the heater is on. Therefore you would assume the heater is working constantly. This would prove that the heater is not of sufficient wattage to heat the volume of water. I hope this will help Mr. Bave or anyone else who may have a similar problem. On the subject of power cuts, I never worry. Water takes a long time to cool down to a harmful level. As the power cuts never last more than about two or three hours, this does not harm the fish. The only way the fish are likely to be harmed is through lack of oxygen. This can be overcome by blowing up a football bladder, attaching an air stone and allowing the air to trickle into the tank. For a number of tanks use the inner tube of a car tyre. I myself have never done anything with my tanks during power cuts and I have never lost a fish during one—touch wood!"



them. Full marks to this company. . . ."

Photograph 1 shows an attractive female guppy. Please send me details of your breeding and rearing experiences with any particular strains/varieties of guppies. I know that deltas are very popular; but what about other varieties with smaller tails?

Mr. S. M. McArdle sends us the following opinions from his abode at 2 Carreghofa Cottages, Carreghofa, Llanymynech, Powys. He says: "In the September, 1975 edition Mr. I. G. Bave was asking for information about his thermostat. As he does not state whether it is internal or external it is difficult to pinpoint his problem. Take the internal 'stat first. The light comes on when the heater switches off; therefore the correct temperature has been reached. With the very warm summer we had it was possible that the heater was off all the time; or, maybe it came on—

Photograph 2 is of one of my favourite small species of fish, *Nannostomus marginatus*, a dwarf pencilfish. It's a really delightful little fish and looks beautiful if kept in groups of at least three. It mixes exceptionally well with other small fish—such as cardinals. If you have not yet kept the species I would thoroughly recommend it for the smaller aquarium. The male grows to only about 1 in., the female to about 1½ in. The fish's colours are as attractive as its darting movements when it's on the move after food; or poised with its fins quivering. Photograph 3 shows the less colourful, but equally interesting and peaceful, *Otocinclus vittatus*, a suckling catfish which is very fond of algae. When not on the move it tends to rest with its fins folded up, giving the impression to those unacquainted with it that it is unwell. On other occasions the species

may be seen attached to a leaf, or to the aquarium glass, by its sucking mouth. It's a useful fish to keep if one is troubled by algae. The fish in the photograph is shown browsing amongst threads of a species of alga.

Mr. R. C. Mills, Bulletin Editor and Tape/Slide Officer of the F.B.A.S., who resides at 70 Lee Road, Perivale, Middlesex UB6 7DB, was kind enough to send me details of the F.B.A.S. "Aqua Talks"—a series of tape/slide shows which are available, on hire to societies, as part of the F.B.A.S. service. Non-affiliated societies can also hire these programmes. "Aqua Talks" consists of a series of coloured slides, accompanied by a taped talk. Over a dozen titles are available, subjects covered including goldfish, *Corydoras*, barbs, killies, aquatic plants, aquarium maintenance, filters, fish features, beach combing and angels. The hiring fee, payable to the F.B.A.S.



in advance, is £2.50 per programme to affiliated societies. Rates for non-affiliated societies are available from Mr. R. C. Mills, upon request, at the above address. This sounds like a very interesting range of programmes that would be of use to aquarium societies. I understand that bookings have been coming in quite steadily—approximately 200 last year—and that one might have to wait a little time for some of the available titles. Booking well in advance would appear to be a good idea. Mr. Mills has kindly offered to let me borrow one of the "Aqua Talks" for review purposes. When I have seen and heard the programme I shall write a review of it for this magazine.

Mr. Mills, in his letter to me, had the following comments to make about aquarium photography: "Naturally, being bound up with the production of the programmes mentioned, a vast number of various slides pass through my hands, all representing

several types of colour reversal film. I wonder how important the variations in film speeds are? We aquarists usually photograph our fish under standard, to us, conditions, so once we have film that suits our purpose it should be immaterial what its speed is compared to other films. In this day and age it is likely to be the cheapest priced film, that satisfies the need generally, that emerges as favourite. Colour rendition is important, and many photographs emerge warmer looking through using daylight type film with tungsten lighting; photo-floods over a tank can overheat the water in a short space of time, so usually electronic flash is preferred, with extra slave flash guns being utilised. Colour film used to date includes Agfa CT 18, CT 21, Fujichrome R 100 and Orwochrom 18. Examples of Kodachrome 2, Kodachrome 25 and Barfen CR 100 have been seen. Using a slide copying device with

Agfa CT 18, Fujichrome R 100 and Orwochrom 18 has been very successful, with only slight colour disparities from the originals, which may have been on various films."

"Of the above films, all were 'process paid' included in the purchase price, except for the Barfen CR 100 which is a bulk film available in long lengths for self loading cassettes. It pays to buy in bulk wherever possible; the 'process paid' films are much cheaper—see the photographic magazines—but make sure you can use the film within its date quoted on the wrapper. It may be prudent to share the purchase of film in large numbers with other photographically minded aquarists. Processing time is remarkably quick with Fuji and Orwo, with Agfa quite equal in the winter months; but holiday time of the year causes a not unexpected delay due to heavier activities at the laboratories. Obviously one only gets what one pays for, but in the aquarium, where it is always

bright and sunny, one does not really need an ultra fast, sophisticated film, but when trying to capture that prize specimen on the show bench where the lighting may be dim, then the extra sensitivity can be helpful." Mr. Mills ends by stating that Fujichrome is cheaper than Agfa. (My own recent attempts at fish photography in colour have been made using Fujichrome film. Its speed, 100 ASA, is close enough to FP4's 125 ASA, thus making exposure f numbers only slightly lower, i.e. a lower f number equals more light passing through the camera lens to the film.)

For the benefit of readers who may be wondering about the current absence of aquatic brand names in this feature I'd like to point out that it is a result of a change in Editorial policy. Brand names may be mentioned now only in product reviews. Contributors to this feature may continue to mention

been thinking about the possibility of those of us who are particularly interested in aquarium plants, working out some sort of system, on an individual basis, whereby we could exchange plants by post. After all, some of us keep certain species of aquatic plants that thrive with us and which other people have been unable to grow or haven't tried. Rather than throw out extra plants it might be worth thinking about exchanging them for a different species with someone who grows plants that we don't have. At the moment I have a few extra plants of wistaria, Java fern and Indian fern. Would anyone care to do a swap for a spatterdock; or for *Ludwigia*, *Vallisneria*, giant *Hygrophila*, any *Cryptocoryne* species, or plants with red leaves? If so, drop me a few lines enclosing a s.a.e. Let me know if you have any plants which you'd like to exchange and I'll try to publish your request in a future feature. Don't



products, by name, in their letters to me; but I shall have to remove the names of products mentioned in those letters that I publish. Their removal may result in my having to substitute other words or short phrases which I shall place inside brackets. I would suggest that readers who wish to know the brand names of products referred to in letters published in this feature should write directly to the people who wrote the letters, and not to me. Unfortunately I do not have the time to reply to more than a few of the letters I receive; and I shall reply only to those who enclose a s.a.e. with their queries.

My recent mention of my liking for Malayan sand snails brought a letter from a reader asking if I could sell him some of my snails. Unfortunately I was unable to reply as the writer did not include a s.a.e. As an ordinary aquarist of amateur status I do not sell fish, plants or snails; however, I've recently

forget to mention what species you'd like to have in exchange. Several years ago a reader tried to start a postal club for aquarists with a particular interest in plants; unfortunately the idea didn't get off the ground. Perhaps plant exchanges, on an individual basis, might be an answer. I'd be pleased to have your opinions on the idea.

Mr. R. Hagley, of Flat 9b, High Street, Wiveliscombe, Taunton, Somerset, writes: "I find the golden gourami to be an easy fish to breed. All I provide is a 24 in. x 12 in. 12 x in. tank, a handful of floating Indian fern and fresh rainwater to a depth of 4-5 in. A steady temperature of 80°F and, of course, a tight fitting cover are also essential. Eggs float and are produced in vast numbers; but raising the fry is a bit of a problem as they are so small. I tried (a popular brand of fry food) as a first food, but lost most of the brood; so I immediately stopped using this food and tried my own concoction which

is simply growth food mixed with a small amount of water in a liquidiser until the food particles are no longer visible. On this mixture the remaining fry grew in about a week to a size where they could manage to eat powdered fine (flake food). From there on, of course, there is no problem except that of keeping not only the water, but the air above it, warm. The fish took about six months to reach saleable size and the two I retained for myself are now, at one year, larger than the parents.

"For fish photography I suggest the use of Pan F, 50 ASA, film for black and white use due to its very fine grain size; and Dixon's 100 ASA Colourslide for colour transparencies. I don't use much colour print material, because of the cost, but have prints taken from slides when required. For lighting I have tried electronic flash and the 1,000 watt movie lights sold for the making of indoor movies. I find both types very suitable. Please note, however, that a filter is needed on the camera when using the movie lights for colour work, otherwise you will end up with reddish tinted slides because the film is not balanced for tungsten light—only daylight or flash. Regarding all-glass tanks: why pay for someone else to make them, plus 25 per cent V.A.T., when it is so very simple to make them yourself? After all, all that is required is one sheet of glass 24 in. x 12 in. for the base, two sheets 24 in. x 11 $\frac{1}{4}$ in. for the front and back, and two sheets 11 $\frac{1}{4}$ in. x 11 $\frac{1}{4}$ in. for the ends; plus about half a small tube of silicone rubber adhesive and half-an-hour of your time. The total cost is less than £5.00. All glass merchants will cut your glass to size for you and will even grind and polish the edges for you at a small charge. A question I would like to pose: I cannot grow *Vallisneria* or *Sagittaria* in my tank, although all other plants do well. I have tried many ways—using lead to hold the plants down, planting so that the crown is exposed, all types of lighting including mixtures of special, warm white lighting and tungsten bulbs, but all to no avail. I have even tried temperatures down to 72°F. The tank is normally kept at an even 80°F and filtration is by an outside twin filter, which I find very effective—but how does one get rid of the algae which grow on the bend of the return pipe? Paint it so that the light cannot reach the inside? While on the subject of lighting, I find that (coloured) tubes do not give sufficient light if only one tube is used above a tank; so I have returned to my old warm white tube and the fish are much more lively. I saw a review of (an expensive type of tube) and I thought it looked the ideal answer; but when I saw one lighting a friend's tank—no thank you. I like to see the reds in my fish. Incidentally, he has now returned to his 40 watt (coloured) tube and says that the plants are definitely growing better than they did under the (expensive) tubes."

(I would suggest that if you can grow most plants, other than *Vallisneria* and *Sagittaria*, you are very lucky. If I were you I would give up the idea of trying to grow these two species and concentrate on the wide variety which you can grow. The two named species have no particular benefits over the majority of other aquarium plants. Algae growing inside siphon or return tubes should cause few problems. A test-tube cleaning brush will keep your tubes clean; or at least one firm produces sets of brushes specially for cleaning filter tubes and pipes).

Mr. J. R. Wheeler's home is at Wembury, Newport Street, Clun, Cravens Arms, Salop, SY7 8JZ. He writes: "In each of two different tanks I have fish with a parasite on board. One fish is a fantail and the other a common goldfish. Both seem to have fairly good energy and reasonable shape, but each will occasionally make a quick scythe-like sweep with its body touching the tank at the lowest point of the curve. Obviously they are trying to scrape off an internal pest. I have given both fish a Dettol bath twice, using the recommended dose. Improvement has been, at best, only temporary, and I wonder if you would endorse this remark by Anthony Evans, in his little book about goldfish: '... organisms living inside the goldfish can scarcely be reached at all...?' I admit I have been lazy over repeating the treatment. I have not, for instance, treated either fish twice in the same week."

The following letter reached me from 5 Ruskin Road, Rochdale, Lancs., the address from which Mr. J. Barns writes: "This is my first contribution to your feature. I first started keeping fish in January 1974, with one 36 in. community tank of 'easy fish.' I soon developed a liking for cichlids and have since kept various species, ranging from 'rams' to *Tilapia*. My current favourites are oscars; I have a 6 in. pair of reds in a 36 in. tank; and a pair of small tigers growing on in a community tank. After reading your magazine for the past two years I have reached the conclusion that one either has the touch for growing plants, or one has not! I have met with very little success; while a friend who lives a bare 500 yards away prunes his plants every fortnight, and sells them to the local shops. I should add that we both use the same U/G filters, lighting, etc., and our water comes from a common reservoir.

I would suggest that your inability to grow aquatic plants could result from excessive filtration. Although many people can grow excellent plants in an aquarium filtered by U/G filters, I feel that their excessive use can starve plants of food via their roots. Try cutting down the rate at which the filters in your planted tank operate; and cut down on the number of hours for which you operate them. Another suggestion would be to keep U/G filters

towards the front of the tank, leaving the rear area free for plants' roots. However, a buried U/G filter should not affect plants in any way unless it is operated—and there are people who find that plant growth improves when U/G filters are introduced and operated. Aquaria containing both plants and fishes can be kept too clean; plants require fish waste to provide food. Imagine how badly garden plants would do if they were grown in clean sand and were only given clean water. Although we must bear in mind the fact that aquatic plants can take in mineral salts through their leaves and stems, as well as through their roots, you can imagine how badly roses would grow if they were never given any fertilizers—either chemical or organic. Aquatic plants also need food. If the adjustment of your filters doesn't help to improve plant growth, try using one of the several plant fertilizers specially formulated for use in aquaria. Follow the manufacturer's instructions carefully.

No. 51 Scarborough Road, Norton, Malton, Yorks. YO17 8AA, is the address from which Mr. D. A. Holder writes: "About two months ago I was given a Japanese weather loach which had been in a tank with two large convict cichlids and was rather battered. Now he has recovered; all his fins have grown again and he is looking handsome. When I first put him in he stirred the bottom up dreadfully, looking for food, until the box filter was able to cope. Now his continual turning over of the top layer of gravel keeps it looking clean—and I think he is worth his keep. He developed a funny habit of 'sneezing' in which he throws his head back, then forward with a jump and a shake. Is this unusual? Also my 'rams' seem to yawn in typical human fashion. Is this possible? Have any readers notice this in other fish and can anyone explain these actions? I would be pleased to hear from anyone." (Dogs and cats sneeze and yawn, so it's quite possible that some fishes may do so as well. I'm quite convinced that my Scottish terrier smiles with pleasure when two particular people, whom she likes, visit my home. Perhaps I could be accused of trying to anthropomorphize? What is your opinion of Mr. Holder's observations?)

Yesterday I fitted a new air filter and new valves to the only aquarium air pump that I now use. During the fitting I cleaned the valve block of deposits of grime; and I checked that the diaphragm was in good condition. The total cost of the few parts was only pence, and the job only took a matter of minutes. However, the result, as I had expected, was a marked improvement in performance. After prolonged use we tend not to notice when there is a drop in the air output from a diaphragm pump. The replacement of the valves—and, if necessary, the diaphragm—can bring a pump's performance up

to its original level. When I had the pump fixed up and working four outside filters, I tried a little experiment which did rather more than I had expected or intended. Perhaps some readers could offer an explanation. To check that air was being drawn into the pump correctly, through the tiny hole above the air filter, I held a lighted cigarette near the entrance to watch the path of the smoke. As I expected, the smoke was drawn into the tiny inlet; but a few seconds later something totally unexpected happened. The four filters, which had been bubbling along quite merrily and fairly quietly, began to bubble and gurgle most noisily and violently. I had slightly tilted the pump to carry out my test and I assumed that the tilting had caused the peculiar reaction. I tried tilting the pump in a variety of directions but it performed normally. I then assumed that the cigarette smoke might have had something to do with the peculiar reaction so I held the cigarette near the air inlet once again. A couple of seconds later the filters started their wild bubbling again; and it lasted about 10 to 15 seconds. The experiment was repeated a number of times and even a single puff of smoke was enough to produce the, to me, peculiar reaction in the pump and filters. Smoking can damage human beings' health, and I've no doubt that poisonous tobacco smoke harms fishes' health as well; but, what physical or chemical property of the smoke caused the peculiar reaction in the filters? Obviously the air in the pump and the filters must have been affected; but how? I'd be pleased to receive the opinions of readers who, like me, are interested in the scientific principles behind our hobby. (I have just repeated the experiment using hot air, carbon dioxide and methane gas. None produced the result obtained with cigarette smoke. I did make sure that my fishes would not be affected during these experiments!)

Mr. J. Dunn resides at 46 Vivian Terrace, Aberafan, Port Talbot, West Glamorgan. He writes: "In the January edition you asked for information about unusual experiences with the clown loach, *Botia macracantha*. I obtained one last September and was told that this fish was basically a bottom feeder and was both shy and retiring. The dealer also mentioned that it could easily be bullied and would always be last to feed, only taking what the other fish in the tank left. For the first two months this appeared to be true. During this period days would pass without my being able to see the fish in a well planted tank. I was worried many times and thought I had lost the fish; even then, a careful search of the tank resulted in nothing. However, during the past month the fish has been coming out of hiding. He has a nasty habit of doing the frightening trick of lying on his side, either on the broad leaf of an Amazon sword plant or in a shady part of the tank.

"I find he is constantly searching the gravel for food. However, when I feed the fishes generally, I now find that the clown loach is the first one to the top of the water for food and that he will take quite a lot of food from the top as well as from the bottom of the tank. I use (a new brand of) flake, mainly, and all my fish appear to enjoy it far more than (an older, popular brand) I used to use. I would like to ask two questions about the newer African cichlids. I have a pair of *Pseudotropheus pendani* (?). The male will take food from anywhere in the tank, but the female will only feed either in mid-water or from the bottom of the tank. Is this normal? Can anyone suggest some reference books on the African cichlids?"

The following is an excerpt only from a slightly longer letter. Readers are reminded that the Editor and I reserve the right to shorten letters—particularly if parts of them might cause offence or distress. In other cases, letters may have to be shortened when the omission of brand names would result in such letters being unintelligible. The address on the following letter is 158 Middleton Avenue, London, E.4. Unfortunately the writer's signature isn't too clear, but it appears to be Mr. G. Kanglo. My apologies to the writer if this is an incorrect reading of his signature. The gentleman writes: "... The limited list of British products in W.Y.O.? seems to be dominated by fish foods. What good are these to the serious marine aquarist who requires powerful air pumps, power filters and good quality synthetic salt, to name a few items of specialised equipment not made by a British firm. ..." (The several foods I mentioned in my limited list of British goods could be used to feed one's marine fishes and/or invertebrates. I assume that some such creatures are kept by "... the serious marine aquarist. ..." and that such creatures occasionally require food—even allowing for the fact that they are surrounded by powerful equipment. I could name one British firm that produces high quality synthetic salt, and another that produces excellent, powerful air pumps.

Our next letter comes from Mrs. Susan Cameron, of 52 Hunter Road, Crosshouse, Ayrshire, Scotland, and it contains what I consider to be an exceptionally useful piece of information. Mrs. Cameron is to be congratulated on finding the cause of an error she made—and on passing the information on to other aquarists. Hers is the sort of letter I really enjoy publishing in this feature. She writes: "I have only been keeping tropical fish for a short time, and recently came across a problem with my U/G filter. I thought this might interest other beginners, who might meet the same problem. I have a community tank, and a dwarf cichlid tank, which have always been clear and clean with (popular) U/G filters. However, I recently notice a thick layer of detritus

on the gravel of the community tank; it was swirling up into the water as the fish disturbed it. This appeared suddenly, and so I knew it could not be a normal accumulation. Then bubbles began to come up from the gravel at the opposite end to the air lift, and investigation showed the cause of the trouble. I had taken the air tube, with an air stone at the end of it, out of the air lift and, without realising it, had not pushed it right back to the bottom of the air lift when replacing it; and the air stone had blocked the bottom of the air lift pipe."

"Air coming from the bottom of the stone had been unable to rise up and had gradually filled the space under the filter, pushing the water there up through the gravel—and taking with it the accumulated detritus up into the aquarium water instead of it being sucked down from the water into the gravel. Eventually the pressure of the air under the filter forced the air out under a corner, and sent bubbles up through the gravel. When I discovered this, and pulled out the air stone and air line, the air burst up the air lift from under the filter, with a great splash and a shower of dirt, and water shot up the air tube. Luckily, my husband had insisted, a short while before, on fitting a non-return valve on the air tube; though I had not thought it necessary as the air pump is hooked up well above the water level of the aquarium. If the valve had not been there I think the water would have reached the pump. Afterwards, the water was clean again within a couple of hours, and the fish were unharmed."

The last of the letters for which we have space this month was accompanied by three reasonably good black and white photographs of fish. The letter and photographs reached me from Mr. L. King, who lives at 5 Weabley Close, Newton Farm, Hereford. He says: "In answer to your question concerning aquarium photography, I have found that HP4 film is excellent. The film speed is 400 ASA, but to obtain the photographs I have sent you, I rated it as 600 ASA. The lighting was warm white. ... Considering the speed at which it's rated, I consider this to be a good, sharp film. I have not yet experimented with colour. With regard to Peter Barker's letter concerning his convicts, I would have thought that he would have consulted a good book before putting other fish with them. To me there is no excuse for this type of ignorance. I have kept cichlids for about six years now and have made the necessary enquiries into their needs and behaviour. Concerning methylene blue, I have found that when I've used it, it turns the aquarium sealant blue. Have any other readers had this problem?" (I recently received a letter from a well-known expert in the production side of the hobby. In his letter, the doctor in question pointed out to

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OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

Several months ago I set up a 54 in. x 15 in. x 15 in. all-glass tropical aquarium. Although it is my custom to change the water every week, I cannot keep fish alive. I have lost about sixty fish up to now. Can you give me any idea where I am going wrong?

Probably you are going wrong in changing the water every week. Most of our aquarium fishes do not take kindly to too frequent changes of water. Then again, all changes of water must be carried out with care. The temperature of any water introduced into the aquarium must be the same as the aquarium water itself. Another thing, are you certain that the fishes you have (or have kept) are non-bullying and non-fin-nipping? Fishes that bully and tear at other fishes' fins soon lead to trouble. However, to get back to the water. Just keep this clean by removing all uneaten food and other decaying matter. Hardy and long-domesticated aquarium fishes will live well in water not completely changed for years. The experienced aquarist usually tops up water lost by evaporation or cleaning with boiled water or clean rainwater collected in a plastic or glass container.

I am considering using peat and clay for a planting medium in my aquarium kept spotless with the aid of an under-gravel filter. Do you think the above compost would impair the proper functioning of the filter?

Most certainly it would unless you place the peat and clay in shallow glass pie dishes and bury them under the grit you have on the bottom. I suppose you are aware that you need about 3 in. of grit on top of the filter plates? This should give you sufficient depth to hide the planting dishes.

How does one sex the blue-spot sunfish?

Externally the sexes of *Enneacanthus obesus* look much the same. For all that, the male has a greater

by Jack Hems

number of blue spots distributed over his body and, in general, more intense colours than the female.

I should appreciate some tips on keeping and breeding *Jordanella floridae*.

J. floridae flourishes best when given a tank to itself. A tank about 18 in. x 12 in. x 12 in. is large enough. For general care a temperature in the middle to upper sixties (°F) is good enough. Courtship and spawning is more likely to occur when the temperature is raised to, and held at, about 75°F (24°C). The fish has a great fondness for greenfood and soft algae should be permitted to coat the back and ends of the tank. This algae will be grazed over frequently. Apart from algae, the best quality flake foods, whiteworms and shredded raw, red meat are eaten avidly. Egg-laying usually takes place on a piece of stone as, for example, a largish pebble or lump of granite. Sometimes, however, the fish prefer to lay eggs on a broad-leaved plant. After the eggs have been deposited, it is recommended to remove the female from the company of the male. The male will guard the spawning site and not molest the eggs. When the fry emerge and become free swimming it is time to remove the male. Feed the fry on cupfuls of green water (floating algae), micro worms, micro eels and powdered dried food.

Recently I purchased three puffer fish which I took to be *Tetraodon fluviatilis*. I placed them in a community tank and in the space of a few days lots of the other fishes had parts of their tail-fins missing. But worse was to come. In under a week or so all the puffer fish were dead on the bottom. While they were alive they gorged themselves on shrimp flesh and I added bicarbonate of soda and salt to the water. Can you offer any explanation for their too rapid demise?

Very few puffer fish are suited to living in a community tank. They bite at the fins of passing fishes and bully timid occupants almost all the time. Gorging themselves on shrimp flesh not as fresh as it might be could cause the trouble. Adding bicarbonate of soda and salt to the water was not the right thing to do. Though puffer fishes appreciate salty and alkaline water you probably made the change in the chemistry of the water too abruptly. Also, lots of other tropicals cannot stand alkaline and salty water. Salt for puffer fish taken from a freshwater tank should be added to the aquarium very gradually.

I am new to the hobby and would like to ask about some elongated blobs of clear jelly that I have noticed on the leaves of some of my plants. Are these jelly-like blobs indicative of some enemy of fish?

The only trouble the jelly-like blobs will give you is when a great many baby water snails break free from them. Too many water snails in a tank will eat the plants and litter the floor with their brown droppings. Remove as many of the egg-carrying capsules from the plants as soon as possible. It is easy to do this with a finger nail.

Is it a sign of sexual interest when kissing gouramies indulge frequently in the habit which has earned them their popular name?

The so-called kissing of fishes of the genus *Helostoma* has nothing to do with amorous inclinations. It is believed to be some form of showing-off or display.

Is there an aquarist society specially interested in barbs or a book describing a large number of species, with their requirements and breeding habits?

To the best of my knowledge there is no barb society. A book that would give you more information about barbs than is usually come by is Professor G. Sterba's *Freshwater Fishes of the World*. Several years ago T.F.H. Publications brought out an excellent booklet on African barbs. Whether this well-written and useful publication is still in print I do not know. I suggest you contact one or two of the dealers who carry a wide range of aquarium books. The booklet on African barbs and Sterba's classic work would prove of enormous help to you.

I am doing some research work in connection with the history of the tropical fishkeeping hobby. Can you suggest an authoritative source I can go to for information on this subject?

I suggest you ask a librarian at your public library to obtain for you the book called *Freshwater Tropical Aquarium Fishes* written some quarter of a century ago by myself in collaboration with George F. Hervey.

There are several pages in this book, now out of print, dealing with the rise of the hobby in Germany more than a hundred years ago. Names of pioneers in the hobby are given, and some important sources of information for the interested aquarist.

A small oscar and a Siamese tiger fish are sharing the same 3 ft. tank. People keep telling me to expect fighting to break out between the two in the not-so-distant future. I fail to understand such people. Puppy dogs and kittens are very often brought up together with no untoward results, so why not two different species of fish?

There is a vast difference between fishes and lots of the furry animals. One can bring up a fox cub with a hen with little fear of bloodshed, but one cannot expect an *Astronotus ocellatus* to grow up and remain as peaceful as a lamb. It is a part of its nature to grow up aggressive, more so at some times than at others. The tank you have will provide accommodation for one oscar or one tiger fish in less than a year's time. Bear in mind that a Siamese tiger fish will reach more than a foot in length, an oscar about 9 ins.

From various of your writings you give the impression that cichlids will not live together on peaceful terms. Permit me to inform you that I have red devils, tilapia, convict fishes and acararas all living together in perfect harmony. What is your answer to this?

A short one: wait and see. And one more word. I have never stated that all species of cichlids will not live together on peaceful terms. But the few that will do not amount to many.

Could you give me some information on the fish called *Trichogaster trichopterus sumatranus*?

T. trichopterus sumatranus is the blue gourami or blue form or sub-species of the grey *Trichogaster trichopterus*. The blue gourami is native to Sumatra and Malaysia. *Trichogaster trichopterus* has a wider distribution: The Malay Peninsula, Thailand, Laos, Vietnam, and across the sea to the Great Sunda Islands.

I should like to stock a 36 in. by 15 in. by 12 in. tank with a pair of tiger barbs and some other colourful fishes such as fancy guppies, neon tetras, and angel fish. Do you think this tank would prove a success?

Tiger barbs live longest and best when they are kept in a group of six or more. Secondly, tiger barbs are fin-nippers and bullies and soon tear the flowing fins of long-finned fishes to shreds. Therefore the best thing to do is to keep the tiger barbs on their own or omit them from your proposed collection.

COLDWATER QUERIES

by Arthur Boarder

I have bred some fantail goldfish but am now losing some of them. They seem to have swollen bellies before they die. What is the cause as I only feed them on dried foods?

It is not easy to be certain what has caused the death of the young fish as the general conditions in the tanks could have been unhealthy. However, I suspect that it is the feeding which has caused the deaths. Young goldfish have very small intestines and if they eat dried foods it is possible for such matter to swell up inside the fish and cause distress. A proportion of live food is of great benefit to young fishes as long as such live food is free from pests and diseases. I prefer mashed garden worms or white worms (*Enchytraea*), as these are safe, not coming from water where troubles could accompany them. I have reared thousands of goldfish on dried foods but I used an old-fashioned coffee grinder to reduce the flake or other dried foods, such as shrimp, to a fine powder. However, in addition to this I always saw that the water was not crystal clear but contained plenty of green algae and of course with this would almost certainly be plenty of *infusoria*. If you must use dried food from a packet to feed your young fish, I suggest that you soak it well first so that it is not likely to swell up inside the fish.

I am changing from keeping tropicals to breeding fancy goldfish. However, I am having difficulty in getting good fancy goldfish. The pet shops I have visited have a poor selection of coldwater fishes. Can you help me to get some of the more unusual varieties of fancy goldfish?

I understand your difficulty in getting good fancy goldfish from pet shops, but I can quite realise why this is. Most high street pet shops stock a very wide range of pet foods, birds, reptiles and fishes, as well as all the accessories pertaining thereto. The average shop may stock some tropicals and a few coldwater fishes, probably mostly common goldfish. One cannot expect such shops to stock some of the more unusual and maybe expensive fancy goldfish. However, there is no need to worry over this issue as I am enclosing the address of a firm which is now dealing exclusively in coldwater fishes. All tropicals have been cleared from this large establishment so that a speciality can be made of coldwater fishes, including the newer varieties of fancy goldfish. The proprietor has been in the business for at least thirty years and is an old friend of mine. I am sure that you will get the type of fish you need

from this firm as fishes are sent out to all parts with expert attention to their safe arrival.

I had a number of young goldfish bred in my pond this year and have found one or two dead ones recently. Can you give me a reason for this please?

There are several reasons why your young goldfish died. The obvious one is that the water in the pond had become foul through the decomposition of matter on the bottom. However, in such a case it is probable that larger goldfish would also have died. This would occur because the larger the fish the more oxygen does it need. If no larger fish died then it is due to the state of the young fish. If they were bred in the pond rather late in the season, then they may not have had sufficient time to get enough nourishment to store up for the winter. Any fry bred after the end of June, may not have grown large enough by the winter to go through that period safely. If fry are hatched in April or May and have been well fed they could be up to two-and-a-half inches long, and be strong enough to go through the winter safely. Most breeders of fancy goldfish give the fry warm treatment so that they may grow sufficiently large to be able to stand the cold during a long winter.

Many pondkeepers find that some of their goldfish die in the spring, having gone through the winter in the pond apparently quite healthily. This is because they were not fed well enough during the preceding autumn. As winter approaches the fish should be fed as much as they will take before the water cools down too much. They are then in a much better condition to withstand the prolonged enforced lack of desire to feed.

I am hoping to breed some fancy goldfish in the spring. I have a medium sized pond and some tanks for rearing. Do I need to separate the sexes some time before they are expected to spawn and can I breed different varieties in one pond?

It is not essential to separate the breeders before spawning although I have known some breeders who do so. I have never found this necessary as my fish have always spawned well without having been separated. They have been kept in the open pond all the winter and I consider that they are then in a better condition to take advantage of the warmer water which will encourage them to spawn. If

they had been kept indoors or in warmer water, they may not have responded to the change of temperature. You may be making a mistake as you say that you will be breeding different varieties in the same pond. If you do this then you are asking for trouble as all varieties of goldfish can breed together and you are likely to get a host of cross-breeds which are of no value whatever. There is one fairly safe method of breeding in such circumstances and that is to watch for the fish to spawn and then catch any special pair of one variety and place them in a fairly large tank with plenty of water plants. After about an hour they should spawn well and can be returned to the pond when a good number of eggs are seen. Do not leave the spawners in the tank overnight. When catching the spawners from the pond do not take up any of the pond water with them as this could contain many sperms from unwanted males. As the eggs of goldfish, and most other species of fishes are only fertilised after they are laid, it is possible to make sure that the eggs laid by the pair caught up will be able to provide the pure strain you require.

I am able to collect a number of different kinds of water plants from a pond near my home. How shall I make sure that they are

not contaminated by disease?

The surest way to make sure that you do not introduce any pests and diseases with the plants from the wild is to leave them where they are and buy a few plants from an expert dealer. There are several firms advertising water plants in *The Aquarist* each month and you will be far better off getting some of these. If you were to see the varied types of pests which are almost certain to be in the pond with the plants you intend to collect, you would find out what I have stated to be only too true.

In most open ponds there are sure to be the harmful creatures which one wants to keep from the garden pond or tank. Water beetles and their larvae and the larvae of dragon flies. Added to these may be water boatmen, water scorpions, fish lice, flukes, leeches and germs of fish diseases. Any one of these unwanted troubles introduced to your pond can start a serious epidemic which may be very difficult to get rid of. There is no need to buy a number of water plants as they should soon grow and give you all that you need. Also you do not have to get many different species of plants and some may not grow as strongly as others and the weaker ones could soon die. Some good species are: *Ceratophyllum demersum*, *Lagarosiphon major* and *Egeria densa*.

W.Y.O.? *continued from page 604*

me that methylene blue tended to stain aquarium sealants blue. I don't know if the staining occurs with all brands of sealant, but owners of all-glass aquaria should bear this point in mind.)

Please send me your opinions on the following for a future edition. (a) Writers such as I frequently advocate that aquaria should be thickly planted; but, as someone pointed out to me recently, it can cost a lot of money to furnish fully a large, new tank. What plants would you recommend as species which, if planted in fairly small numbers, would soon reproduce and help to furnish a tank? (b) What species of fish have you bred in large enough numbers to sell, and what sort of prices did you get when you sold them? (c) In your area, what would be the average cost of a medium sized pair of any or all of the following: "ordinary" angels, neons, guppies,

cardinals, dwarf gouramies, discus, red swordtails and tiger barbs? Give appropriate details, including sizes. (d) From what source do you obtain the water with which you fill or top up your tanks? Is the tap water in your area soft, hard, acidic, neutral or alkaline? (e) Do you use any planting media under the gravel in your planted tanks? If so, what, and to what effect? (f) Please send me details of your breeding experiences with *Apistogramma ramirezi*; with *Astronotus ocellatus*, the oscar; with any species of discus; and with *Pseudotropheus auratus*. (Can anyone tell me the origin of *Astronotus* as a name? It conjures up all sorts of pictures!)* (g) Do you have any original tips to pass on to other readers? I'd be pleased to receive your comments on any of the above—or on any topic that would be of general interest. I look forward to hearing from you.

*(Marked with stars — Ed.)

B.K.K.S. NEWS

A reminder for all those wishing to attend the Koi-Keepers' Seminar at the Post House, Leicester, on Sunday, 14th March, that owing to additional films and interesting material, proceedings will now start at 11 a.m. and not noon as previously stated. Three lecturers, all acknowledged experts in their field, have

accepted an invitation to attend and all pond-keepers and potential pond-keepers should find their journey well worth the trouble. Entrance by programme only—programmes 50p, children free. Programmes can be obtained at the door on the day at The Post House, or from Malcolm Waumsley, 165 Woodside Road, Amersham, Bucks, HP6 6NR, or Roland Seal, 7 Highlands Road, Offerton, Stockport, Cheshire, SK2 5HU.



Coldwater Enthusiast

I am interested in coldwater fish which I have had for two years. I have been very successful in breeding my Bitterlings, though I have not been successful with my Jap Weather fish, my five Catfish and my two common Goldfish.

I would like to know where I could obtain a mussel for my Bitterlings which I hope to breed this season, and could you please give me any information on the Bitterlings.

PETER GALLAGHER,
79 Kendal Crescent,
Beacon Lough,
Gateshead 9,
Tyne and Wear.

(An article on Bitterlings appeared in January, 1975 issue of *Aquarist & Pondkeeper* and more information was given in "What Is Your Opinion" feature, October, 1975.—Ed.).

Plecostomus Spawning

I am writing to let my fellow readers of the *Aquarist* know of a surprise spawning which recently took place in one of my two tropical fish tanks. Since September, 1975, a pair of *C. severum* have been spawning fairly regularly in a tank 48 in. x 15 in. x 12 in. None of the young have reached the free-swimming stage as yet, either because the eggs became fungused or were eaten by the parents, or a 7 in. *P. plecostomus* which, until recently, shared this tank with the *C. severum*.

When these fish spawned again on the rear wall of the tank on the 14th January, 1976, I removed both parents and the *Plecostomus* to another tank measuring 48 in. x 12 in. x 12 in. Now this tank was already occupied by four medium-sized *C. meeki*, a 2-in. *Gyrinocheilus aymonieri* loach, and two small *Plecostomus*, one measuring 3½ in., which I shall call "A", and another measuring 3½ in. which I shall call "B." The *Severum* eggs hatched after three days and fell to the bottom of the tank. A number of eggs had already fungused and I was beginning to doubt whether the young would reach the free-swimming stage. On the 20th January only about 25 to 30 young had survived out of an original spawning of about 300 and they were due to break free from the egg sacks the following day. I arrived home on the 21st January and went straight to the tanks to see how many young were free-swimming.

Immediately I entered the room, however, I was given an item of news which made the progress of the young *Severum* seem of little consequence. My sister informed me that she had counted four baby *Plecostomus* in the tank containing the other fish. Sure enough, I was able to count six young specimens measuring ½ in. in length which were perfect replicas of the adult fish. The *Severum* and the large *Plecostomus* were immediately moved to their former home together with the *C. meeki* so that the young *Plecostomus* would not come to any harm, and I began to wonder how the surprise breeding had come about.

Both "A" and "B" were purchased in late 1974, when they were little over 1 in. in length. A few months after "A" was purchased, he (or she) began to develop eight or ten small protruberances at the front of its snout. As the fish has developed, these have become longer and eventually forked, forming a nasty-looking set of hooked, upward-pointing barbels. "B" has never developed any such barbels and this, in addition to the fact that "A" seems to have a slightly wider, flatter snout, had formerly led me to believe that these fish were not of the same species.

In the tank there is a large, round stone with a slight kink at its base which "A" tunnelled out to form a small cave. In the September, 1975, issue of the *Aquarist* (Tropical Queries) I saw that a reader had discovered young *Hypostomus* catfish under a flat stone. As "A" seemed to be spending most of her time (I had now decided that "A" was a female) in this cave, I suspected that more young would be found there. On lifting the stone about 20 young darted out to various parts of the tank. They were all the same size and were equally well developed.

I had no idea of how old the young were as I had not observed any signs of spawning behaviour in either fish. My theory is that these fish are live-bearers. It seems clear that the young fish were born inside the small cave which "A" used to, and still does, occupy most of the time, as no eggs or other signs of birth have been observed.*

Furthermore, the cave is barely large enough to accommodate "A" let alone both "A" and "B," and if eggs were laid it would be necessary for both fish to occupy the cave at the same time, otherwise the male would be unable to fertilise the eggs as they were laid. I feel, therefore, that the young were born live inside the cave. The only weak point I find in this theory is that "B" has no visible gonopodium and I cannot imagine how he would have fertilised the eggs carried by "A."

Now, a week since the young fish were discovered, my biggest problem is how to provide enough food for the young.

At present, I leave the 3 foot Grolux tube on for 10 or 12 hours a day to promote algal growth and I also

add the occasional pinch of dried flake food. I would be interested to hear through this column from anyone who has had *Plecostomus* breed in their tanks, as their experiences might help me to ensure that the progress of the young is normal.

Unfortunately, I did not measure pH or DH values of the tank water but the average temperature was 76°F. The young must be quite hardy, however, for the day before they were discovered someone had unplugged the heater and the temperature must have fallen to the upper fifties Fahrenheit with no apparent ill-effects. I will keep readers in touch with their progress, and also hope to be able to report a successful spawning and raising of *C. severum* fry in due course.

Yours faithfully,
C. V. FUCHTER,
57 Watson Avenue,
Chatham, Kent.

* (The book "Catfish" by Emmens and Axelrod contains a colour photograph of what are described as eggs of *Plecostomus* and in the text Axelrod states: "... they (*Plecostomus*) do not appear to have been bred in captivity but their eggs are large (10-12 cm.) and orange in colour." He goes on to say that he has eaten hundreds of *Plecostomus* in Brazil and that "their eggs are superior caviar." Ed.)

Belgian Aquaria

I am, at present, serving with the British Forces in Belgium. This fact, as you must realise from the letters of other serving members, cuts down on the amount of fish I can keep. I have become, alas, more of an onlooker, than a fish keeper, but this does not diminish my interest in the hobby.

Open to me are all the fine tanks contained in the many aquariums and shops of Antwerp. My travels around the city have led me to meet some kind and helpful members of the Belgian Aquarist world.

To anyone thinking of spending a holiday in or around Antwerp, I would like to point out a few places of interest where aquarists can wander through a wonderland of fish.

First on the list has to be Antwerp Zoo. This is situated adjacent to the Central Station. The entrance fee is 120 B.fr., about £1.40 and half-price for children. It is open from eight o'clock until dusk, and contains in addition to the fine display of mammals, an excellent aquarium of some two hundred and fifty tanks, containing a fine selection of both temperate and tropical marine and fresh-water fish. Points of interest are the sections of invertebrates and the massive tank of Red Breasted Piranha. This one tank holds over one hundred and twenty fish, all of the same size, subtle lighting enhances the appearance and make the tank a sight to be remembered. There is also a fine Reptile

house and frequent performances are made by the Dolphins in the large Dolphinarium. All the places mentioned above, are included in the entrance fee.

Shops to look out for are "Ambula" in Diepestraat, and "Aqua-Flora" on Kloosterstraat. These are all within walking distance of the Central Station, while you walk you can also take in some of the fine buildings in the City.

A full list of places of interest are available to anyone who can afford either a 6½p or 8½p stamp. I will gladly reply to all enquiries.

Cheers and happy fishkeeping.

L./Cpl. SKAWSKI, P.A.W., R.C.T.,
Headquarters R.C.T.,
British Forces Antwerp,
BFPO 21.

BOOK REVIEW

Crustaceans by Waldo L. Schmitt

The scientific class Crustacea covers a fantastic range of living organisms, of very diverse behaviour and habitat. The aquarist, or any other amateur naturalist, could easily be excused for being confused by the subject simply because of this tremendous variation, so this book is an ideal introduction and first reference. Crustaceans are found in jungles, deserts and many other localities as well as in water, and their ways of life are often mysterious and bizarre. Like insects, they are everywhere and include amongst their numbers parasites, symbionts, tool-users, house-builders and many other specialised groups, and fill every relevant ecological niche.

Aquarists will find several to be already familiar. *Daphnia*, *Artemia*, *Argulus*, Copepods, as well as the popular crabs, lobsters, and shrimps. All are thoroughly dealt with. Students of fish parasitology should benefit from the information on life-cycles and the descriptions should help with identification. The text is lightened with many anecdotes and personal experiences and numerous illustrations. The major part of the book is a summary of the Class, but additional chapters deal with identification, habitats, behaviour, effects on man, communication and physical detail.

The author is a research associate at America's Smithsonian Institute, and was previously the curator of the Division of Marine Invertebrates at the U.S. National Museum. His knowledge of the subject is therefore extensive and his travels around the world give background to his writing. Every serious aquarist should have one book of this kind available for reference.

Published by David and Charles, Newton Abbot, Devon TQ12 2DW. 204 pages, 75 illustrations, price £4.25.

A. JENNO.

EVOLUTION OF INDIAN TROPICAL FISHES

by B. F. Chhapgar

EVERY aquarist knows that the occurrence of different kinds of fishes is not uniform throughout the world. Thus the Americas are famous for tetras and live-bearers, while Africa is richest in cichlids. Continuing eastward, we find that Asia abounds in barbs and anabantids (air-breathing fish). This trend is also found in India, where barbs and catfishes are the commonest fishes, followed by anabantids, while a few cichlids are also represented.

How did such a distribution come about? Were such fishes always there, or have they migrated recently from other countries? By studying rocks and fossils, as well as the climates as they existed over the last millions of years, the pieces of the evolutionary jigsaw puzzle fall into place.

One has to look pretty well back, about 170 million years ago, before the first record of an Indian freshwater fish is found, in the region of the present Godavari valley, from what the geologists call the Upper Triassic period. This is a Dipnoan, i.e. a lungfish, called *Ceratodus*. Lungfishes nowadays occur only in Australia, South Africa, and South America. This poses a question as to where they came from, and why they died elsewhere.

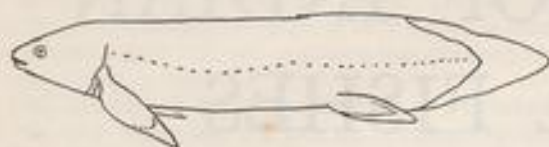
During the epoch that we are talking about, there were no continents as we know them today. There were only two huge land masses (see figure)—the northern Angara, comprising parts of present-day Asia, Europe, and North America, and the Gondwana, consisting of Australia, southern Asia, Africa, and South America. These two land masses were separated by seas, but were connected by a land bridge near present-day Assam in India. The lungfishes evolved 325 million years ago, during the Middle Devonian period in the North American and European parts of Angara, and migrated into Gondwana over the 'Assam link'. The Upper Triassic was a period of great droughts in India, so that the lungfishes died out here, but persist to the present day in the other regions of Gondwana.

On the return of moister conditions 145 million years ago (Jurassic period), there was again an invasion of freshwater fishes from the Angara to the Gondwana over the Assam link. But this time they were Ganoids (enamel-scaled fishes), of the genera *Lepidotus*,

Tetragonolepis, and *Dapedius*. These too spread to Australia, Africa, and South America, but another period of desiccation wiped them out. Once again, on the return of wet conditions 120 million years ago (Cretaceous period), different Ganoids, of the genera *Pycnodus* and *Lepidosteus*, colonized India. But the world in those days does not seem to have been conducive to a settled life, for these fishes became entombed in the extensive lava (volcanic) flows of the Upper Cretaceous. When these volcanic activities subsided 60 million years ago (Eocene period), *Lepidosteus* returned to India, this time in the company of the teleost fishes, such as the Osteoglossidae, Cyprinidae (barbs), Anabantidae (air-breathers), and Nandidae. Recolonisation occurred again and again so long as the Assam link existed.

By this time the Gondwana land mass was breaking up, and Australia had already separated from India, although there were still land connections between India, Africa and South America. More important for future migration was the invasion of the Bay of Bengal northward, breaking up the Assam link between Angara and Gondwana. Thus, when volcanic action killed off the existing Indian stock, chances of new migrations were nil, and we have no fossil fish records for the whole of the Miocene period, up to 25 million years ago. South America became separated from Africa in the Upper Eocene, and though Africa got separated from India for the greater part of its extent, it retained a connection with India in the northeast, up to the middle Pleistocene.

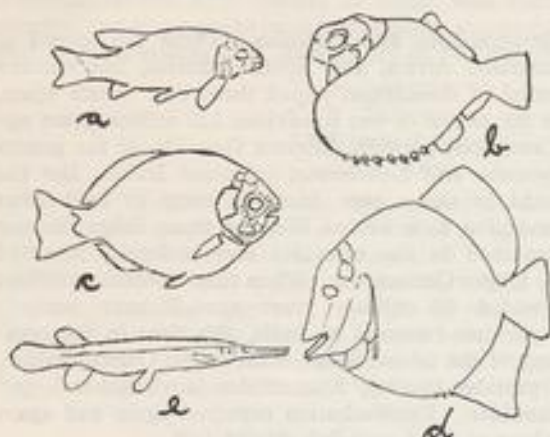
About 12 million years ago, during the Pliocene period, furious mountain-building activity resulted in the raising of the Himalayan-Alpine arc. This enabled the spread of hill-stream fishes. The Himalayas at first were very much lower than they are now, and suitable conditions at the bases of these hills also facilitated the dispersal of march-loving Siluroids (Catfishes), such as *Chrysinichthys*, *Mystus*, *Rita*, *Bagarius*, *Clarias*, *Heterobranchus*, etc., and the Ophicephalids (snakeheads). Carps had not colonised India during the Pliocene, because of brackish water at the head of the receding Bay of Bengal. Further mountain-building activity coupled with successive waves of glaciation (ice formation) during the last



A Dipnoan fish, *Ceratodus (Neoceratodus) forsteri*

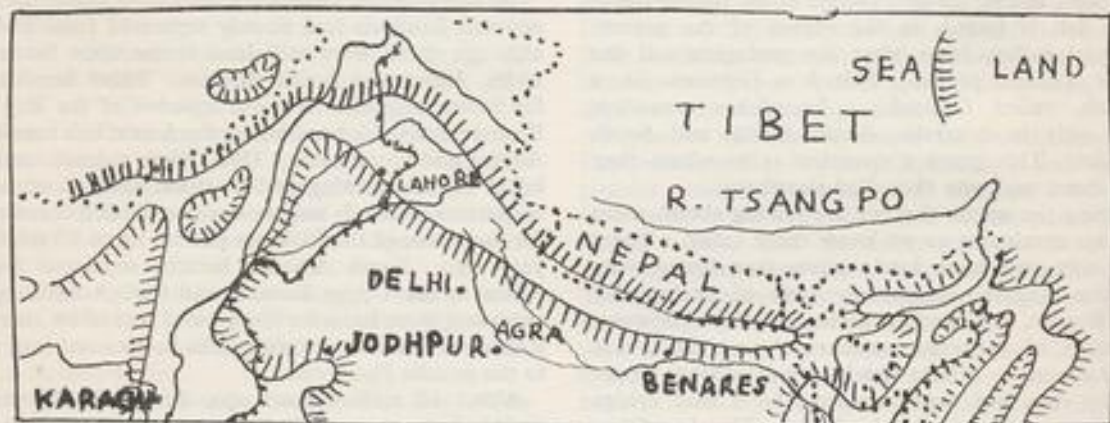


Above: The World as it was 170 million years ago—showing the present day continents superimposed on the Angara and Gondwana land masses.



Left: some Indian Ganoid fishes:
a. *Lepidotus*, b. *Tetragonolepis*, c. *Dapedius*, d. A *Pycnodont* fish and e. *Lepidosteus*.

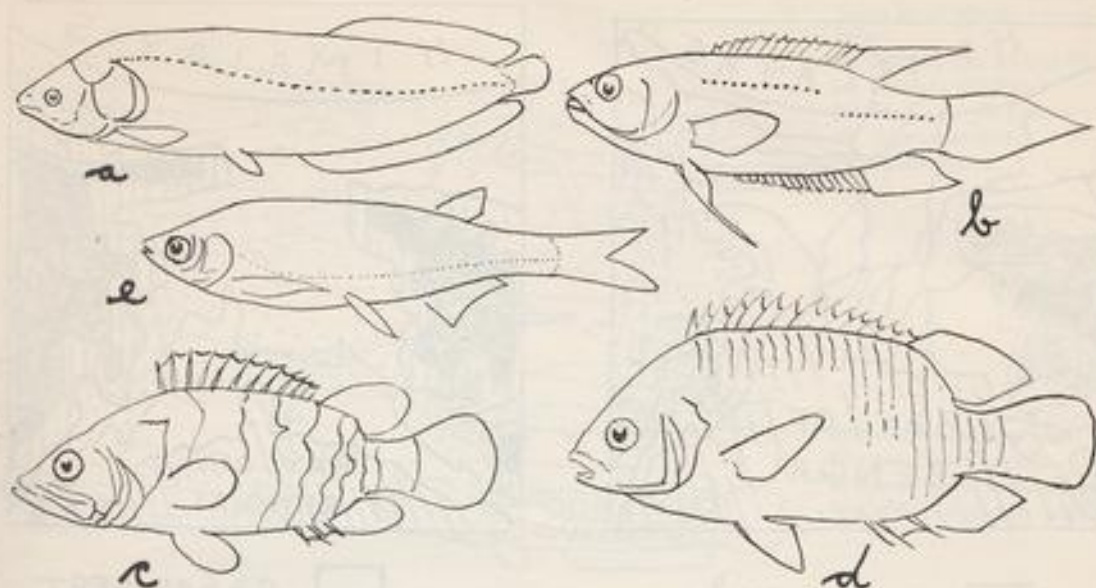
Below: The Himalayan region 12 million years ago showing an encroaching arm of the sea—the Siwalik Gulf, below the mountain range.



million years facilitated spread of freshwater fishes from east to west, but these migrations did not extend to Africa. There were in all five glacial periods which gave India pluvial conditions and converted its plains into plateaux owing to eustatic movements of the sea.

Let us now see how the fishes, once they settled down along the Himalayas, spread all over India. If we look at a map of this region during the Pliocene period, when the Himalayas were not yet as high as at present, we find that the sea extended through most of present Pakistan and spread an arm as the

Siwalik Gulf, stretching as a narrow strip along the base of the Himalayas and receiving the run-off water from their southern face. A considerable part of this gulf towards the east was estuarine and contained brackish water. As the sea receded westward, this gulf formed a series of freshwater lakes in which lived the Siluroids (catfishes). But, during each glacial period, this series of lakes joined together and ran as the Indo-Brahm river, having its headwaters in Assam and draining towards the west. Thus migrants from the east could spread to the extreme west, and we now see, as a result, the uniformity of



Some Indian Fossil Eocene Fishes:

(a). An *Osteoglossid* fish, (b) *Polyacanthus*, (c) *Nandus*, (d) *Pristolepis*, (e) *Chela*.

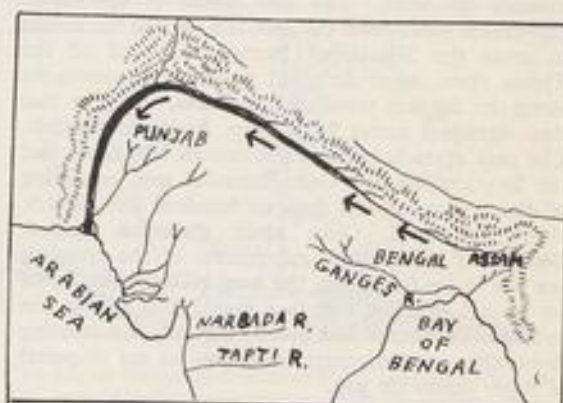
the fish fauna of the Ganges and the Indus rivers. Separation of the fish fauna of these two rivers occurred only 250,000 years ago, during the third or fourth glaciation. This period coincides with the break-up of the Indo-Brahm river, simultaneous with the tilting of the peninsular block, before which the drainage of Assam also discharged into it.

From the Ganges, the fishes spread into the Mahanadi and the Godavari river systems of peninsular India. We find that the greater part of the fish fauna in these two rivers is that of the plains and not that of the headwaters. If we look at the map of the Gangetic delta region, we shall find that, due to ice formation, the sea level fell by 100 to 200 metres during each glacial period and vast shallows of the present-day sea (indicated by sparse stippling on the map) became dry land. Moreover, the Ganges was then flowing much more westward, in the present bed of the Hooghly, than it does today. Thus, during the height of the glacial periods, the Ganges and Mahanadi formed a common delta, allowing the fish from the former to colonise the latter.

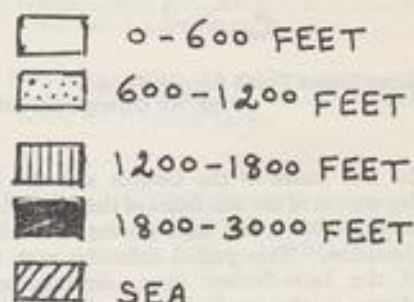
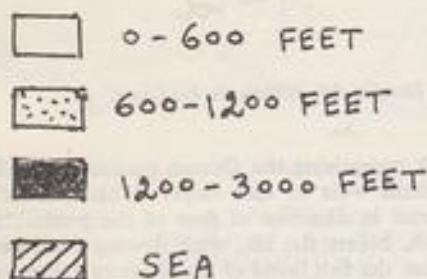
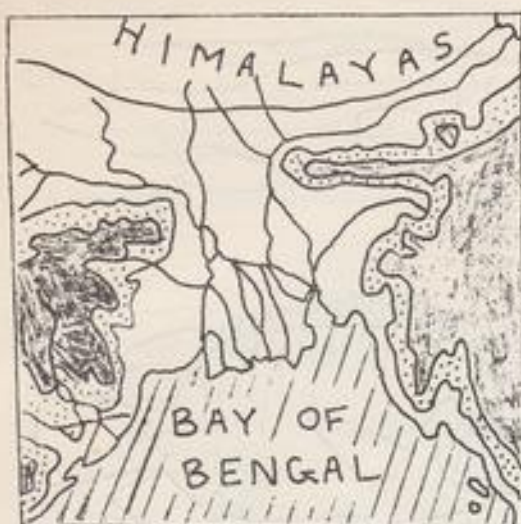
As we have already seen earlier, the Deccan lava flows, commencing in the late Cretaceous and continuing at long intervals up to the Upper Eocene, annihilated the fish fauna during each active phase, but the intervals between successive flows were long enough to permit recolonization. Not more than 250,000 years ago, during the late Pleistocene, the lava

block comprising the Deccan peninsula tilted, with a resultant west to east slope. This resulted in the reversal in direction of flow of the peninsular rivers which, before the tilt, were flowing northwestward, so that the fish fauna of the Western Ghats spread to the Eastern Ghats, Orissa hills, and the Aravalli, Satpura and Vindhya ranges.

In the meanwhile, as the Himalayas rose to a great height, the differential uplift movement of the range acted as a physical barrier between the eastern (Nepal-Assam) and western parts. We therefore find that



India at the height of a glacial period, showing the westward flowing Indo-Brahm river.



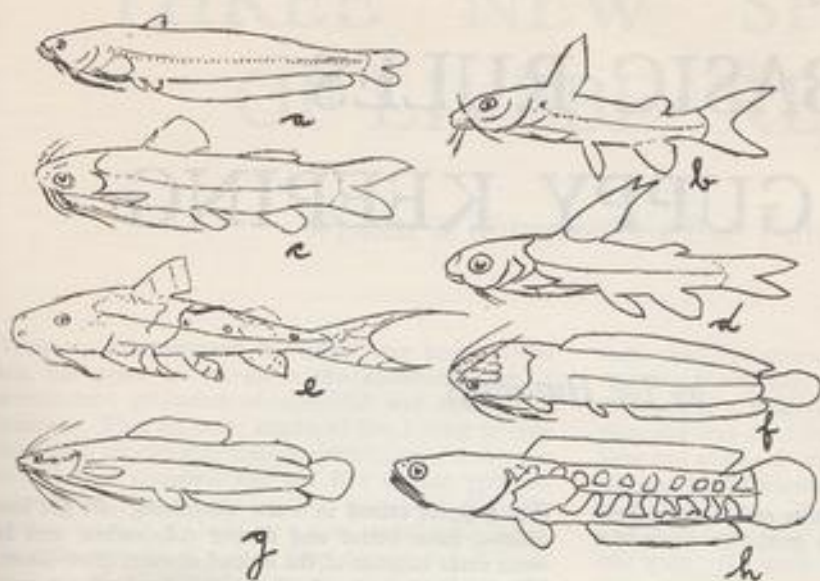
The Garo-Rajmahal gap as it is today (left) and as it was at the height of glaciation (right)

the eastern fish element predominates as far as the Teesta drainage but thereafter becomes less and less towards the west. The new stocks of specialised hill-stream fishes from the east, not finding the means to cross the Himalayan barrier westward of the Teesta river, were deflected towards the southeast along the Satpura trend of mountains, which at that time stretched across India from Assam to Gujerat. The only obstacle between the eastern Himalayas and the Satpuras was the Garo-Rajmahal gap, consisting of plains of much less than six hundred feet altitude above sea level. Once again glaciation helped. Because of the eustatic movements of the receding sea due to ice formation, the level of the "Gap" rose by several hundred feet (see map), thus giving rise to increased rainfall and greater run-off, and creating favourable environmental conditions to aid dispersal of fishes across the gap.

From Gujerat the hillstream fishes migrated south and along the Western Ghats (see map). A gradual

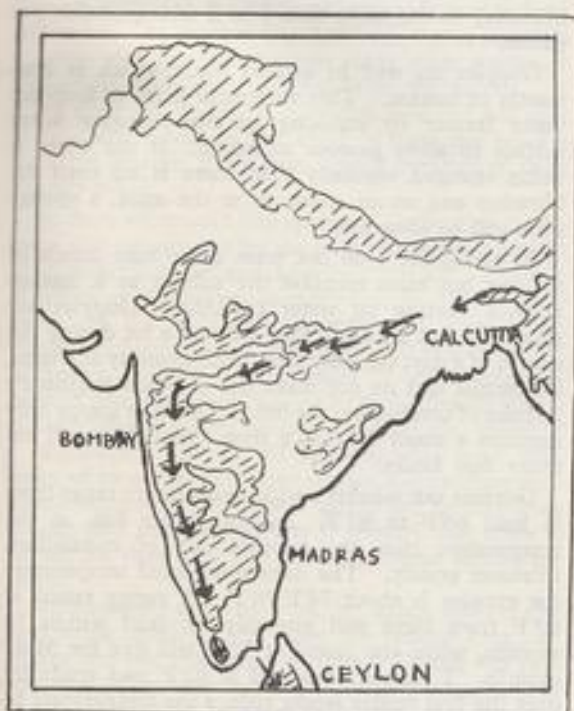
spread westwards across the Himalayas is also taking place even now, e.g. *Amblyceps* has gone as far as Kangra valley and *Psilorhynchus* has gone as far as Delhi.

To conclude, we find that almost the entire fresh-water fauna of present-day India consists of migrants during the Pleistocene period or of their modified descendants. Severance of India from Australia, and later from South America, at a very early period resulted in the difference in their fish fauna, while land links with Africa till later enabled some migration of fishes from one subcontinent to the other. Thus cichlids like *Etilopus maculatus* (orange chromide) and *Etilopus suratensis* (pearl spot) occur in India. Of course, the most predominant forms in India are the barbs and catfishes, with a smattering of air-breathers and other miscellaneous forms. Tetras and livebearers are completely absent, as are the egg-laying toothcarps (Cyprinodontidae), but for a few exceptions like *Aplocheilus*.

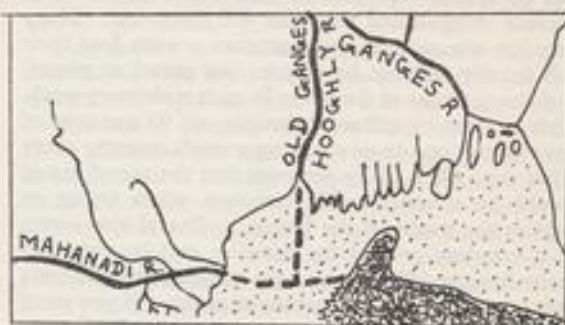
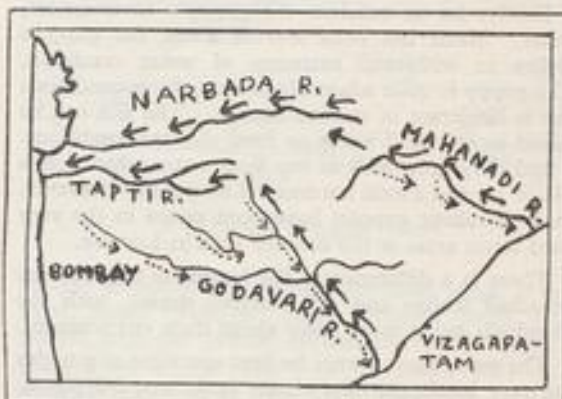


Some fossil Pliocene Indian fishes:
 (a) *Silurus*, (b) *Chrysichthys*
 (c) *Mystus*, (d) *Rita*
 (e) *Bagarius*, (f) *Clarias*
 (g) *Heterobranchus*
 (h) *Ophicephalus*

Below: Deccan Peninsula
 Showing flow of rivers
 before tilt (solid arrows) and
 flow at present (broken arrows).



India showing the route of migration of the Malayan fishes.



The Bay of Bengal as it is today (light stippling) and as it was at the height of the glacial period (dense stippling); hypothetical continuation of the Ganges and Mahanadi Rivers is also indicated.

BASIC RULES FOR GUPPY KEEPING

by Jeff Hutchings

IN THIS article I am going to make some suggestions that a beginner can use as a guide to successful guppy keeping.

Firstly, let us consider the guppy's environment, water. Much has been written about the guppy's ability to withstand extremes of water condition. The guppy is quite adaptable to most water conditions but is intolerant of sudden change. The fish can be raised in soft acid water or hard alkaline conditions. I find they grow well in my local water which has a pH of 7.4 and a total hardness of 80 p.p.m. However, many excellent guppies have been raised in the very hard water areas of the country such as London.

There is a difference in the hardness between the broadtail strains and the shorttail strains, with the broadtails being more fussy about their environment.

The water must always be kept sparkling as guppies are very intolerant of a nitrate build up; 0.3 p.p.m. can be lethal. Guppies in poor water will tend to become sluggish and their fins will clamp up. Many breeders who wish to get maximum growth feed their fish heavily and use bare tanks (no gravel or plants) and change most of the water in each tank every week. This is done by either syphoning out 90 per cent of the water at one go or changing a small quantity every other day. It is easily apparent that the use of gravel would be a considerable nuisance when trying to syphon the waste off the bottom. Gravel also serves as a breeding ground for parasites and bacteria and many fine caudalled males have suffered from diseases through resting on the bottom at night. If you must have plants in the tanks then put them in small trays (plastic margarine containers are ideal).

The next point, if carried out, will eliminate the possibility of planted tanks. That is, the use of aquarium salt. It has been proved by experiments

that guppies raised in water containing salt get less disease, have better and deeper colouration, and in some cases because of the lack of disease, grow faster. The fish can be gradually acclimatised to accept a 50 per cent brine solution happily although it is not necessary to use more than 1 to 2 tablespoonfuls per gallon.

Guppies do well in aerated water which is constantly in motion. This movement helps to keep the water fresher by exposing an ever-changing water surface to allow gaseous exchange. If the water is being changed regularly then there is no need for filtration and an air stone, or at the most, a sponge filter will be adequate.

At this point I do not want to go into details of feeding but must mention the subject as it has an obvious bearing on water condition. Guppies are small fish and although they will eat a lot during the course of a day, can only eat a small quantity at a time. Be careful and do not make the common beginner's mistake of overfeeding the fish. The male guppy only requires a small flake at a time although it will eat every few hours.

Guppies can tolerate a wide temperature range from at least 60°F to 90°F. As with other fish, as the temperature rises the guppy's rate of metabolism increases greatly. The normal accepted temperature for guppies is about 74°F/76°F. A guppy raised at 80°F from birth will probably be dead within 18 months, while one raised at 72°F will live for 36/48 months. I start a brood off at 82°F and gradually over the first twelve weeks reduce the temperature to 76°F at which level it is maintained. If you are not interested in raising show fish then raise the fry at a lower temperature.

Continued on page 619

THREE "NEW" SPECIES OF LIVEBEARERS

Written & illustrated by Bob Purdy

TROPICAL FISHEREEDERS the world over have, in the last ten years or so, given the aquarium trade a tremendous profusion of colourful and fancy livebearers. That all these strains of fish belong to only four basic species may come as something of a surprise to a lot of aquarists but the fact is that guppies, swordtails, platties and mollies are about the only livebearers that are bred on a commercial basis today. In some ways this is a good thing because it is difficult to think of any other four species of tropical fish that have done more to attract newcomers to our hobby; they are colourful, peaceful and extremely easy to keep and breed. In another way, however, this is not such a happy state of affairs because many other species of livebearers have been crowded from the market. A lot of these can be just as colourful, peaceful and easy to keep and breed; in fact many of them can be of a lot more interest these days simply because of their scarcity value.

As there are around fifty species of livebearing toothcarps that are suitable for the home aquarium it would be impossible to list and describe them all. The fact is that most of them are so rarely seen in dealers' tanks nowadays that a large percentage of species are simply unobtainable. I have heard tell of a one-sided livebearer, *Jenynsia lineata*, males of which have the distinct disadvantage of having to find a female with a suitably placed genital opening. I have also heard of a single-sexed species, all females, who mate with males of an entirely different species and produce only female offspring. Much as I would like to keep such strange and interesting fishes it appears that there is no call for them and I've yet to see these species for sale.

Occasionally, aquarists can be lucky and a few livebearing species, other than the famous four, are offered for sale from time to time. During the past two years I have been fortunate enough to acquire three "new" livebearing species, and with the hope of generating some new interest in the more rarely seen livebearing toothcarps, I shall briefly describe my experiences with them.

The first "new" species of this family to grace my

tanks had the unusual name of *Belonesox belizanus* and was commonly called the Pike Top Minnow. There was a tank full for sale at an open show I attended and even though they were barely an inch long and quite colourless I purchased a pair for £1.50. *Belonesox belizanus* is a species that must be kept on its own at all costs. They are predators of the first order and quite capable of devouring a fish half their size in one gulp. To persuade my young pets to eat anything but half grown guppies was next to impossible,



A *Belonesox belizanus* (male)

on odd occasions they would take small strips of red meat; flaked foods and other prepared foods were treated with the utmost disdain and totally ignored. They lived at the surface of the water and, until thoroughly settled in their tank, were very nervous, shyly darting into thickets of floating plants at the first sign of movement.

They are not too worried about the water conditions that they're kept in; my tapwater is very soft but this species will also do just as well in hard water. Temperatures ranging between 74°F and 78°F are about right and the tank should be well planted with an abundance of floating plants. One danger experienced when keeping this species is the possibility of uneaten food falling to the bottom of the tank and fouling the water as it decomposes. For this reason a bare space, clear of gravel, at the front of the tank is very useful for spotting uneaten food particles and makes their removal quite simple.

The female of this species is capable of reaching a length of eight inches but the male will rarely exceed four. An unusual aspect of these fish is the fact that they have day and night colours that are completely

opposite to those adopted by most other tropical species. Most fish become washed out and some go almost colourless during the hours of darkness but *B. belizanus*, which is quite a lightly coloured fish during the daytime, becomes almost totally black at night.

The male Pike Top Minnow has a distinctive black spot behind the caudal peduncle and a background body colour of drab yellow-green. There are a few rows of horizontal spots running along the flanks; the belly is a very light grey colour. The female is, as previously stated, a lot larger than the male and is much lighter in colouring. In both sexes the eye is very large and prominent and sexing mature fish is reasonably easy because the male develops a relatively large gonopodium. Both male and female have a large predatory mouth which can open to an incredible size, the common name, Pike Top Minnow, is in fact very well suited to this species.

The pair I purchased were barely an inch long and as they grew it became more and more obvious that the so-called female was, in fact, a late developing male for its anal fin was slowly developing into a gonopodium. It would appear that females of this species need to be two to three inches long before they can be positively identified. My subsequent failure to locate a female prevented me from breeding but I'm told that they produce a large number of young in a brood with the fry measuring up to an inch in length. It would also appear obvious to me that some kind of breeding trap would be needed as I can't imagine the female not attempting to eat her own youngsters.

The next "new" species of livebearer I acquired was the exact opposite to *B. belizanus* and fully grown males rarely reached threequarters of an inch and the females would just manage to top an inch when mature. My first pair were sold to me as mosquito fish and after some difficulty I was able to identify them as *Heterandria formosa*. The name "mosquito fish" can be quite misleading because *Gambusia* species, *Limia* species and even guppies have been called this at one time or another; to call *Heterandria formosa* a mosquito fish is slightly ludicrous because mosquito larvae are simply too big for these tiny fish to eat.

Although this species would have little trouble in surviving the environment of the average community tank it is better kept to itself in a small planted aquarium where it can be more easily seen and cared for. Feeding is no problem and *H. formosa* will take all the usual commercially prepared fish foods, providing they are small enough to be eaten, and thoroughly enjoys an occasional feeding of smaller *daphnia* and newly hatched brine shrimp. Water conditions are relatively unimportant and although this species is quite tolerant of temperature variations, it is best kept at an average of around 74°F.

The male, described as one of nature's smallest vertebrate animals, has a light brown background colour with a very distinct, dark brown bar running from the eye to the end of the caudal peduncle. Below the bar the belly is a light shade of fawn and there are seven to ten verticle stripes going around the top of the fish and joining the bar each side. The male's flanks show an iridescent sheen of green-blue in a favourable light. Apart from a distinctive, dark spot at the base of the male's dorsal fin all other fins, in both sexes, are quite colourless. The female is very similar to the male in both background colours and patterns but the sexes are easily distinguished, the female is larger and the male has an obvious gonopodium.



Heterandria formosa (female)

H. formosa is relatively easy to breed but because of the female's unusual method of giving birth it is difficult to produce large numbers of young fry. All other species of livebearers produce broods all at once and at preset intervals but females of this species give birth to one or two youngsters each day for about two weeks, giving a maximum number of around 25 fry in a month. An adult pair can be housed in a very small tank, the one I used was only two gallons capacity; after two to four weeks young fry will be seen darting around the surface of the water. A cover of floating plants is useful for the fry to hide in although, to my knowledge, no youngsters were ever eaten by their parents. At birth the fry are about the size of a newly born guppy, which is quite surprising considering the diminutive stature of the adults. The fry can be fed on microworms and newly hatched brine shrimp but, although they are quite hardy, they are very slow to grow. There is no need to remove the youngsters from the company of their parents because they seem to grow at a faster rate if allowed to remain in the same tank.

The Blue *Limia*, *Poecilia melanogaster*, is the most recent "new" species of livebearer that I've managed to obtain. I have never seen Blue *Limias* for sale and the fish I had were very kindly given to me by a friend. I've no idea where the fish originated but I ended up with one adult pair and about 30 very young fry.

The Blue *Limia* is, in fact, a very old aquarium favourite and it is indeed sad that such a beautiful and easy to keep fish is such a rarity in these days. In both male and female the background colour is an olive green being darker towards the top of the fish

and lighter towards the belly. The scales are reticulated in adult fish and a brilliant blue to purple sheen is displayed along the flanks of both sexes. In immature youngsters there is a pattern of vertical stripes which, although totally absent in the adult male, never quite disappear from the adult female. The male has an attractively patterned dorsal fin but all other fins, in both sexes, are almost colourless. Sexing is very easy because the female has a most distinctive jet black belly and is larger than the male.

I am told that this species is easy to breed and is very prolific, the females giving birth to as many as 70 youngsters every month. The small fry I had were no trouble to raise taking all kinds of food providing it was small enough to eat; they grew at a relatively speedy rate. The adult pair were housed in a four foot community tank and in no time at all were showing off vivid blue to purple colourings.

My final experience with this species was nothing short of a total disaster. I am still not certain about what really happened and can only assume that a very heavy feeding of *daphnia* was to blame. I had transferred all the fry to the four foot tank as they were almost fully grown after about seven weeks and starting to show adult colours. Three days after doing this I fed a very large amount of *daphnia* to all my fish (this was the first *daphnia* I had acquired since the arrival of the Blue Limias) and the only immediate result was very full bellies all round. About two days later I noticed a couple of young Blue Limias gasping and

swimming erratically near the surface of the water, within a week all my Blue Limias were dead. That the Blue Limias over-ate and died of some form of stomach trouble is the only tentative conclusion I can come to but certainly, if I am lucky enough to acquire Blue Limias again, I shall keep any form of *daphnia* well away from them.

Belonesox belizanus, *Heterandria formosa* and *Poecilia melanogaster* are only three of many livebearing species which were, at one time or another, very popular with



Poecilia melanogaster

tropical fish keepers. Demand for the more unusual livebearers seems to have tailed off in the last few years with the result that they are all almost unobtainable today. Because the aquarium trade is governed by the laws of supply and demand, only the highly coloured and fancy strains of guppy, swordtail, platy and molly are imported and it can only be hoped that this article will be instrumental in creating a small demand for the "new" species of livebearers.

BASIC RULES FOR GUPPY KEEPING

continued from page 616

Lighting has not been as well researched as other factors but it is known that the amount of light and length of day plays an important part in the growth of the fish. It appears that if guppies are raised in a dim light the percentage of deformities is far higher. A satisfactory level of light would be 12-14 hours per day from a 40/60 watt light (this is greatly simplified).

Fortunately the guppy is hardy and not too susceptible to diseases. In my own experience the diseases most likely to occur are the bacterial and fungal rots which affect the guppies' finnage. The use of salt as suggested earlier, will reduce the incidence of disease. If disease does occur then proprietary brands of cures can be used to treat the fish successfully. Probably the most important fact that a beginner must learn is to spot an unhealthy guppy before the disease symptoms take hold. A healthy guppy is very active, the males displaying their colourful finnage in a mating dance towards a female or even another male. If a fish is spotted with fins drooping or lying motionless on the bottom it may be unhealthy. There is a difference between the ragged caudal caused by love or war and that attacked by

fin rot. An unhealthy fish will lack colour and look drab.

A female will quite often develop "clamped" fins and begin a snake-like rocking motion when ill and may also become very hollow bellied. A healthy female's scales should shine and the finnage be extended. One disease prevalent in some strains of guppies is the breakdown of the eggs in the female rendering them sterile. The fish will swell up like a normal female but does not drop fry and may eventually die. If dissected the fish will be found to be full of a yellowish liquid rather than eggs or young.

Finally, population. Guppies are gregarious; at their happiest chasing around in a group. Although they will survive in overcrowded conditions they will tend to suffer as far as quality is concerned. If the fish are being raised as show fish I suggest that no more than ten adults should be kept per cubic foot of water.

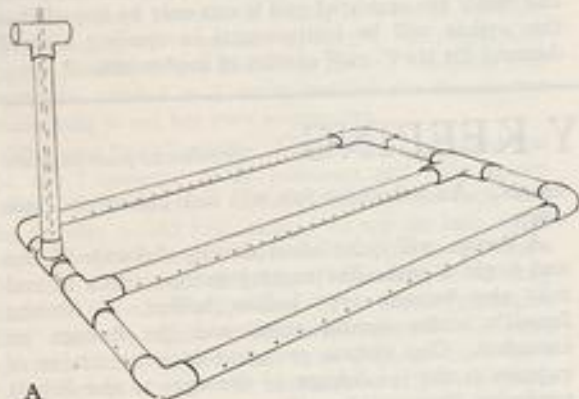
To summarise then, the guppy requires a fresh, well-illuminated environment in which to live, grow and multiply. In the next article I will deal with feeding of guppies.

BEGINNERS' CORNER

(6) FILTERS (2)

by *Bill Simms*

A BIOLOGICAL filter is completely different from the outside, wool and carbon type, for it is placed under the gravel at the aquarium bottom, and has no wool or carbon. The principle is that the sediment is drawn down into the gravel, where the plant roots and bacteria can work on it, and so it is a somewhat more natural method. Because this system feeds and encourages plant life, the effect on dissolved minerals is better than an outside filter, for the plant leaves can absorb minerals.

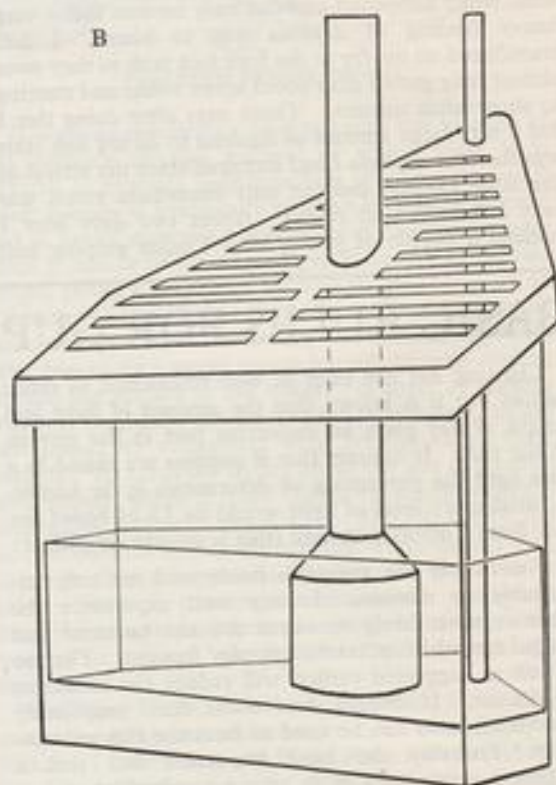


Before anything else is placed in the aquarium a suitably sized bio-filter is laid on the bottom—two 18 in. ones for a 36 in. tank, for instance—and then 2 in. or so of gravel is laid on that. The water filling and planting proceeds as usual, and then the air line from the aerator is connected to the top of the thin air tube up the centre of the larger bore upright tube of the filter—shown on the upper left in the drawing.

When the aerator is switched on a stream of bubbles moves up the larger tube, carrying with it a column of water that pours out of the upper end, and this returns to the tank, aerated, as well as cleaned.

The water that comes up the larger pipe has been

drawn down through the gravel into the holes of the filter at the bottom, and thus circulates constantly. It is best to keep this circulation going all the time,



for then the gravel and bacteria have a constant set of conditions to work in.

Well planted aquariums fitted with a biological filter can remain with practically no water changes for years—so long as there are not too many fish,

Continued on page 623

VIEWPOINT

by A. Jenno

AS PART of my comment in the December issue, dealing with current problems in hatching the present crop of Brine Shrimp eggs, I promised to give the results of further experiments. These may prove useful to others using this method of feeding fry. Alternatives were also mentioned and this point is most easily dealt with first.

Quite simply, there does not appear to be an effective substitute for *Artemia nauplii*. Several foods are good for the fry in conjunction, but without these live offerings the young fishes do not do so well whatever else is used. My other fry foods are Liquifry, peas, Biol, and recently the new Aquarium fry food. These are all of small particle size and are taken greedily by the fishes, but there is not the same development as when at least one daily feed of shrimp is included in the diet. I had a longish romance with micro-eels some time ago, but finally gave up because of the difficulty of entirely separating them from their very rich culture solution, which caused water pollution when the eels were fed in large quantities. Micro-worms are, without doubt, a good food, but to obtain large amounts a number of fair-sized cultures must be kept going in rotation and a stronger stomach than mine is needed to deal with them properly. In terms of final results, necessary equipment and time expended then there is no real alternative at present.

Having made the above statement, the obvious thing to do is to set up a decent hatching programme and concentrate on producing as much Brine Shrimp as is needed. Three basic parameters affect the percentage hatch achieved. These are the temperature and density of the hatching solution, and the amount of aeration injected into it. Temperatures above 70°F are essential and the very best results seem to come at values around 80-85°F. As is well-known, the hatching period is shortened at the higher temperatures and this results in more eggs proving viable, presumably because of some deteriorating influence present in the longer periods connected with lower temperatures. For many years up until the onset of the present differences, I used ordinary "aquarium" salt at a mix of six teaspoonsful per gallon of water, but this has definitely not been enough for the eggs being currently supplied. Measurement with a hydrometer shows this mix to have a density of about 1.015. After experimenting, I would now

suggest a minimum of 1.025 as a more suitable figure and recommend the use of a hydrometer as a more sensible method of achieving the correct mix than reliance on volumetric formulae. Density values between 1.025 and 1.028 do a good job, but above this range we just waste salt. Aeration makes a considerable difference, but the aquarist must experiment in his own container shapes and sizes to find out what amounts these dictate. Generally, we need to promote sufficient oxygenation without stirring up the unhatched eggs, which either float or sink, and the empty shells. This keeps the middle levels free of most debris so that the free-swimming nauplii can be siphoned off in a clean state. A little fiddling soon establishes the required air flow to set up this condition.

Following my conversation with Mr. Holmes of King British, at the Belle Vue Show, I tried various kinds of salt. "Aquarium" salt, i.e., cooking salt—Sodium Chloride, turns out to be as good as anything for practical purposes. New marine water made from a full marine salt mix gives a slightly better hatch, but not a significant improvement when related to the higher cost of the salts. Old marine aquarium water (tinted yellow) gave no better results than the common salt solution and did not last as long. If the aquarist has this available, for instance following routine water changes, then it can by all means be used, but it would not seem worth making up marine water just to hatch shrimps in. I have been trying to get hold of some of the so-called "Rift Valley" salts, but with no success so far. Price may, of course, be obstructive in this case also. Additions to common salt of Epsom and other proprietary types do not seem to make much difference. From the above then, it would seem that the physical condition of the solution, as shown by its temperature, density and oxygen levels, is more important than its chemical composition.

To conclude on this, it should be noted that the comments made only apply to the hatching of Brine Shrimp to obtain nauplii for immediate feeding. It is possible to grow them up into adults, and even to breed them eventually, but this is no easier than raising fishes and demands other conditions which are a different subject altogether.

Readers will no doubt be looking forward to the proposed introduction of new heating equipment with some apprehension. The new regulations appear to make the continuance of the established patterns impossible, and of course any new models and their development will inevitably hit the aquarist where it hurts, in the pocket. It is easy to say that the present immersible glass-encased heaters and thermostats are safe enough, and have an apparently immaculate record over very many years of use by

very many aquarists. The fact still remains, however, that they are a potential danger if smashed in the aquarium or if tampered with while the power supply is still connected. Various compromises are appearing at the moment. The removable bung used in some thermostats at present is surely doomed and the addition of little clips to make present models less easily openable is only a temporary make-shift. The earthed system, which has an internal earth terminal inside the instrument to allow for a fusing function or breakage, is not yet known to be a satisfactory answer from the point of view of those framing the regulations. In fact, at the moment it would seem that none of the present immersible equipment patterns has any guaranteed future.



Mesh divider for saving livebearer fry

Thus it might be instructive to look at what may be possible, in line with both efficiency and simple application. The basic reason for the introduction of the regulations is that the mains supply in Great Britain is definitely dangerous when a person sustains an electric shock. We could therefore offset this by employing a less dangerous supply for our equipment while still retaining the ability to use the mains as the originating source. Isolating transformers offer this facility in that they give an output voltage supply which has the same electrical characteristics as the domestic supply from which they draw their power, but without the same potential for accidental shocks. They are limited to specific output current ratings and so must be obtained in a size suited to the total load which will be applied, but in the case of a home aquarium installation this need not be a difficulty. Price is the main drawback; as an example at the present time the cost of such a unit to provide power up to 200 watts would be in the region of £15-£20. If the aquarist can afford this then all well and good. Certainly hospitals, schools, old people's homes, etc. should consider this kind of protection.

External thermostats would seem to avoid the intention of the new regulations and there is no reason to believe they will need changing. They are expensive nowadays, mainly due to V.A.T., but have an established reputation for reliability and long life, and are very easy to adjust. The biggest bugbear is the heater. It must be obvious that it is far better to heat the water inside the aquarium directly, for the sake of efficiency and simplicity, than it would be to encourage the warmth to find its way in from some external source. Outside heaters have been tried before and have not been able to compete with the inherent advantages of immersible ones. We therefore need a new design for use inside the aquarium as before, but yet which meets the needs of the new regulations, the most troublesome requirement of which at the moment is the need for double-insulation around any parts bearing the mains supply voltage. Materials must be used which are chemically inert and biologically non-toxic, and yet a good rate of heat transfer must be built in. This last property is not usually co-incident with double-insulation.

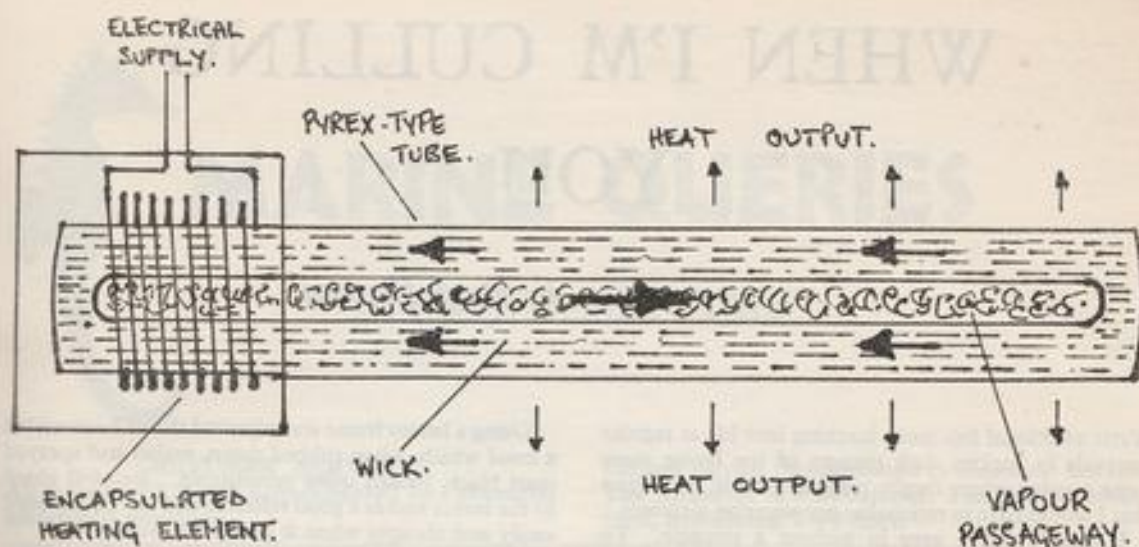
After careful consideration my answer would be a development of the now well-known and thoroughly investigated "heat-pipe" principle. The diagram shows a simple design and its internal construction. The advantage of such a unit is that the heating element does not have to be in thermal contact with the aquarium water because the heat is transferred from the internal hot area to the surrounding medium by



Toadfish

the capillary wick mechanism in the tube. The heating element could therefore be isolated inside a double-insulated end section and there need be no electrical contact with the aquarium even in the event of tube breakage. Heat transfer in properly designed "pipes" is very fast and efficiencies of 90 per cent are common. My understanding is that water can be used as the internal activating agent and that the wick can easily be made of non-toxic material.

The heat-pipe works in the following way. The entire wick is wetted on initial assembly and then



PROPOSED HEAT-PIPE AQUARIUM HEATER.
LARGE ARROWS SHOW LIQUID/VAPOUR CIRCULATION.

sealed inside the tube. On heating one end, a vapour is formed and this passes along the hollow central tube or passageway. At the cooler end the vapour is condensed and enters the wick as liquid which is then returned through the wick's capillaries to the hot end, losing its own heat on the way. Thus a continuous heat transfer circuit is set up around the system as long as one end is hotter than the other, with the acquired heat from the source being released along the tube length to the outside medium.

The above principle, then, ought to allow the design of a new heater whose use would be very similar to current types, whose physical shape and size might not be too different either, and which would appear to be able to meet the requirements of the proposed regulations. Nothing here is new, of course, so perhaps our manufacturers have already looked at this

idea, but it does seem to be one reasonable way of overcoming a difficult problem. It would be interesting to find out whether anyone who is representative of the consumer side of the hobby is being consulted in the talks taking place on this subject.

Photo 1 shows the mesh arrangement for saving livebearer fry (Viewpoint, December), Photo 2 shows a Toadfish (*Opsanus tau*). This is a fascinating creature, and I would be grateful for any information anyone can give on this. At the moment it is kept in a small freshwater tropical aquarium, where it spends most of its time in a large flowerpot and appears to be nocturnal. I have had it about a year and have never yet seen it move of its own free will. I would particularly like to know whether its normal habitat is freshwater or brackish or even perhaps marine? A. JENNO.

BEGINNERS' CORNER *continued from page 620*
and that excessive amounts of food are not fed into the water. I find they do best when the spiral-shaped under-gravel water snails (Malayan livebearers) are used also (in tropical tanks), for these help to keep the gravel moving slightly, and encourage beneficial mulm-eating bacteria.

Another type of internal filter is shown here (B). It fits into a corner of the aquarium, and is tended

like the outside filter described previously. It does not need a return syphon, for the water enters it through the slots in the lid, works through the filter wool and carbon to the bottom, and is there sucked up the central large-bore tube by the stream of bubbles released into the base. Changing the filter wool is somewhat more messy than with an outside filter, and it is smaller, but for small aquariums it can be satisfactory.

WHEN I'M CULLING YOU

by Hugh Dennett

WITH additional fish tanks lurching into life at regular intervals in various dark corners of the house there came a point where family pressures made me realise that I would have to rationalise my aquarian activities.

It wasn't that I gave in without a struggle. To their vehement calls for planned redundancies and axing half of the production units I argued long and hard that the guppies would have to be sabre-toothcarps to withstand the rigours of mixing with the Jack Dempseys, and that if the zebra danios were going to share the same tank as the pair of convicts then at high noon the zebras were sure going to bite the Detritus.

But some tanks would have to go or I was facing a family walkout. My plan, then, was to have just one tank. Large enough to satisfy my present and future requirements, and cheap enough to justify its existence. I decided to make an all-cichlid tank 60 in. x 24 in. x 18 in. as these are, without doubt, the most interesting fish to keep.

Sturdy plants are a must in a tank housing these sorts of fish, but I had no worries on this score as my friend, Harry Wilkinson, promised to let me have a dozen Amazon of a special sort that he had grown on from seedlings. He maintained that despite clean gravel in the new tank and an under-gravel filter with a high turnover and only a 40 Watt four foot tube switched on twelve hours a day, I would get plants to be proud of. His faith was justified in the event and I decided to call them Wilkinson Swords.

Eight pounds secured some second-hand $\frac{3}{4}$ in. glass which was cut to size and with aquarium adhesive at five pounds (!) for four tubes I assembled the tank as per instructions by the adhesive manufacturers. It is very important for this size of tank to have an inch wide strip of glass glued at right angles along a line approximately an inch below the top edges of the front and rear glass sheets to prevent bowing.

Having welding facilities and two old single bed frames available, I made my own angle-iron stand being very careful not to get any distortion as nearly $\frac{1}{2}$ ton rests on it when the tank is full.

Using a batten frame and plywood sheets I assembled a hood which, when rubbed down, sealed and sprayed matt black, looked quite presentable. Bacofol glued to the inside makes a good reflector and can be replaced easily and cheaply when it gets a bit tatty.

Filtering this quantity of water was, I thought, outside the scope of my existing small internal box filters so the idea of a home made under-gravel filter had to be worked on. A 2 mm perspex sheet to cover the whole base area was purchased and was drilled all over at one inch intervals using a $\frac{1}{8}$ in. drill.

Five foot or so of $1\frac{1}{2}$ in. rigid plastic pipe was bought for 65p and two lengths were glued through two holes in the back corners of the perspex so that they ended at what would be the water level. A 90° elbow was fitted to throw the water across the water. The perspex sheet was stood on feet—again using $\frac{3}{4}$ in. lengths of the plastic pipe spaced about every nine inches. An airline was let into both uplift pipes about $\frac{2}{3}$ of the way down and gravel was laid over the whole area to a depth of three inches.

The tank was filled and tested (out of doors), filled again in its permanent position and left for a few days. The filter appeared to work very well using two small pumps on each uplift. Plants and future occupants were added and I was in business. The fish included two Red Devils (*Erythraeum*), two Jack Dempseys, two Jewel Cichlids, a Firemouth and a pair of convict cichlids. Although this sounds like the supporting cast for 'Jaws,' in practice I've found the tank to run fairly smoothly (for cichlids). The convicts have by now reared a brood in one corner in spite of their neighbours and in spite (it might be of interest to note) of the addition to the water three days before the eggs were laid, of a hefty dose of Interpet 'White Stop' for an outbreak of 'ICH'.

So with a tank that has proved to be successful all I have to do now to bring me complete satisfaction is to save up the convict offspring from the next four or five broods, take them down to my local fish shop and watch the look of horror appear on the face of the dealer.



MARINE QUERIES

by Graham F. Cox

READERS' SERVICE

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

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

I have recently purchased a *lunula* and a *kleini* and have a difficult time when I feed them. As soon as they see me, they hide away which makes feeding very hard.

I am afraid to leave too much food in my tank for them because I would be inviting trouble like pollution or a nitrite reading which these fish could not stand.

I would be very grateful for any advice you could give me. These fish are over 2 inches long and were feeding when purchased.

Both *Chaetodon lunula* and *C. kleini* are amongst the hardest of the butterfly fish family. Indeed, these two species, plus *C. auriga* and the Red Sea species—*C. fasciatus*, are the ones which I always recommend to relatively inexperienced marine aquarists considering a first venture into keeping butterfly fishes. However, please note that this is **NOT** the same as saying that these four butterfly fishes are good beginner's fishes! Nothing could be further from the truth. One wouldn't like to see any beginner tackling butterfly fishes until he had at least 3-6 months (depending on his innate, instinctive if you like, fish-keeping ability) experience with such "indestructibles" as the damselfishes, smaller groupers, lionfishes (=dragon fish), squirrel fishes, trigger fishes, etc., etc. Even then, owing to the pronounced tendency amongst fishes of the family *Chaetodontidae* (=the butterfly fishes) to devour with relish a wide variety of invertebrate creatures, no marine aquarist should purchase any butterflyfishes at all* if his system is ultimately destined to contain a living community of fishes, invertebrates and algae (=a complete sea aquarium).

*This may not be wholly true. At the moment I am conducting carefully controlled laboratory

experiments in an attempt to show that Butterfly fishes which have evolved very elongate jaw structures (i.e., *Forcipiger spp.*, *Chelmon spp.*, *Prognathodes*, etc. have these peculiar structures for the express purpose of extracting small crustaceans, etc., from corallin rocks.

*If this hypothesis can be verified, then, since very few aquarists are interested in deliberately culturing micro- and just macro-crustaceans as an end in itself, but are only concerned with culturing the larger coelenterates, echinoderms, hydroids, serpulids, tunicates, sponges, crustaceans, etc. We have here a very interesting group of Butterfly fishes which **can** be cultured in the complete sea aquarium. This would enable us to fill, in a very satisfactory manner, what has previously been a serious "vacuum" in the stocking of the complete sea aquarium.

Incidentally, here also in the interests of accuracy one must define one's terms very carefully. The experienced aquarist will have noted that in the paragraph above I used the generic term *Chaetodontidae*, and not the term *Chaetodontoidae*, since using the latter super-family term would have automatically embraced the entire angel fishes group as well as the butterfly fishes. This would have been grossly "unjust" to the angel fishes since, by and large, they do **not** interfere with any of the more popular invertebrates cultured in the complete sea aquarium.

The factors which could have induced this anorexic condition in your butterfly fishes are as follows:

1. You could be offering the wrong types of food. Few butterfly fishes can resist gamma-ray sterilized frozen seafoods such as mysis shrimps, cockles (still in the shell) finely-grated squid and so on.

2. You might be offering foods of the correct type but in wrong-sized particles. For example, butterfly fishes being essentially "peckers" are quite unable to cope with a one square inch chunk of squid flesh, in the way that say a trigger fish could handle it.

3. The fishes may be terrified of some other occupant(s) of the tank. This state of mind (not uncommon amongst butterfly fishes), would manifest itself in the "butterflies" hanging head-up or head-down in one of the four upper or lower corners of the tank. The only solution to this one is to remove either the butterfly fishes or the "terrorist".

4. The fishes might be diseased or transportation debilitated or suffering from shock. Both the latter two conditions will develop into a disease situation very shortly if you don't quickly create conditions in which the fishes can obtain their essential food and vitamin requirements.

5. The water quality, whilst being adequate for hardier species such as damsel fishes, trigger fishes, etc., may be totally inadequate for the more delicate and demanding butterfly fishes. For example, although you mention that the nitrite content of your seawater is zero, one wonders if you have considered the seawater's temperature, specific gravity, pH value, trace-element content and **not least, nitrate** content. If you have not been effecting regular partial water changes and/or algae-harvesting techniques, you may well have a **nitrate** level in solution which is so vastly greater than that in tropical seawater as to be seriously damaging to the metabolism of the more delicate reef creatures such as butterfly fishes.

I would like to state here that I heartily endorse your expressed refusal to leave foodstuff lying around in your tank in the forlorn hope that something, someday might somehow eat it. Over the years I have met many "sloppy feeders" of this genre. After a few months they have always left the hobby, their tanks having suffered a massive epizootic explosion of flukes and copepods which wiped out their entire stock. Henceforth, instead of swelling the ranks of successful marine aquarists who routinely

keep their fishes for years rather than months, they spend the rest of their lives "bad-mouthing" the hobby and the trader who introduced them to the marine hobby and classify all forms of marine-life as "impossible" to culture.

Having now read your letter through twice more, I would offer you the following advice:

A. Carry out a 50 per cent water change in your *empty* (i.e. of livestock) hospital/quarantine tank. The tank must, of course, be empty of all life-forms at the time you do this, since such a massive up-grading of water quality so suddenly effected would induce instant *osmotic shock* in any unfortunate inhabitants of the aquarium.

B. Net and bag-up the two butterfly fishes and gently transfer them to the reserve tank. Since the difference in water quality between the two systems will now be substantial I strongly recommend that you spend at least half-an-hour with an egg-cup (or similar small-capacity, non-toxic container), making small additions of the tank-water to the bag-water at 2-3 minute intervals in order to prevent the risk of osmotic shock as outlined in A above.

C. Commence a month-long period of *intensive feeding* (N.B.: this term should *NOT* be allowed to equate with *over-feeding*) to allow both fishes to regain their full vigour and viability. Carry out any medication programme(s) which the fishes' condition may dictate during this period.

D. If you feel that condition (3) above might be valid, bag-up the offending occupant(s), and remove to the hospital/quarantine tank.

E. Replace the now fully-recovered butterfly fishes into your show-tank, remembering to take all acclimatisation precautions listed above as when first removing them. Now give the butterfly fishes 2-3 months in which to fully establish themselves in your show-tank.

F. Finally, replace the erstwhile aggressor(s) into the show-tank.

However, should chaos and confusion break out again, you will have no options other than disposing of the butterfly fishes or the aggressor(s).



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PRODUCT REVIEW

Aqualonic Filta-Bed Undergravel Filter (complete with air line), manufactured in the U.K. by Aqualonic Engineering, and distributed by Hillside Aquatics, 29 Dixons Hill Road, Welham Green, Nr. Hatfield, Herts., AL9 7EF. Four sizes are available: 17 in. × 9 in.—96p plus 8 per cent V.A.T.; 23 in. × 11 in.—£1.08 plus V.A.T.; 26 in. × 11 in.—£1.20 plus V.A.T.; and 38 in. × 11 in.—£2.04 plus V.A.T. (The manufacturers will make any size to order at ½p, plus 8 per cent V.A.T., per square inch).

Mr. Eric J. Small, BVA/PTA Dip., Proprietor of Hillside Aquatics, provided the following information: "... The Aqualonic Filta-Bed is an undergravel filter of quite revolutionary design. There is no ugly air lift tube, which means the amateur's tank has a better appearance; and there is no tube to get in the way of a net when fishes are being caught in the shop. For anyone having a tank with abnormally deep gravel or coral sand, extension blocks are available which can be clipped on to the air lift part up to any height desired. Even with a low powered pump the turn over will be adequate for the size of tank. If they are used in marine tanks then a better quality pump should be used. The manufacturers inform me that with a Wisa 300 pump the 17 in. × 9 in. Filta-Bed gives 90 gallons per hour turn over. The Filta-Bed is fairly robust, but if you hit it with a hammer, or tread on it, the part that is crushed will be defective—although it will not affect the rest of the filter." (Most filters wouldn't function at all if they received a bang with a hammer or were trodden upon by a foot).

The 17 in. × 9 in. sample I received for this review shows the item to be composed of a "hard", green-coloured, synthetic foam. This size comes in three sections or plates, each of which has a series of tunnels underneath. A rectangular block of the plastic foam is fitted to one plate. It is about 1½ in. deep × 2 in. broad × 3 in. long; into the end of it is sealed the air line supplied with the filter. The tubing is about 1½ ft. long. There is a narrow hole on top of the air lift block and when the air line is connected to a suitable pump, a stream of bubbles emerges from this hole.

Out of interest I tried to submerge the filter plate under water without any gravel covering them. I found, as expected, that they were extremely buoyant

—because of the thousands of air bubbles trapped inside; and I found it impossible to get them to sink. This filter obviously requires a reasonably heavy level of gravel/rocks to keep it in position. (Obviously all undergravel filters need to be covered with enough gravel to make them function effectively and efficiently).

I tested the filter in position, covered with an appropriate layer of gravel, and it appeared to do an effective job in keeping the aquarium water clean and aerated. The thin, green air line was barely visible in the tank—unlike the sturdy tubes supplied with some brands of undergravel filters. Certainly the design is original. Component plates making up a single filter are connected using rubber bands; but these may be dispensed with. I found that a good layer of gravel kept the plates in position. (The manufacturers recommend at least ¼ in. of gravel; I used about 2 in.)

Aqualonic give the following as features of their new filters: (1) Helps to maintain good water circulation. (2) Avoids large tubes in the aquarium. (3) Full range of sizes to suit most tanks. (4) Each filter supplied with correct size of air lift.

Although, personally, I prefer outside filters, the Aqualonic Filta-Bed Undergravel Filter is original in its design and appears to be efficient as well as being very easily concealed from view in the aquarium.

Nuova Turbinette Power Filter, manufactured in Germany, and jointly distributed by Fantasy Pet Products Ltd., 13 Nutley Lane, Reigate, Surrey, and Hillside Aquatics, 29 Dixons Hill Road, Welham Green, Nr. Hatfield, Herts. Retail price—£19.20 plus 25 per cent V.A.T., i.e. £24.00.

Although they are not new on the British market, I was pleased to take up an opportunity to review the three Nuova power filters available—starting with the cheapest of the three, the Nuova Turbinette. (I hope to review the two more expensive models in future editions).

The Turbinette's body is constructed of rigid, green plastic, with the motor unit fixed on top (see photograph on page xxiv of the November 1975 *Aquarist*). The round body of the filter is approximately 5 in. in diameter at the top, tapering to about 4½ in. at the

bottom; it is about 9½ in. tall. With the lid and motor unit in place the unit is approximately 12 in. high from top of motor to base of container. There are provisions for two inlets. An additional length of tubing and inlet strainer are required if one wants to use both inlets; however, I found that I got a very good water turn over with only one inlet in use. There is one outlet which returns the filtered water to the aquarium. This terminates in a spray head which, using a variety of pieces of tubing and connectors, one can position wherever desired in the aquarium. The lid of the unit is held on firmly by four small, metal clips.

Water is drawn out of the tank by the inlet(s) siphon, down to the bottom of the filter body, and up through the filter wool, etc. Clean, filtered water is returned to the aquarium from the top of the filter.

The plastic used is of the best quality—the same as is used for giving blood transfusions by the medical profession. The specifications supplied with the Turbinette are as follows: output—66 gallons per hour; total contents—0.6 gal.; filter material capacity 0.5 gal.; depth of filter material 8 in.; motor—25 watt, 2,200 rev. per minute.

In use I found the filter to be very quiet and very efficient. It started without any bother when first set up and has, over a two month period, always started at the first flick of the mains switch. The unit was fitted with approximately 3 ft. of two core cable. (This was long enough to reach the power point I used, but a longer length would probably be useful to a larger number of aquarists). Because of its efficiency I found it helpful to change the filter wool at regular intervals. Obviously the need to change the filter wool will depend upon the state of the aquarium being filtered, and upon the types of fish being housed.

I was most impressed by the Turbinette and found that, with only one inlet connected, it kept a 30 in. × 15 in. × 15 in. tank very clean indeed—and the water circulation was excellent, giving an even temperature spread. I would certainly recommend this power filter as quiet, very efficient, apparently very reliable, and small enough to conceal easily. Its price is also reasonable by today's standards.

Aqualonic Aquarium Air Diffuser, manufactured in the U.K., and distributed by Hillside Aquatics, 29 Dixons Hill Road, Welham Green, Nr. Hatfield, Herts., AL9 7EF. A patent has been applied for.

Aqualonic have recently introduced an interesting concept in aquarium diffusers: a diffuser that doesn't consist of an air "stone" as such. The diffuser consists of a firm, synthetic, foam-like sponge substance—for want of better words; or, rather, correct terminology. This pale green coloured substance is set into a brown plastic base, which covers its bottom and its two sides—leaving the top exposed.

The ends of the "sponge" are sealed with a colourless sealant; and from one end protrudes the knob on to which the airline fits.

Mr. Eric J. Small, B.V.A./P.T.A. Dip., proprietor of Hillside Aquatics, supplied the following information about the diffuser: "... A special method of sealing the unit has been used so that there is no danger of any air leaking out at the sides. A plastic cover surrounds the lead weight inside, so that even if water entered the inside somehow, a marine tank would be completely unaffected." The Aqualonic Aquarium Air Diffuser is available in two lengths: 6 in. costing 60p plus V.A.T., and 12 in. costing £1.00 plus V.A.T. (at 8 per cent). Of the 6 in. model Mr. Small says: "It does not need a powerful pump to operate it;" and of the 12 in. model: "It has all the attributes of the 6 in. model, is eminently suitable for marine tanks, and again does not require a very powerful pump to operate it properly..."

I tested the 6 in. diffuser first, in a 12 in. deep aquarium, using one of my favourite air pumps. The Aqualonic Diffuser gave a good stream of bubbles along its length. The bubbles were rather larger than I had expected and gave a good circulation of the aquarium water. With no pull on the airline I used, the diffuser remained settled on the gravel of the aquarium. (I thought it might tend to float but it showed no tendency to do so). The 12 in. diffuser, tested with the same pump and in the same aquarium, gave a good spread of large bubbles along its full length, producing excellent water circulation. Again there was no tendency for the air-filled diffuser to rise from the base of the tank; obviously the lead inside was of an appropriate weight. I raised each end of the long diffuser, in turn, and noted that the end nearer the water surface always tended to release much more air than the lower end—as is to be expected. However, the diffuser is designed to operate in a horizontal position—and it did so well.

Both 6 in. and 12 in. models seem to be soundly constructed and should give a long life expectancy. Both are well sealed and there were no signs of leaking air. I was strongly tempted to take one of the test samples apart to see its inside design, but I resisted the temptation as I didn't want to destroy one of these sturdy units—and I feel I would have served no useful purpose had I done so. Both long diffusers gave an attractive cascade of bubbles along the back of the tank—a cascade rather like a waterfall in reverse. In both instances the dancing curtain of bubbles made a scintillating picture when caught by the aquarium light.

The practical and aesthetic aspects of these new diffusers should make them popular with both freshwater and marine aquarists. Their original design makes them both practical and interesting. A good, new product.

B. WHITESIDE, B.A., A.C.P.

From a Naturalist's Notebook

by Eric Hardy

DURING 1976, the European Information Centre for Nature Conservation is to devote its publicity to the conservation and management of wetlands, a stimulus to international organisations to take more interest in water, even man-made wetlands like gravel-pits. Four new postage stamps in Leichtenstein depict declining wetland species: the freshwater crayfish, the European pond tortoise (*Emys orbicularis*) the otter and the lapwing. Meanwhile, Seethaler Lake in Austria has become a reserve for its important aquatic vegetation and micro-organisms, and Norfolk Naturalists' Trust is establishing a £50,000 conservation centre at Ranworth Broad.

Water life receives scant mention in the Countryside Commission's three new editions of guides to the Lake District, Peak District and Northumberland national parks, which otherwise give the visiting public a broad introduction to the geology, history, archaeology and ecology of these regions. Northumberland (128 pages, HMSO 95p) mentions the rich aquatic vegetation of Crag Lough, one of the county's few haunts of shoreweed, white, slender and bottle sedges, mare's tail, bogbean, smooth hoosetail, marsh-cinquefoil and speedwell, and various mosses. The hybrid yellow waterlily grows in Chartner's Lough in Harwood Forest. A recently new spike-rush on the British flora, *Eleocharis austriaca* grows in silted areas of the Rede near Byrness and of the North Tyne near Falstone and Kielder Burn; but the rare bog sedge *Carex paupercula* is the last survivor of several rarities which made Muckle Moss famous. The latter grows also on Trawsfynydd moors in Merioneth and used to be at Knock Hill, Fife; but it is not now on Vicarage Moor, Wrexham, though books still quote this for Denbighshire. *Eleocharis austriaca* also has two colonies by a gravelly backwater below a steep bank at Tima Water, Selkirk.

No mention is made of Northumberland's haunts of caddis-flies and other aquatic insects of anglers' interest: Crag Lough, Bolam Lake, Plessey Woods near Stannington Bridge, Sweethope Lough and Whitfield Lough.

The Lake District guide (157 pages, 85p) also pays some attention to waterlife. Though slow in its colonisation, the goosander does nest in the national park, at Hawes Water and in 1975 bred on Dove's Tarn above Brotherswater.

Much of the natural history in these guides seem intent more on giving readers a lesson in ecology of

common things and landscape history than telling them where to find plants or animals they can't see near home. In the Peak (87 pages, 90p) for instance Prof. Piggot's natural history chapter gives no indication of why Coombs and Goyt reservoirs attract bird-watchers or where lists of mayflies, stone flies and caddis-flies greatly interest angling visitors: Monsal, Lathkill and Bradford dales, Cordwell Valley, Longshaw Lake, Padley Wood and Bretton Clough for instance. The work and publications of the Peakland Archaeological Society are notable omissions, though others are listed.

With further reference to East Anglia's aquatic plants, the possibility of the American pondweed *Hydrilla* or *Elodea nuttallii* (first found in Lakeland's Esthwaite Water in 1914) growing in the Fens depends upon confirmation by flowering. Claimed at Werrington, near Peterborough in 1974, the plant is more abundant than common *canadensis* in the Welland basin of South Lincs and Cambridgeshire, down to Crowland, and the River Nene in Cambridgeshire. It flowers in several places near Oxford, mostly from aquaria origins. It has light green, narrow, tapering shorter leaves than the similar *E. ernstiae* (*callitrichoides*). First found in Longford River, it is spreading in the London area, and in Southeast Lancashire. Its smaller female flowers differ from the flowerless plants of Esthwaite and Renvyle, Connemara, with more finely pointed leaves in whorls. Sterile plants grow in the Medway below Maidstone.

Mid November seems to be late for a large brown *Aeschna* dragonfly still to be on the wing in the north, but one was flying at the lily-pond in Croxteth Park, Liverpool.

Water soldier (*Stratiotes*) is mainly an East Anglian plant, bordering the dykes of Upton Broad; it grows in the Cambridge fens but not now at Wicken Fen apparently. Elsewhere it is often introduced to waters by aquarists and soon increases vegetatively. Many such plants were crowded this winter with seed capsules in a west Cheshire pond by the field-path between Fornell's Green behind Meols, in Wirral, and New House Farm, parallel with Heron Road below Three Lanes End, will not set fertile seed because all the plants, which flower regularly in July, are female and such seeds are sterile. It increases solely by offsets from introduced plants. I don't consider it to be native here in the northwest, as it is

in more calcareous districts but it has been around Wirral ponds for 200 years.

Some of the small prey of freshwater fishes hide safely among its spiny leaf-axils, but it is more troublesome when it soon becomes excessive, filling a small pond where dying plants don't easily rot away, but silt up a water. The ripe egg-capsule is reported not to have been found in Britain. After flowering this plant sinks to the bottom for the winter, rising to the surface again late the following spring, where it floats freely with its stiff, saw-edged leaves, but it also lives submerged.

Common *Elodea canadensis* isn't known to produce seed wild in Britain, though introduced into Ireland and Cambridgeshire well over a century ago—a pond at Dublin and another near Cork in 1836, 1842 at Berwick and shortly afterwards in an arm of the Grand Union Canal at Market Harborough where American timber was unloaded. Though still widespread, it is no longer the "Babbington's curse" of pre-first world war botanists. Waterfowl are its main distributors, though barges contributed a lot to its earlier dispersal.

A real collector's piece among students of British water-plants is A. Fryer's "The Potamogetons of the British Isles" with hand-coloured plants, selling originally at £55, and worth grabbing today at twice that sum.

At the time of writing, British Museum zoologists have made a timely debunking of sweeping assumptions published about the fictitious Loch Ness "monster" based upon underwater photographs attributed to a team from Boston Academy of Applied Science. None of the photographs, stated the B.M., is sufficiently informative to establish the existence, far less the identification, of a large living animal in the Loch. Too many self-publicists in natural history have taken advantage of the wave of interest created in Loch Ness to make entirely unfounded and uninformed claims. As the later Prof. Ritchie of Aberdeen stated in the "monster's" pre-war resurrection from history, there may be some animal, or animals, in the loch which haven't been seen well enough to identify; but that doesn't mean it is anything unusual to the loch. But of course, truth doesn't sell newspapers or always make the best TV story; the media's craze today is for a "story," not information.

When Chester Museum first exhibited its pictorial map of northwestern whale (cetacean) strandings, in 1963, I pointed out to a member of its staff a mistake in the date of the rare Risso's Dolphin or Grampus stranded in the Mersey in Widnes which was in December 1939, not 1940 as the exhibit showed. I ought to know because I was the only naturalist to examine the whale there and I deposited a set of photos in Liverpool Museum; I wrote an account in the Liverpool press that week, and an account in the

scientific journal *Nature*. Apparently they got the wrong date from the mistake which the British Museum (Dr. Fraser) admitted was in their report on stranded whales. But that was 12 years ago, and Chester Museum still had the wrong, unaltered and misleading date on their public exhibit this winter, an astonishing lapse through lack of local experience and liaison. They did correct the arctic tern wrongly labelled common tern in an exhibit set up at the same time in 1963, but seem to blindly follow a misprint in the B.M. cetacean records without adequate contacts in their own area.

CORRECTION

In Naturalist's Notebook of January, 1976, reference was made to the emptying of household toilets at Hinkling Broad, Norfolk. We wish to apologise to the manufacturers of Elsan products for the use of their name in this connection especially since that company has taken steps to ensure that the end result of its treatment processes are environmentally compatible and biodegradable. Indeed, it has been very active in research and development work aimed at preventing water pollution and protection of the public health. Their products are widely used by the world's airlines, by Governments, Local Government and a very wide range of discerning users. It is hoped that further details of these successful endeavours by Elsan Ltd. will be revealed within these notes in an early issue.

BOOK REVIEW

Natural Life of the Barrier Reef by Walter and Jean Deas.

Apart from an introductory chapter which deals with the geological and biological development of the Barrier Reef and its attractions for the visitor, the book is a pictorial summary of the typical inhabitants of the area.

Walter Deas is an instructor and guide at holiday resorts in this part of Australia and is also an accomplished underwater photographer. The selection of superb colour photographs which make up the majority of this volume show the marine life in its natural habitat and includes especially good shots of various invertebrates such as corals, sponges and other stationary specimens.

The book is not intended primarily for aquarists, but will prove interesting in that it shows us how some of our favourites live in the wild and may give us ideas towards improving their life in captivity.

Published by Robert Hale and Co., Old Brompton Road, London SW7 3JU. 31 pages, 52 colour photos, publisher's price £1.60.

A. JENNO.



News from AQUARISTS' SOCIETIES

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

NEW officers and committee of the Bradford & District A.S. are as follows:—President: K. Avison; Vice-President: D. Sugden; Hon. Secretary: A. Fisher, 2 Sherborne Road, Idle, Bradford, W. Yorks; Treasurer: A. Daugherty; Show Secretary: J. Cornforth; Publicity Officers: L. Garenby and A. Herberts; Committee: D. Woodcock, J. Barford, P. Clapham, R. Hainsworth, R. Stanfield.

AT the end of last year Riverside A.S. organised an outing to see Dick Whittington on Ice for their members' children. One week later on a club evening it was the turn of the parents to enjoy themselves. Mr. P. Tomkins, chairman of the F.B.A.S. thanked all those who had helped with the evening, and Mr. R. Hason, president of the club presented members with the awards won by them during the year.

Officers for this year are as follows:—Chairman: J. Nethersell; Treasurer: W. Nethersell; Show Secretary: G. Biggs; Asst. Show Secretary: D. Lambourn; Secretary: Mrs. M. Nethersell, 13 Greyhound Rd., Hammersmith, W.4; P.R.O. M. Goss; Social Assistant: R. Newman.

THE Fancy Guppy Association (North West Lancs. section), held their annual general meeting in January when the chairman, Mr. J. Hinchings, outlined an interesting programme for this year. Meetings are held monthly on the third Sunday at 2.15 p.m. at St. Margaret's Church Hall, Tag Lane, Ingot, Preston, Lancs. New members will be very welcome. There are fish to view and refreshments at all meetings. Please contact the secretary, Mrs. J. Ilton, 3 The Dell, Fulwood, Preston, Tel. 718868.

IN December the annual general meeting of the Welwyn Garden City A.S. was held when the following committee were elected:—Chairman: P. Bolin; Secretary: E. Swift; Treasurer: P. Sweet; Show Secretary: S. Turner; Programme Secretary: L. Pitts; Publicity Officer: B. F. Viduan; and the club Junior Representative J. Malone.

Early in February the "Fish of the Year" Competition took place between club members. This was judged by Mr. Sweetman and his assistant. First and second places were taken by the Club Treasurer, P. Sweet and third place went to D. McCrystal. While the judging was taking place, D. Pitts gave members a talk on keeping Gouramis. This was followed by W. Day who told the story of how fishkeeping developed in his home. Members were pleased to welcome seven visitors who it is hoped will eventually become regular members.

OFFICERS of the Malvern & District A.S. for the current year are as follows:—Chairman: J. Walton; Secretary: G. W. Roan, 6 Chester Place, Malvern, Worcs.; Treasurer: J. Mason; D. West and D. Grinnal.

A WELL attended January meeting of the New Forest A.S. was entertained to a Colour Slide Lecture on "Practical Aquarium Maintenance" by C. Harrison, produced by the F.B.A.S., it was of good quality, and all members, even beginners, felt they had learned much, on how to fit and service their own aquarium equipment. Table Show Result: Class B: M. Asst (Combustible). Meetings are held on the third Monday every month at 7.45 p.m. Visitors and new

members most welcome. The secretary is R. Travers, 6 Auckland Avenue, Brockenhurst, Hants. SO4 7RS.

THIS year the changes in officers for Leicester A.S. are as follows: President and Treasurer: B. Peal; Hon. Vice-President: E. Colver; Chairman: J. H. Williams; Secretary: Mr. and Mrs. R. Martin, 2 Avocetale Road, Wigston Fields, Leicester; Show Secretary: M. Whitham, 5, Grantham Road, Leicester.

Stroud and District A.S. annual dinner held in January was as in other years a great success. Mr. Amor, chairman, thanked all members for their help in 1975 and for making the Open Show one of the best yet. The Society will be 25 years old this year. Mr. Tindell, president, thanked Janet and Geoff King for all the work they had put into the Society and after the dinner and toasts the awards were presented by Janet King and are as follows: Beck Cup: 1975 G. Tindell, 1976 C. Whitaker. Runner-up Beck Cup: 1975 A. Bainbridge, 1976 G. King. Junior Cup: 1975 S. Amor; 1976 A. Hodges. Ladies Cup: 1975 S. Cole; 1976 D. Cole. Special Aquarium: 1976 C. Cole. B.A.R. Award: 1975 J. Cole; 1976 T. Owen. Tindell Shield: 1975 N. Hyett; 1976 C. Hodges. Chairman's Special Award: C. Whitaker. Best Fish: C. Whitaker.

IN January the Goole and District A.S. held their annual general meeting and officers for the coming year were elected as follows:—Chairman: R. Pullen; Secretary: Miss M. Coates, 8 Hull Road, Howden, Goole DN14 7AH; Treasurer: R. Carr; Show Secretary: P. Hutton, 9 Hood Grove, Goole; Programme Secretary: Miss M. Coates.

THE December meeting of the Retford & District A.S. was enjoyed by all who participated in a Quiz arranged and presided over by Mr. J. Jones and Mr. E. Neville of Geantham A.S. The fish were judged by Mr. W. D. Gilding. Results:—Large Barbs: 1 and 2, Mr. and Mrs. B. Chester; 3, Mr. and Mrs. A. J. Steels. Small Barbs: 1, 2 and 3, Mr. and Mrs. J. Brett. Guppies: 1, Mr. and Mrs. B. Chester; 2 and 3, Mr. and Mrs. J. Brett. Juniors: 1, 2 and 3, Master S. White.

THERE was a good attendance at the annual general meeting of the Bristol A.S. Mr. S. Lloyd was again elected as President. Other officers are:—Treasurer, Mr. C. Lloyd and Secretary: Mr. V. Cole, 10, Hardwick Close, Brislington, Bristol 711286. A question and answer session revealed that angels, neons, swordtails and catfish were probably the most popular Tropical Fish. The secretary is V. Cole, 10, Hardwick Close, Brislington, Bristol 711286 and the society meet on the second Monday in the month at 7.30 p.m. at the Bishopston Parish Hall, visitors welcome.

THE first annual general meeting of the Kingsclere and District A.S. was held in December. Before elections were held members expressed their sincere appreciation for the efforts of the officers during the Society's first year. The following officers were unanimously elected to serve for one year:

President: J. Perry; Chairman: R. Orslow; Secretary: E. Mouldley, 11 Knowle Crescent,

Kingsclere. Telephone Kingsclere 298748; Treasurer: M. Shore; Table Show Secretary: A. Stepp; Shop Manager: M. Shore; F.B.A.S. Delegate: R. Orslow.

Results of the Table Show for Class H were as follows: 1, A. Stepp; 2, M. Shore; 3 and 4, E. Mouldley. The meeting closed with an open invitation to all prospective members to attend any future meetings. These are held at "The Crown," every-other Tuesday evening, commencing at 8 p.m. Anyone is welcome to come as a visitor or a prospective member.

OFFICERS elected at the Runnymede A.S. annual general meeting were as follows: Chairman: H. Nicholls; Secretary: P. Cairn, 1 Muncaster Road, Ashford TW15 2HL; Treasurer: J. Shepherd; Show Secretary: T. Butler; Social Secretary: P. Grosvenor; P.R.O.: L. Duke; Floor Member: Carol Butler.

CHANGES of officers made at the annual general meeting of the Bath A.S. were as follows: Chairman: D. Phipps; Secretary: K. Owen, 8 St. Michael's Road, Whiteaway, Bath, Avon; Treasurer: B. Webb; Committee Members: C. Phipps, T. Fowler, C. Russell, N. Owen and R. Clark.

THERE was a good attendance at the January meeting of the Stroud and District A.S. to hear guest speaker, Mr. Bishop, a judge from the Severnside Aquarist Association give a talk and display of Setting up a Show Furnished Aquarium, Best tank size, Plants and Rocks. The chairman welcomed new members and the winners of the cichlid competition were 1 and 2, T. Owen; 3, I. Willey.

THE following committee was elected at the annual general meeting of the Billingham A.S. Chairman: D. Sudron; Asst. Chairman: A. Harrison; Secretary: J. Ryan; Asst. Secretary: B. Urwin; Treasurer: Mrs. B. Urwin; F.B.A.S. Rep: J. Ryan; Show Secretary: D. Anderson; Asst. Show Secretary: Mrs. J. Binks. Committee: Mr. Kane, Mrs. Richardson, B. Steels, R. Roper, P. Hall, Mrs. Anderson, R. Wrightson, G. Smith, P. Kane.

OFFICERS elected at annual general meeting of the Mid-Sussex A.S. were as follows: President: D. Soper; Chairman: R. Johnson; Vice-Chairman: N. Short; Secretary: B. Slade, Sundown, Arntsey, Haywards Heath, Sussex; Treasurer: R. Young; Show Secretary: B. Burles. Committee members: P. Berry, C. Corbin, A. Temple, D. Stone. Other posts appointed: Membership Secretary: J. Birch; Chief Steward: C. West; Editor: D. Stone; P.R.O.'s: T. and S. Tester.

DUE to a very successful open show, the treasurer of the Bournemouth A.S. reported that the club has now found itself in a very good financial position.

A new chairman and committee were voted in this year as the old officials stood down. The new chairman is, Mr. J. Jeffery, and the new committee members are: B. Bebb, B. Coombs, K. S. Gibbs and Mr. Walker. The new librarian is P. Brown. A vote of thanks was recorded to Mr. Walker (ex-chairman) and the former committee members. Table show results: Platys—1, Mr. Bebb; 2 and 3, Mr. Walters.

OFFICERS elected at the Norwich and District A.S. annual general meeting were as follows: Chairman: R. Watts; Treasurer: Mrs. Williamson; Secretary: N. Newby, 125 Witood Road, Heavitree East, Norwich

NRT 9XG. Committee members: N. Keeler, M. Shambrook, T. Cork, D. Cooper, B. Read, C. Williamson, L. Newby (to represent junior members).

MAIN business at the annual general meeting of the **Taunton & District A.S.** was the election of a new committee as follows: Chairman: S. Pearce; Secretary: D. Curry, Flat No. 1, The Square, Wivelcombe, Taunton, Somerset; Vice-Chairman: Mr. O'Neill; Treasurer: E. Pallant; Trophy and Show Secretary: M. Pratt; Public Relations: R. Hagley; Social Secretary: M. Bray; Club Judge and Show Manager: M. Bray assisted by S. Pearce. Also elected to office as Committee members were D. Fox-Spencer and Mr. Earnshaw.

A Club finance report was given by Mr. Pallant which showed that the bank balance is now in a better condition than it was at the same time last year due in part to the increase in membership.

COMMITTEE details of the **Village A.S.** for this year are as follows:—Chairman: F. Thorne; Treasurer: J. Dobson; Show Secretary: D. Lee; Committee and P.R.O.: B. Butserworth; Secretary: F. E. Ansell, 66 Churchill Crescent, Redditch, Stockport. Club meetings at 8 p.m. the second Tuesday of every month.

AT their January meeting the **Rainford & District A.S.** welcomed Mr. Thompson of Merseyside A.S. who gave a first class lecture on furnished aquaria and how to photograph them. Many slides were screened, and a collection of cameras and floodlights were on display. A most interesting evening and one which is recommended to other nearby societies. Meetings are held every third Monday of the month at the Junction Hotel, Rainford. Telephone 074 488 3635 for details of next meeting.

IN January the **Whiteway & District Fishkeepers Society** held their annual general meeting, when the following officers were elected:—President: L. Emery; Chairman: K. Overment; Vice-Chairman: R. Hammett; Secretary: S. Daniels, 21, Haycombe Drive, Whiteway, Bath BA2 1PG, Avon; Treasurer: D. Overment; Show Secretary: Mrs. E. Daniels; Committee Members: Mrs. M. Grogan, Mrs. L. Calley, R. Fielding, G. Jennings, G. Holloway, D. Bradley, S. Bransgrove, D. Calley, Master D. Sullivan.

OFFICERS elected for **Walthamstow & District A.S.** for this year are as follows:—Chairman: D. Goodbody; Vice-Chairman: A. Wigold; Secretary: G. Smith, 22, Ardleigh Rd., Walthamstow E17; Treasurer: A. Chandler; Show Secretary: J. Twine; Committee Members: W. Cook and W. Wigold. Meetings are held at the Grange Community Centre, Frederic St., London, E17 at 8 p.m. on the first Friday and third Wednesday of every month. New members always welcome.

THE January meeting of the **Gloucester A.S.** was the first meeting to be held on the new premises at the Chequers Bridge Leisure Centre, and was attended by about thirty members as well as a few new faces. In an attempt to break away from the normal idea of a speaker on a specific subject each month, members and visitors alike were invited to try their hands at judging a selection of fish brought along specially for the evening and then to compare their results with those given by another member of the club who is a Severnside Judge in the classes which were on the table.

This departure from the usual programme was enjoyed by all who took part even though marks

given by different people to the same fish varied widely. It was also felt that it helped to give people who show fish or who attend shows an insight into the problems faced by Judges.

MEMBERS elected to the committee at the annual general meeting of the **Abingdon A.S.** were:—Chairman: A. Watson; Treasurer: Miss D. Gospeon; Show Secretary: D. Higgs; Librarian: J. Humphreys; Outings Liaison: P. Carey; Secretary/F.B.A.S. Rep.: D. Blundell, 23 Welford Gardens, Abingdon, Oxon OX14 2BN. Meetings are held on alternate Thursdays (next meeting 4th March) in the "Barley Mow," Lombard Street, Abingdon from 8 p.m. Forthcoming attractions will consist of a series of F.B.A.S. Tape/Slide Lectures, Table Shows, auctions and friendly advice.

THE **Preselly Tropical Fish Society** held their first open show at the "Lord Kitchen" Millford Haven in January, and for such a young society it was well attended. Prizes were won by: 1, P. Busby (Pearl Gourami); 2, R. Rowland (Marble Angel).

OFFICERS elected at the annual general meeting in January of the **Port Talbot & District A.S.** were:—Chairman: J. Igan; Vice Chairman: Mrs. S. Callister; Secretary: D. Nicholls, 8, Dolphin Close, Sandfields, Port Talbot, West Glam.; Treasurer: A. Callister; Show Secretary: A. E. B. Fouracre. Meetings are held fortnightly on Tuesdays at the Talbot Youth Centre at 7.30 p.m. (March meetings on 9th and 23rd). Visitors and new members always welcome.

AT the two society meetings in January of the **Kingsclere and District A.S.** members were given a detailed talk on Showing Fish by R. Onslow. A large library was formed and put to good use by many members. A trip to various tropical fish shops was arranged using a mini-bus donated by one of the members for this trip. Results of the Table Shows were as follows:—Class M; 1 equal, M. Shore; 2, M. Moulsey; 3, E. Moulsey. Class D; 1, A. Lawson; 2, E. Moulsey; 3 and 4, W. Cornick. Two new members were welcomed, and meetings are held on alternate Tuesdays at 8 p.m. in "The Crown," Kingsclere. A special welcome is extended to all prospective members for the meeting on 9th March for K.B.A.S. Aquatalk No. 6.

AT the annual general meeting of the **Slough & District A.S.** the following officers were elected to the committee:—Chairman: R. Knight; Vice Chairman: M. Colgate; Secretary: E. Knight, 52 Aldin Avenue South, Slough; Treasurer: B. Withers; A. Appleton; J. Pilkington, S. Withers, R. Winter. The next meeting will be on 17 March at the Friend's Meeting House, Ragnone Road, Slough. All enquiries to secretary at above address.

THE following officers were elected at the annual general meeting of the **Dewsbury and District A.S.**:—President: E. Hemingway; Vice-President: D. Farrar; Treasurer: A. Wheeler; Secretary: J. D. Scatchard, 72 Moor End Lane, Dewsbury, West Yorkshire WF13 4PD. Telephone: Dewsbury 402510. Show Secretary: D. Farrar; Librarian: C. West. Meetings are held on the last Thursday in the month at Park Road School, Batley, commencing at 7.30 p.m.

FOLLOWING the annual general meeting in January of the **Weymouth A.S.** a new committee was formed and the officers are now as follows: Chairman: J. Fitzgerald; Vice-Chairman: J. Farey; Secretary: P. Hardy; Treasurer: Mrs. J. Hardy; Committee members: R. Thompson, Mrs. E. Farey, C. Taylor.

AT a lively annual general meeting of the **Hull A.S.** the following officers were elected: President: R. Willerton; Vice-President: I. Bellard; Chairman: T. Douglas; Vice-Chairman: A. Douglas; Hon. Secretary: M. Lesson, 13 Braemar Avenue, Indike Lane, Hull.

Telephone: Hull 854889; Show Secretary: G. Andrews; Asst. Secretary: J. Stabler; Treasurer: G. Batch; Librarian: G. Frisby; Committee members: E. Morton, K. Taylor, J. Porter; P.R.O.: A. Frisby. Meetings are held every first and third Wednesday evenings at the B.R. and Dockers Club, Anlaby Road, Hull.

EARLY in January, Mr. Barry Funnell gave **Hastings and St. Leonards A.S.** one of his excellent talks on Livebearers and supported his lecture with a selection of slides. At the second January meeting the annual auction of fish and equipment was held.

AT the first meeting of the year **Basingstoke A.S.** had an F.B.A.S. tape and slide lecture by C. A. T. Brown about judging, and at the meeting a fortnight later the subject was meeting up in a talk by M. Carter, of Bracknell A.S., this was more like a debate during which members had a go at judging some selected fish. The results were of a high standard with R. Hollings and J. Jackson doing particularly well, and juniors A. Marshall and S. Hannah beating most of the adults.

PLANS to hold an Open Show during 1976 have been revised by the **Three Counties Group of Societies.** The costs of the venue normally used have increased to over £300 which is resulting in a search for other suitable premises, and the date for the proposed Show will now be put back till 3rd April, 1977.

A SLIDE SHOW and lecture was given at the January meeting of the **Goldfish Society of Great Britain** by Mr. D. Eastingwood. This showed how he set about constructing a fish house. The slides, stage by stage, showed the construction starting from a bare patch of ground to the finished building. A good feature of the talk was slides showing fishkeepers in the Midlands. Mr. Eastingwood itemised every detail of his costs, and gave valuable advice on the building laws.

His fish house is a modified large glass house and to overcome the problem of "green water" and also to keep in line with modern thinking that goldfish kept in a fish house in aquaria require continuous supply of fresh water, during the erection of the building he installed a continuous water supply to each aquarium. Plastic piping was used and each aquarium has a valve above it so that the water flow can be adjusted. The overflow from each aquarium flows to a drain. The questions asked reflected the amount of interest shown on the subject of fish houses and the building of such. Diary dates for 1976: Saturday, 20th March, annual general meeting.

DETAILS of the January annual general meeting of the **Brighton & Southern A.S.** are as follows: B. Rice, Chairman (re-elected); J. Smith, Vice-Chairman (P.R.O. elected); M. Rooney, Secretary (re-elected); T. Martin, Treasurer (elected); B. Sayers, Show Secretary (re-elected); four other Committee members: Mrs. P. Rooney, T. Ramshaw, D. Terry and G. Clarke.

Of special interest at the annual presentation was a new member, T. Ramshaw, who took four trophies in his first year of showing. Other successful members included B. Sayers, three trophies; Mr. and Mrs. Houghton four trophies including "Fish of the Year". The Junior Cup was won by Master M. Stapleton. Other winners were R. Cannon, two trophies; Mr. and Mrs. Peck, two trophies, and Miss K. Sayers and B. Shanklin, Mr. and Mrs. Rooney, D. Mann, G. Clarke, who all won one trophy. Mrs. L. Mann won "The Member of the Year" award for all her hard work throughout the past year.

Meetings are now held on the first and third Monday of each month at K. T. Club, Franklin Road, Portslade, at 8 p.m. Particulars of the society can be obtained from Secretary, M. Rooney, 66 Portland Villas, Hove. Phone: Brighton 411131.

COMMITTEE changes made at the recent annual general meeting of the **Cotswold A.S.** were: Chairman: M. Poole; Secretary: R. J.

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Telling, 28 The Lennards, South Cerney, Cirencester, Glos.; Treasurer: Mrs. S. Sargent; Show Secretary: R. Dodson.

The club meet monthly on the last Wednesday at 7.30 p.m. at the Post Office Inn, Stroud. Visitors are most welcome and new members even more so. Details available from the Secretary.

RESULTS of the Stretford & District A.S. in connection with the Salford Open Show last year are as follows: Corydoras Catfish: 1, 2 and 3, Mr. and Mrs. Baldwin (Sandgrounders). Loaches: 1, Mr. and Mrs. Muckle (Sandgrounders) (Section winner); 2, J.A.M. (Stretford A.S.); 3, J. Price (Stretford A.S.). A.O.V.-Catfish: 1, Mr. Goddard (Macclesfield); 2, J.A.M. (Stretford A.S.); 3, Mr. and Mrs. Houghton (Southport). Sharks and Flying Foxes: 1, D. Avery (Merseyside) (section winner); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mr. and Mrs. Houghton (Southport). Rasbora, Danios and Minnows: 1, B. Wilson (Merseyside); 2, R. J. Payne (Merseyside); 3, J. Taylor (Merseyside). Killifish: 1 and 3, K. Ryger (Wrexham) (section winner); 2, J.A.M. (Stretford A.S.). Pairs (Egglayers): 1, K. Smith (Middleton); 2, Mr. and Mrs. Burgeyne (Farnworth); 3, Mr. and Mrs. Muckle (Sandgrounders). Pairs (Livebearers): 1, Mr. and Mrs. Baldwin (Sandgrounders) (section winner); 2, J. Ridley (Heywood); 3, Mr. and Mrs. Poulton (Northwich). Breeders (Egglayers): 1 and 2, J. Ridley (Heywood) (section winner); 3, Mr. Wolstenholme (Heywood). Breeders (Livebearers): 1, Mr. Davies (Stretford A.S.); 2, Mr. MacDonald (Oldham). Marine fish, (one in class): 1, K. Smith (Middleton) (section winner). A.O.V. Tropical: 1, C. Evans (Sandgrounders) (section winner); 2, C. H. Whitley (Accrington); 3, F. Oliver (Wrexham). Mini Jars: 1, 2 and 3, C. Jones (Wrexham) (section winner). Juniors: 1, D. Price (Wrexham) (section winner); 2, J. Price (Wrexham); 3, Miss P. D. Taylor (Merseyside). Goldfish (common): 1, 2 and 3, Mr. Whitley (Accrington). Goldfish (fancy): 1, Mr. Whitley (Accrington) (section winner); 2, S. Walsh (Accrington); 3, P. A. Taylor (Merseyside). A.O.V. Coldwater: 1, Mrs. B. Dawson (Heywood); 2 and 3, S. Walsh (Accrington). Guppies: 1 and 3, D. Butley (Heywood); 2, Mrs. Dixon (Ashton-under-Lyne). Flaties: 1, J. Ridley (Heywood); 2, R. J. Payne (Merseyside); 3, Mr. and Mrs. Poulton (Northwich). Swordtails: 1 and 2, Mr. and Mrs. Muckle (Sandgrounders) (section winner); 3, S. Weetman (Stretford A.S.). Mollies: 1, K. Houghton (Southport); 2, J. Ridley (Heywood); 3, Mr. and Mrs. Poulton (Northwich). A.O.V. Livebearers, (one in section): 1, Mr. and Mrs. Baldwin (Sandgrounders). Barbs (Small): 1, B. Wilson (Merseyside) (section winner); 2, Mr. Cowley (Middleton); 3, D. Butley (Heywood). Barbs (Large): 1, D. Oldham (Wythenshawe); 2, Mr. and Mrs. Goddard (Macclesfield); 3, M. Bolton (Northwich). Characins (Small): 1, A. Chadwick (Oldham) (section winner); 2, S. Brewis (Farnworth); 3, D. Taylor (Stretford A.S.). Characins (Large): 1, Mr. P. Ridley (Heywood); 2, Mr. and Mrs. Houghton (Southport); 3, P. and H. Batchelor (Loyne). Fighters: 1, R. J. Payne (Merseyside); 2, D. B. Latham (Independent); 3, J. Taylor (Merseyside). Anabantids: 1, Mr. Hopwood (Wrexham) (section winner); 2, J. Taylor (Merseyside); 3, Mr. and Mrs. Baldwin (Sandgrounders). Cichlids (Dwarf): 1, Mr. Poulton (Northwich); 2, J. Merrigan-Bate (Sandgrounders); 3, C. Evans (Sandgrounders). Cichlids (Large): 1, J. Ridley (Heywood) (best-in-show); 2 and 3, S. Wolstenholme (Heywood). Angels: 1, Mr. and Mrs. Muckle (Sandgrounders); 2, Mr. and Mrs. Axon (Ashton-under-Lyne); 3, Miss D. Bolland (Wythenshawe).

Changes in the committee of the **Stretford & District A.S.** are as follows:—Chairman: J. Edward; Asst. Chairman: E. Bowden; Secretary: A. Wilson, 4 Upper Chorlton Rd., Old Trafford, Manchester C16, Tel. 061-226 6566; Asst. Secretary: S. Weetman; Show Secretary: M. Pownall; Asst. Show Secretary: I. Brown; Treasurer: I. Gibson.

MEMBERS of the Association of Midland Goldfish Keepers met in January, and within a short time the members were listening to their Vice-President, A. Roberts, as he explained his views about fancy goldfish. Briefly he believes that the Chinese created the various forms intentionally as works of "moving art" in the same way that great painters created "static art" in their pictures. Each being a concept in the artist's mind the end product was a deliberate creation. He does not believe that the various varieties are the result of mutations—mutations do not arise so frequently to allow the numerous varieties to have been produced, but are due to mass manipulation. Being man made the goldfish is continually trying to revert to the original wild carp form. The goldfish breeder must prevent this tendency by rejecting any fish that exhibits any sign of reversion.

He was emphatic that it does not take years to produce good fish, and if judicious breeding and selection is practised it is possible to get results in two to three years. This latter point was illustrated by the exhibition of a number of last seasons young veiltails and Bristol shubunkins of very good quality. It was stressed that the quality of the adult was very dependent upon how it was treated during its early life. For this reason he could not understand why people who bought young fish grew them to adults and then showed them successfully insisting upon telling the breeder that he had won with his fish. It was not the breeder's fish unless the breeder had grown it to show size—and the breeder deserved no credit for what the exhibitor had produced, by good management, from the young fish.

Details of membership and meetings can be obtained from the secretary D. G. Denny, 71, The Moorfield, Stoke Aldermun, Coventry. The venue is very easily reached from the motorway and attracts members from a wide area of the Midlands.

THE new list of club officers of the Cardiff A.S. is as follows:—Chairman: R. Batten; Vice Chairman: C. Harding; Secretary: B. Hurley, 35, Spring Gardens Terrace, Cardiff CF5 0BT; Treasurer: Mrs. E. Bouich; Show Secretary: B. Guy, 3, Meadvale Road, Cardiff CF3 749; P.R.O.: R. Dawes.

Oldham & District A.S. Due to a very encouraging increase in membership, the society have to find larger premises. Meetings are now held every other Monday at 8 p.m. at the Federation of Ukrainians in Great Britain, 96 Waterloo Street, Oldham, where old and new members will find a very warm welcome. Forthcoming attractions include lectures on Water Testing, Angels, Mini Jars, Slide Shows, on Marine-life, Cichlids, Germs in the Rough, plus the usual monthly table shows. Any further information regarding membership etc., can be obtained from Mr. E. Birchwood, 4 Hill Top, Healds Green, Chadderton, Oldham, Lancashire, Telephone 061-633 2908.

BRITISH CICHLID ASSOCIATION A NEW Southern area group of the B.C.A. has been formed. The first meeting was held on the 30th November last year. It was agreed to meet quarterly at various places in the South of England, so giving everyone the chance of attendance. Non B.C.A. cichlid keepers also welcomed. For further details please contact Mrs. D. R. Jessup, 9 Parade Mansions, Willowhayne Crescent, Angmering-on-Sea, Sussex. Rustington 71638.

LIST OF SPECIALIST SOCIETIES THE following list is not complete and we invite details of other specialist societies from the secretaries. These would apply only to the main addresses and not to any branches. This list will be published at various intervals.

Catfish Association of Great Britain.—Alan Haley, 255 Lewisham Way, London, S.E.4. Tel: 01-692 8296.

Goldfish Society of Great Britain.—R. A. Dodkins, 107 Cobham Road, Seven Kings, Ilford, Essex IG3 9JL.

British Discus Association.—F. W. Ashworth, 41 Pengwern, Llangollen, Clwyd LL20 8AT.

British Koi-Keepers' Society.—D. C. Davis, 137 Gayfield Avenue, Brierley Hill, West Midlands DY5 2BX.

British Marine Aquarists' Association.—J. H. Vickery, 26 Rosalind Avenue, Dudley, West Midlands DY1 4JW.

Fancy Guppy Association.—S. Croft, 85 Planks Lane, Wombourne, Staffs.

British Cichlid Association.—Jan C. Sellick, 68 Kings Drive, Bishopston, Bristol BS7 8JH.

NEW SOCIETY
Bexleyheath & District A.S. Venue: Committee Room, Christchurch, Broadway, Bexleyheath, Kent. Meetings are held on the second and fourth Friday each month, commencing 8 p.m. New members welcome. All enquiries to Mrs. A. E. Greenhalf, 149a Broadway, Bexleyheath, Kent. Tel: 01-304 3396.

AMALGAMATION
THE Worsley A.S. and the **Farnworth A.S.** have now amalgamated and the new name is now the **Bridgewater A.S.** The secretary is B. Mason, 302 Bolton Road, Worsley M28 5GW.

CHANGES OF NAMES
THE Brize Norton A.S. is now to be known as **Witney & District A.S.** Meetings will be held at the "Eagle Vaults," Witney, every second and fourth Friday of the month.

The next meeting will take place on Friday, 12th March, at 8 p.m. and all fish keepers or prospective keepers are very welcome, including juniors. The programme of activities for this year will include numerous slide shows and guest speakers and will prove very entertaining to all fish enthusiasts. For further details please contact D. Tovey, 28 Northolt Road, Carterton, Oxon.

Bishops Cleeve A.S. is now called **Cheltenham Tropical Fish Club.** There is a change of venue and the meetings are now held on the second Friday of the month at St. Marks Community Centre, Brooklyn Road, St. Marks, Cheltenham. The Secretary is Mrs. J. Bishop, 36 Clarence Square, Cheltenham.

SECRETARY CHANGES

Bassetlaw Fishkeepers A.S.: Mrs. A. E. Clarke, 4 Big Row, Big Lane, Charborough, Retford, Notts.

Malvern & District A.S.: G. W. Roan, 6 Chester Place, Malvern, Worcs.

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

Mount Pleasant A.S.: A. Harvey, 31 Moore Street, Sunderland Road End, Gateshead 8, Tyne and Wear.

Bristol A.S.: V. Cole, 10 Hardwick Close, Brislington, Bristol, 711286.

Fancy Guppy Association (North West Lancs): Mrs. Joan Bloor, 3 The Dell, Fulwood, Preston. Tel: Preston 718868.

Bradford & District A.S.: A. Fisher, 2 Sherborne Road, Idle, Bradford, W. Yorks.

Leicester A.S.: Mr. and Mrs. R. Martin, 2 Avondale Road, Wigton Fields, Leicester.

Erith & District A.S.: K. J. Bowman, 442 Huest Road, Bexley, Kent DA5 3JR.

Basingstoke A.S.: R. Rich, 93 Pinkerton Road, Basingstoke. Tel: Bas. 27874.

Blackpool & Fylde A.S.: Mrs. S. McLeod, 33 Langdale Road, Mereside Estate, Blackpool FY4 4RR.

North Gwent A.S.: L. Harding, 10 Pen-y-Crug, Rensau, Ebbw Vale, Gwent NP3 5XB.

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Macclesfield A.S.: M. J. McDermott, 7 Oakland Avenue, Haslington, Crewe. Tel: Crewe 585230.

Stretford & District A.S.: A. Wilcox, 4 Upper Charlton Road, Old Trafford, Manchester 16. Tel: 06-226 6568.

SHOW SECRETARY CHANGES
Tottenham & District A.S.: C. James, 7, Stockton Gardens, London N17.

Goole & District A.S.: P. Hutton, 9, Hood Grove, Goole.

Sudbury A.S.: L. J. Brazier, 66 Ormesby Way, Kenton Middlesex. Tel: 01-204 5374.

RETURN OF TROPHIES

WILL the winners of trophies at the last Independent A.S. Open Show, held at Islington Town Hall, return them to E. Bowes, 145 Sanson Road, Leytonstone, London, E.11. Postage will be refunded.

SHOW VENUE CHANGES

THE Stanley & Consett A.S. Open Show will now be held at the Morrison Busy Sports Club, Anfield Plain, Stanley, on 11th April.

F.N.A.S.

THE Annual General Meeting of the Federation of Northern Aquarium Societies will be held at the Lake Hotel, Belle Vue, Manchester on Sunday 21st March. Due to circumstances beyond the control of the Federation the Longlight Hotel is no longer available.

OPEN SHOW POSTPONEMENT

THE Yate & District A.S. regret to announce that their Open Show which was to have been held on the 10th April has had to be postponed, owing to unforeseen high expense at the arranged venue. It is hoped to rectify this by finding alternative accommodation and re-arranging the Show for September.

AQUARIST CALENDAR

10th March: Don Valley A.S. Open Show in the Staff Dining Rooms of the British Steel Corporation, Stocksbridge, nr. Sheffield. For details please contact show secretary, C. Broomhead, 5 Broomfield Road, Stocksbridge, nr. Sheffield.

20th March: Goldfish Society of Great Britain annual general meeting.

20th March: Riverside A.S. Open Show, St. Saviour's Church Hall, Cobbold Road, Acton, London W. Show Secretary: G. Biggs, 267,

Greenford Road, Greenford, Middlesex. Phone No. 01-223 2630.

27-28th March: Federation of Scottish Aquarists' Festival, Civic Centre, Motherwell. Full details and schedules from D. Petheringham, 23 Royal Park Terrace, Edinburgh, EH5.

28th March: Heywood & District A.S. Open Show, Civic Hall, Heywood, Lancs. Show Secretary: J. W. Ridley, 53 Miller Street, Heywood, Lancs.

28th March: Workshop Aquarist & Zoological Society, Lady Margaret Hall off the A60 in Workshop, Notts. Doors open 11.30 a.m. Judging 2 p.m. B. M. Fisher, 24, Vessey Road, Workshop, Notts.

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

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

4th April: Nelson A.S. annual show, Civic Centre, Stanley St., Nelson. Details from I. J. Stokes, 3, Beckenham Court, Burnley, Lancs.

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

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

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

11th April: Sheffield and District A.S. Open Show, Granville College, Sheffield. Enquiries to: Mr. E. Stanton, 57 Medlock Crescent, Hazzard, Sheffield 13.

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

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

24th April: Chingford and District A.S. Open Show to commemorate 25th anniversary at St. Edmund's Church Hall, Chingford Mount Road, London, E.4. Schedules from Mrs. S. Harvey, 54 Kenilworth Avenue, Walthamstow, London, E.17. Available end of February.

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

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

25th April: Reigate and Redhill A.S. Open Show at the Village Hall, Blechingley, Surrey. Further details later.

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

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

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

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

2nd May: Medway A.S. Open Show at Medway and Maidstone College of Technology, Oakwood Park, Tunbridge Road, Maidstone, Kent. Schedules and details from Mr. C. A. Elliott, Beechwood, 72, Dargate Road, Walderslade, Chatham, Kent ME5 3EL.

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

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

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

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

9th May: Bournemouth Annual Open Show to be held on Sunday at Kinson Community Centre, Prilham Park, Kinson, Bournemouth. Show secretary, J. V. Jeffery, 30, Braemar Avenue, Southbourne, Bournemouth BH6 1JF.

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

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

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

16th May: Merseyside A.S. Annual Open Show will be held at the Rainhill Village Hall, Rainhill, Lancashire, Hon. Secretary, J. Bailey, 11, Auburn Road, Liverpool L15 8BJ.

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

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

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

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

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

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

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

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30th May: Corby and District A.S. Open Show. Sunday, at the Corby Civic Centre, F.B.A.S. rules. Details and schedules from the Show Secretary, C. McInnes, 18 Westminster Walk, Corby, Northants. MK6-March.

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

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

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

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

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

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

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

18th June: Hinckley and District A.S. are holding their 5th Open Show at Westfield Community Centre, Rosemary Way (off Coventry Rd., A47) Hinckley. Benching 11.30-2 p.m. Schedules will be available shortly from the secretary: B. Baxter, 29 Northfield Rd., Hinckley.

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

20th June: First Redditch Open Aquatic Show organized by Delson A.S. At the Abbey Sports Stadium, Birmingham Road, Redditch, Worcs. Details: P. J. Emsley, 25 Plyford Close, Lodge Park, Redditch, Worcs. Phone Redditch 83342 (nights only).

20th June: Alfreton and District A.S. Annual Open Show at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, K. Dean, 22 Fletchers Row, Nottingham Road, Ripley, Derby DB8 3BA. Phone Ripley 3902.

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

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

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

20th June: Malvern & District A.S. Third Open Show at Barnards Green Cricket Club, North-end Lane, Malvern. Schedules available later. **27th June:** Dunlop Aquarium Keepers Society Open Show will be held at the Dunlop Factory, Speke, Liverpool. Schedules are available from show secretary, T. Hampton, 3 Madelaine Street, Liverpool, 8, tel: 051-709 5509.

3rd July: Cardiff A.S. Open Show, St. Margaret's Church Hall, Roath, Cardiff. Details from B. Guy, 3 Meadow Road, Cardiff. Tel.: 793749.

4th July: Lytham A.S. Annual Open Show, will be held at Lytham Baths, Disconson Terrace, Lytham, Lancashire. This is a larger new venue. Show Schedules from: Show Secretary, Mr. P. Ham, 1 Wyndens Grove, Freckleton, Preston, Lancs. Telephone Freckleton 63182.

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

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

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

10th July: Provisional date for Sandgrounders Annual Show at Meols Cop School, Meols Cop Road, Southport. Further details when available from Hon. Show Secretary, G. A. Waterhouse, at 23 Moss Lane, Southport, Merseyside PR9 7QR, or phone Southport 24743, S. Hooton.

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

25th July: South Humberside A.S. First Open Show, Memorial Hall, Cleethorpes.

Schedules available from G. Wilson, 100 Guildford Street, Grimsby.

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

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

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

21-22nd August: Yorkshire Aquarists Festival.

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

28th August: The third Welsh National open show to be held at the Sophia Gardens Pavilion, Cardiff. Further details available from: C. Turner, 146 Arzan Street, Roath, Cardiff. Tel.: Cardiff 499982. M. Guthrie, 4 Nurston Close, Rhosse, Glamorgan. Tel.: Rhosse 710649.

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

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

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

15th September: Bristol A.S. Coldwater Open Show. Schedules from Show Secretary, B. N. Howden, 12, Stoneleigh Walk, Bristol, 4. 773355. Postal entries close 31st August. Venue Bishopston Parish Hall.

19th September: Bassendun Fishkeepers A.S. First Open Show. Schedules from K. Clarke, 4, Big Lane, Charlborough, Bedford, Notts.

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

19th September: Wythenshawe and District A.S. Open Show at The Pecum Hall, Civic Centre, Wythenshawe, Manchester. Tropical, Marine and Coldwater Sections. Show secretary, S. Barratt, 14 Piperhill Avenue, Northenden, Manchester M22 4DZ.

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

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

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

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