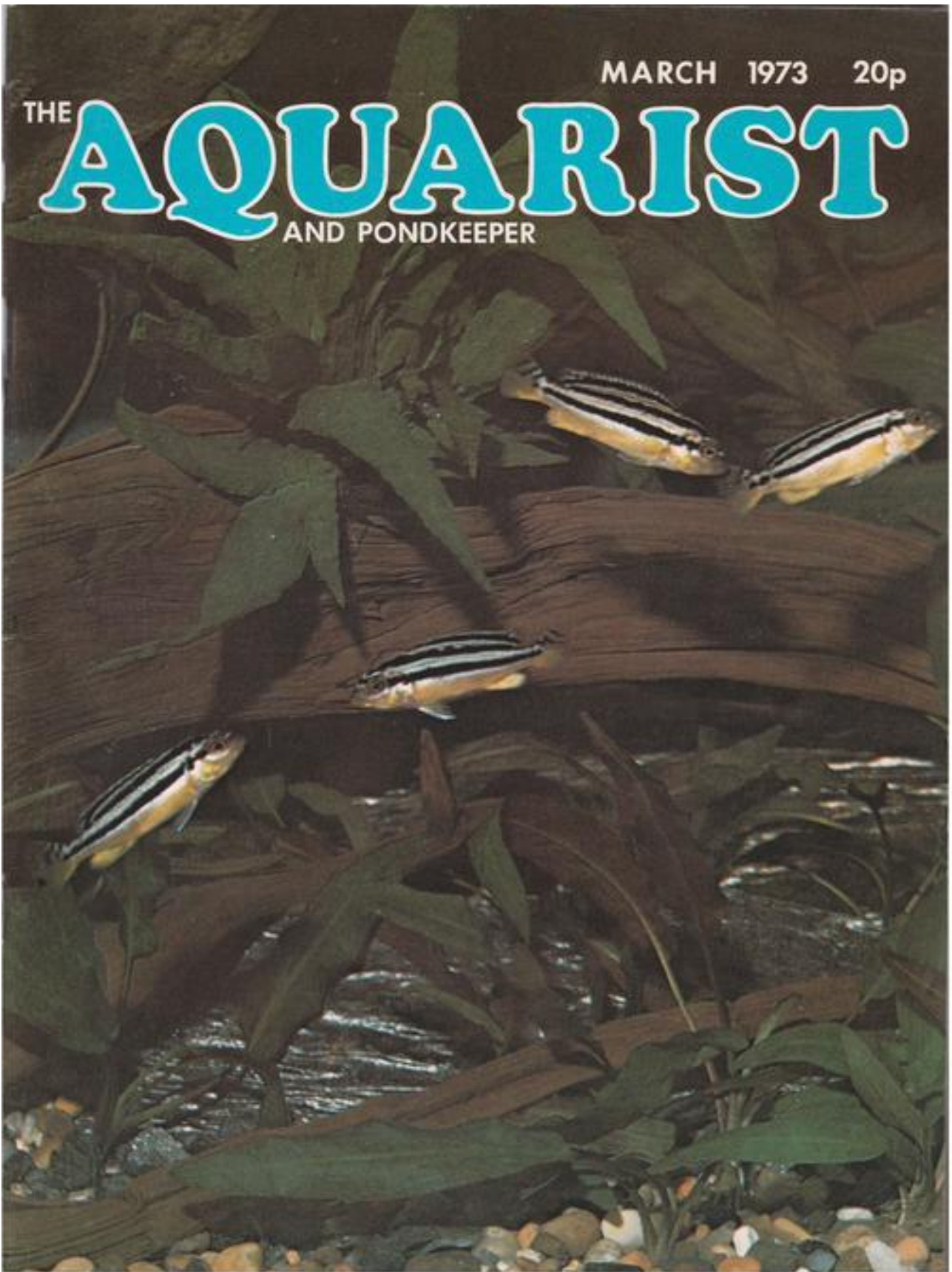


MARCH 1973 20p

THE **AQUARIST**
AND PONDKEEPER





THE AQUARIST

AND PONDKEEPER

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Our Cover
Young *Pseudotropheus*
auratus

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The Editor accepts no responsibility for views expressed by contributors.

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WHAT IS YOUR OPINION?

by B. Whiteside

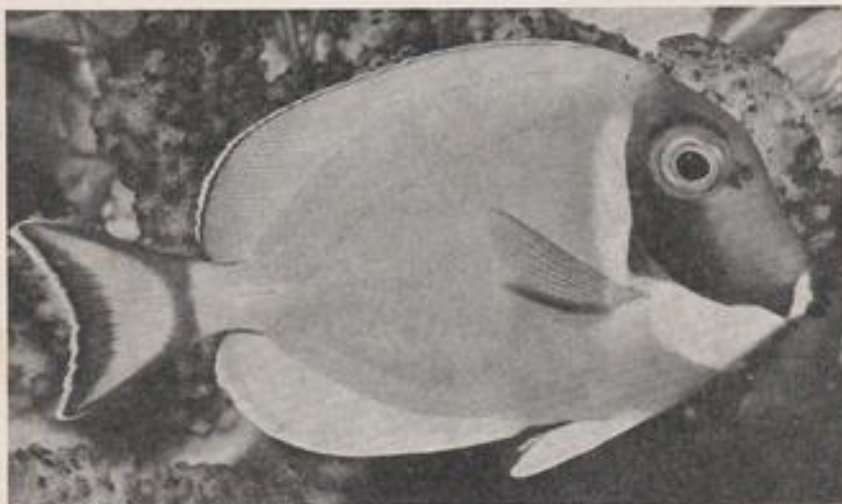
Photographs by the Author



WITH THIRTY-TWO letters piled up in front of me, I'd better waste no time in starting off this month's feature. Mr. K. H. Broughton, B.Sc., lives at 115 Park Road, London, N.W.9, and he considers that some aquarists who find difficulty in getting plants to grow may possibly be over-zealous in their filtering operations. Mr. Broughton begins with a consideration of exchange resins for softening water, and points out that the selection of such resins requires some care. Some types will remove all dissolved matter from water, leaving it as pure as, if not purer than, distilled water. Others, such as "Zeo-Carb 215" (Permutit Co. Ltd.) remove mainly calcium and magnesium (the factors responsible

10 ppm hardness, and *Symphysodon discus* in water of hardness 50-80 ppm. With the first type of resin the pH will always be 7, whilst in the second type, where hard water having a pH greater than 7 is softened, the resulting water will in all probability lie on the alkaline side too."

Mr. Broughton goes on to point out that in his opinion waters purified or softened by resins are not ideal for plant growth; however, during the maturing stage of a newly set up tank, excreta from fishes, and the usual small amounts of mulm that collect in any tank, would produce a supply of minerals for plant food, and growth would begin. With continuous resin



for hardness) by replacing them with sodium and/or potassium. The water is thus softened—but some trace elements may be lost as well. Since plants need a number of elements for growth as well as carbon dioxide and light, they cannot be expected to thrive in water purified by the first type of "all purifying resin." He points out that plants will not thrive long in distilled water. If a resin of the second type is used, the mineral balance of the water will be upset. A soft water can contain a small amount of magnesium, and this element is essential for the plants. In any case, the total removal of calcium and magnesium is not called for. "According to McInerney," he says, "*Hyphessobrycon innesi* will breed in water up to

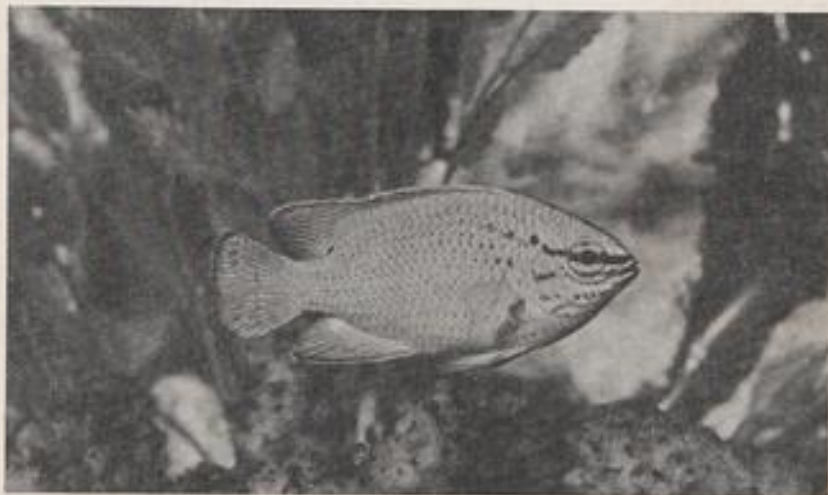
treatment this cannot occur, the minerals being whipped out of the water as fast as they go in. With this in mind, once the water has been resin-purified/softened, no further treatment is necessary—or desirable. Unless limestone is present in a tank—and it should not be—hardness cannot arise, and vital elements are being lost. "Softening is a 'once-and-for-all' activity," Mr. Broughton maintains. Taking up the point made by Mr. C. Bradley (September '72 edition), Mr. Broughton notes that only *Aponogeton crispus* and dwarf lily would grow in Mr. Bradley's tank which had resin in one of its filters. The reason for these two species growing, says Mr. Broughton, is that both store food in a bulb or rhizome, and such food is

enough to sustain the plants for quite some time. To sum up, he states that he would advocate discontinuing continual resin filtration as being unnecessary—indeed detrimental. Soften with resin at first, he says, and leave it at that. "Leaving the filter off for a few hours and then putting it on again is of no value. Scrap it!" he writes.

Mr. Broughton also questions the value to be gained from combining charcoal with peat in a filter. "Peat is necessary to acidify the water—particularly with those resins which leave the water soft but alkaline," he states. He also points out that peat gives water an aesthetically pleasing warm brown coloration—but this facet is a matter of taste. Mr. Broughton also notes that charcoal is capable of removing this coloration provided by peat. He ends by making the point that dwarf lilies produce floating leaves, and these shade lower plants—a feature which isn't

more difficult to photograph. What fantastic colours the marine fishes have! I'm tempted—but I'm poor! I'd be pleased to hear of your experiences with either of these fishes, for a future feature.

Mr. K. G. Russell's home is at 178 Lampits, Hoddesdon, Herts., and he writes to compliment Singleton Bros. Ltd. on the fine service which he received when he returned some items with which he was not entirely satisfied. The items, although they had been in use for over two years, were replaced with new ones. "Maybe you could blow a trumpet for them in your excellent column," says Mr. Russell. (I'm always pleased to include praise for any firm or product which has given satisfaction or good service to readers.) Mr. Russell kept tropical and coldwater fishes when he was at school, and he had an 8 ft. by 4 ft. by 2 ft. pond when his home was at Tottenham. His greatest success at breeding coldwater fishes was



calculated to encourage healthy plant growth below water level. (Although I had to somewhat shorten Mr. Broughton's letter, he has made some interesting observations. Do other readers have any further comments on this topic?)

Photograph 1 shows the first marine fish that I have photographed. It's a powder-blue surgeonfish (*Acanthurus leucosternon*), and belongs to a keen marine aquarist whom I have only recently met, although he only lives a few miles from where I live. The fish is owned by Mr. Bob Crossan, "Roywood," 370 Old Glenarm Road, Larne, Co. Antrim, and I would like to thank Bob for allowing me to photograph his fish. The powder-blue surgeonfish in the photograph would surely get the prize for the most co-operative fish that I have ever photographed. I took seven shots of it and each was as good as the one shown. Photograph 2 shows another of Bob's fishes—the electric-blue damselfish (*Pomacentrus caeruleus*) which was slightly

when he crossed a comet tailed goldfish with what his dealer called "an American standard harlequin shubunkin." The resulting brood was hatched from spawn that was placed in an old, deep, kitchen sink sunk in the garden, and the youngsters were placed in a heated, indoor tank for the winter. The young ones certainly had the comet tail, but seemed to be a clear pink colour after the change from the normal bronze colour at birth. Mr. Russell never found out what the potential of the young was as the tank's heater blew on a very cold night and the lot were dead the following morning.

After giving up the hobby for 17 years, Mr. Russell began again after his son won a goldfish at a local fete. The fish died, and rather than replace it with another, Mr. Russell went the whole hog and had a 60 in. by 15 in. by 12 in. tank made—for keeping tropicals. That happened two years ago; now he has between seven and nine tanks, according to need. Mr. Russell is a

member of the F.G.A., and has also recently joined the British Cichlid Association—so he hopes to increase the number of species of fishes which he has. His next venture is the erection of a fish house to hold 40 tanks, and he hopes to get down to some serious breeding of guppies for showing, and other species to sell off to help pay for some of the expenses involved.

Mr. C. Thacker's letter is headed: 3 Rathen Road, Withington, Manchester, Lancs., M20 9QJ, and he writes in praise of "Rena" pumps. "The Rena 100 is a pump I can recommend for working both an outside Bubble-Up filter and a vacuum cleaner at the same time. The Rena Super is the only other kind of pump I use," says Mr. Thacker. He has nine tanks and uses three Rena Supers. His 4 ft. by 2 ft. by 2ft. marine tank is aerated by three air stones, and contains an undergravel filter with three large uplift tubes—each operated by its own air stone. All get their air supply from one Rena Super—and it is not even adjusted to full power. In his fish room he has six tanks, of different sizes, and these contain 17 items which are operated by one Rena Super alone. The pump has been operating the 17 items, 24 hours per day, for the past two years! Mr. Thacker recommends the use of undergravel filters, with Rena Super pumps, to all readers. (I would be interested to hear of the up-to-date opinions of readers regarding the use of undergravel filters in other than marine tanks. We've had opinions on this subject before, but I would be interested to hear of the latest views on the subject.)

I was interested to receive a letter from Mr. J. Griffiths, of 9 Ashlea Close, Garforth, Leeds, LS25 1JX, the gentleman to whom I awarded the prize for what I considered to be the most useful tips submitted for my Christmas competition. Mr. Griffiths's letter begins: "I was very pleased to hear yesterday that I was the winner of your W.I.Y.O.? competition, and was delighted to receive the book and pH testing kit, both of which will be particularly useful. My own new community tank is thriving, and the two tips I suggested proving trouble-free. Thanks to other information gleaned from W.I.Y.O.? (e.g., lime-free gravel, warm-white fluorescent plus tungsten lighting, outside rather than undergravel filtration, compatible and incompatible plants, and a highly recommended plant dealer in Kidderminster) my 20 gallon tank is thriving with plants, and in one month dwarf gourmies, several neons, and two zebras have actually spawned, and two Harrison's pencilfish made several false matings." Mr. Griffiths continues: "I find the practical information provided by other relative amateurs in the field far more useful than the often prejudicial information contained in specialist books and articles, and W.I.Y.O.? is excellent in this respect."

Mr. M. White's home is at 95 Midland Road, Royston, Nr. Barnsley, Yorkshire, S71 4QJ, and he has never found any evidence to support recent

suggestions that *P. kiribensis* (now correctly named *P. pulcher*, I understand) can be fin-nippers. Mr. White kept his pair in a 24 in. community tank and they never bothered with other fishes; they are now in an 18 in. tank, with nine platies, and there is still no sign of fin nipping. To improve the look of his tank's iron frame, Mr. White stuck on 1 in. by 1 in. copper-coloured mirror tiles. Regarding people who have recently asked for more book reviews, Mr. White thinks that they should examine new books for themselves at their local dealer's shop. He contends that opinions differ so much that aquarists should examine books and equipment for themselves and not depend upon reviewers' or critics' evaluations. (This would certainly be the ideal method, but how many aquarists live close enough to a dealer's shop to see things for themselves? And are all dealers willing to allow possible customers to browse through expensive books? The nearest dealer from which I live is almost 30 miles away.) Mr. White ends his letter with some questions about fish auctions, as he says they are a cheap way of stocking a tank. He asks: "Why are these auctions never advertised? How does one enter one's fishes, etc., for auction, and what percentage of the price raised does the organiser keep?" (To be quite honest, I have never heard of a fish auction in my life. I'd be pleased to receive readers' information on this topic.)

Stephen Clifton is 14 years old, and lives at 80 South Crescent, Featherstone, Wolverhampton, Staffs., WV10 7AU. The boss in his community tank is a large silver angelfish. It is the second largest fish in the tank, the largest being a catfish which Stephen could not identify. (From the excellent drawing which he enclosed I was able to make a tentative identification—but I suggested that Stephen wrote to Mr. Jack Hems to obtain the expert's advice. A second letter from Stephen informed me that Mr. Hems had confirmed the identification.) Stephen has a 3 ft. community tank, and a 4 ft. marine tank, and he spends about 80p per month on all his fish foods. He asks for reader's suggestions as to which species of cichlids are easy to breed. In his second letter, Master Clifton tells us that he decorated his marine tank with a display of crumbly sandstone when first set up; but within three days the water had turned a sickly yellow colour. All the rocks and most of the sand had to come out—and 20 gallons of salt water was tipped away. (Expensive!) The next set of rocks came from Cannock Chase, a woodland area not far from Stephen's home, and these rocks have given no bother. He wonders what was wrong with the sandstone. The first marine invertebrate that Stephen had was a large, white sea anemone. He was fascinated to see his clown fish nestling down in it, but he was totally amazed to see his 1½ in. domino damsel doing exactly the same thing. This was against everything Master Clifton had read; he would like to have readers' opinions on the matter. He ends his

letter by saying that a few months ago he bought a small, brown crab; it became the household pet, and amused everybody with its antics. The crab's favourite food was *Tubifex*, and when it was feeding and a fish came too close it would lift a claw and wave it menacingly. Unfortunately, one day the crab crawled into a cavern in the tank and stayed there. Upon examination it was found to be very dead, its shell's underparts hanging loose. He wonders if this would have had anything to do with its death. (I should think so! But what might the cause have been?)

Lawrence Hunter is 15 years old, and his home is at 86 St. Mary Street, Kirkcudbright, S.W. Scotland. He has only recently started to read *The Aquarist*, but already he finds it "very interesting and extremely informative." Lawrence has kept coldwater fishes for a year now and has obtained a great deal of pleasure

while I was still at school, I gradually "trained" my parents' slight interest in aquaria, and made sure that they knew how to feed fishes—if not much more. When I left school and went to a teachers' college for a four year course, I had my parents at the stage of being competent to feed my fish for me during the week, and I usually managed to get home from college each weekend to give my tanks their weekly "clean"—if necessary. Holiday periods enabled me to carry out more elaborate tasks. Thus, my advice would be to start training your parents or siblings in the art of fish feeding early on, and they will be well able—and possibly quite keen—to do the job when you do go away from home. If necessary, when the time comes, dispose of the majority of your tanks, and retain only one or two in which to keep your favourite species of fish and plants; however, if it's fish or study, do put



from them. In his letter he posed several questions, to which I gave him a personal reply; however, one of Lawrence's questions would probably interest younger aquarists—and judging by the number of letters sent to this feature by young people in their teens, there should still be plenty of knowledgeable adult aquarists in the years ahead. Lawrence writes: "May I close with a point I'm sure has occurred to many aquarists of my age. I would love to start keeping tropical fish, but my mother and father won't allow me for one simple reason. In three years I will probably be going away from home to university, and so what happens to my fish then? My parents won't look after them so I refrain from starting on tropical fish. How do other aquarists overcome this problem?" My answer, as both aquarist, student and schoolteacher, is to put your studies first should the occasion arise when you have to make a choice. One can start keeping fish again at any time, but it's rather more difficult to resume studies at an advanced level. In my own case,

the study first; after all, it will probably only be for three or four years.

Mr. W. Blount writes from 97 Mallorie Road, Norton, Stoke-on-Trent, ST6 8ER, on the subject of "rams." Mr. Blount was surprised to find that some readers find these fish difficult to keep. He bought a pair of "rams" in July 1971, placed them in a community tank, and gave them no special attention. The fish doubled in size, and in December 1972 they spawned on a piece of sandstone under which a catfish hid during the day. On the third day the eggs were eaten. A few days later another spawning took place—but again, after three days, the eggs were eaten. After the next spawning the piece of sandstone was placed in a 2 lb. jam jar, and it was floated in the tank. The parents, who were *outside* the jar, went through the motions of fanning the water over the eggs. The water in the egg jar was lightly aerated and a few drops of a fungus preventative were added. On the fourth day

Continued on page 472

generally more shiny and of a darker green than water plants. This is an important factor to look for when buying plants for your aquarium as it will be found that a plant grown out of water cannot instantly adapt to being planted fully submerged. Some plants are more adapted to their life underwater than are others—plants such as *Cabomba*, *Elodea*, *Ceratophyllum*, have almost completed their evolution to being fully aquatic, almost growing without any need for roots, any roots that they do produce being merely for anchorage. Water lilies, and plants of the species *Aponogeton*, are also exclusively aquatic, feeding from cones and rhizomes, the woody rootstock at their base. However, most of the plants that we encounter for use in the aquarium are amphibious—they are able to adapt to life both in or out of the water, or both at the same time.

Because of the aforementioned differences between a plant living out of water and one in, it is possible to find a diverse number of leaf forms on an aquatic plant but this is something that is seldom encountered in the aquarium as it is only the below-surface leaves that concern us. I have had facilities to grow plants in greenhouse conditions where they are free to grow out of the water, and where they will find a high humidity in the air into which they surface. I think that one of the greatest surprises comes with the emerse leaves of water wistaria, *Synnema triflorum*. We are all familiar with those apple-green leaves, sometimes oval with small serrations, but more often greatly divided leaves, spreading profusely in our tanks.

How many of us, however, have seen the leaves above the water which I am positive would never be recognised as the same plant. Dark green, oval, and covered with short hairs, slightly reminiscent of a nettle! I caused this plant to develop emerse leaves by first establishing it growing well underwater and then lowering the water level. The first attempt was too hasty. I exposed the apple green leaves and the result was withering, but the second time I just took the water level down to where the leaves pushed against the surface, and then I patiently waited for it to grow out of the water. When these unfamiliar leaves had sprung up high enough, I pinched off a suitable length and planted it in a pot of compost with a plastic bag over it held in place with an elastic band to maintain an even humidity around the leaves. It grew and grew in this well-moistened soil, and in just one week I was able to pick off yet another length and plant as a separate plant. Two little stems began to grow from where I had taken the second cutting off the first plant, and this went on and on, and after only a few weeks I had a whole tray of little *Synnema* plants. They loved the sunlight so long as the moist air around them stopped them from drying as they would never encounter dry air in the paddy fields which they naturally choke up. I then reversed the treatment with a few pieces and planted them underwater. Those emerse leaves didn't change; in fact

they fell off, but not before the serrated underwater leaves had begun to grow. This was one of the few plants that I found to do better in the hideously hard water of East Sussex than in the beautiful soft water of Birmingham.

As already said, most of these amphibious plants will grow better and faster out of water than they will in it and so, naturally, that is the way that they are propagated for sale on the commercial market. Water diffuses the light and makes it far less intense, but aquatic plants are adapted to this and they still respond and grow. This is why they will grow quite happily under artificial lighting in an aquarium, whereas you find that cut flowers in a vase will still close up at the end of the day, despite the fact that you may have the living-room light on. This is because those flowers have been growing in the full intensity of sunlight and they find artificial lighting far too weak to affect them. Now when those semi-aquatic plants that will respond to the diffused underwater light are grown *outside* in full daylight, then their growth is quite expectedly faster. So, most of those plants that are described as bunch plants grown from cuttings are propagated in trays out of water, their roots in moist soil, and their leaves surrounded in warm humid air. *Bacopa*, *Ludwigia*, *Rotala*—these are just a few of those plants that can be grown like this. *Wistaria* would not be grown out of water because the emerse leaves are so different and unattractive, but *Ludwigia* has emerse leaves not too dissimilar from those it develops underwater, as also has *Bacopa*, so they are grown like this. The dealer then receives plants that are not too suited to their imminent life underwater. The emerse leaves have developed a thin cuticle to stop them drying out and underwater this inhibits their respiration. Also, these leaves are used to the full intensity of light out of water, so after only a few days submerged a beautiful plant will become brown, then black, and all the leaves will drop, never to return as their change has been too drastic. *Bacopa* seems to adapt a little better than does *Ludwigia* as it does not have such high light requirements. I found that *Ludwigia* flourishes best emersed, in a greenhouse, and then as near to the windows as is possible.

Do you know the plant that is affectionately known as Parrot's Feather, officially known as *Myriophyllum proserpinacoides*? I have had rather disappointing experiences with this plant when trying to grow it underwater. I was immediately suspicious when it arrived as the leaves refused to stay wet, the water running off them like water does off a duck's back. However, their feathery blue-green silvery leaves proved a fabulous addition to one of my tanks—but how temporary! After the inevitable two or three days, the lower leaves became brown and that delicate prettiness became a siphonable mess around the base of the other more adapted plants it was sharing with. It

is such a shame to see this happen, so why not preserve it a little longer by growing it out of water? There is also an interesting plant that for some time disappears and then it seems to take the market by storm, going under the name of Water Orchid. This plant is probably a form of *Spiranthes odorata* and looks a little like the house-plant that appears everywhere—the *Chlorophytum*, or spider plant. This plant, like the parrot's feather, looks marvellous when it first arrives, but I think that the attitude of most dealers, if they had had previous experience of this plant, would be to sell them all before the stems start to go glassy at the beginning of the end! To grow this plant is not very difficult at all if its bulbous rootstock is planted in a pot and it is kept in a humid atmosphere, instead of being submerged. I admit that this is difficult. It was easy for me when I had a greenhouse available but when living in the centre of the city in Birmingham, I found greenhouses rather scarce. Also, the central heating in my flat was so dry, that you were lucky to find there was any tea left in your cup by the time it reached your lips! Each plant that I was experimentally growing therefore had its own little environment enclosed in a plastic bag. I had cat-litter trays of plants growing in damp soil, too, with small canopies of plastic sealed to keep in the humidity, held up by strategically placed wire coat-hangers. This is fine if you can get a lot of enjoyment out of growing plants like this, but not everyone likes the hardly aesthetic beauty of steamed-up plastic bags everywhere around the living room.

Having confused the definition of aquatic plants, it is difficult to know where to draw the line at what can be considered aquatic. A plant that lives—just lives not thrives, underwater, is *Saururus cernuus*, which recently I have seen in the shops. This is a climbing plant that is never found too far from water and when it was given the out-of-water treatment, and it lived in my shower, it grew so fast, developing often two new heart-shaped leaves every week, I was beginning to think that it was dangerous to spend too long in the shower! The pot-plant called the Swiss Cheese Plant *Monstera deliciosa*, also loves bathing in water. It, too, is a climbing plant, closely related to the philodendrons, but how on earth could we ever realise its climbing tendencies when the most we see of it is a few leaves in a pot? It is only with a twenty-foot specimen that we can see it developing aerial roots from the nodes which in the wild it would trail in the water to feed off the abundant nitrates and minerals to achieve its gigantic proportions.

But let's come back down to earth, or at least to the river bed, to consider those aroid lilies, the cryptocorynes, that lethargic group of plants, so incredible and diverse, so seldom appreciated in their full beauty, because we are always cleaning our aquariums. If they are left undisturbed they form a carpet, then a bed, and then a jungle of tightly-packed leaves carefully layered

in a tidy blanket of dark green. These plants take their time, their metabolism is slower than others, but as a result they are not fussy about lighting conditions. They have unusual flowers but very few of them will flower in the aquarium. Their flowers are sheltered by a spathe which is often thought to be the flower itself. A little large for the aquarium, but do you know the arum lily, that water-loving white lily that is so popular at funerals? The flower is that furry yellow stick in the centre, and not that white hood that surrounds it. It is a good job for the aquarists that these plants do not rely on seed propagation alone or they would be even more expensive than they are at present. They reproduce asexually, or vegetatively, secretly sending out runners under the gravel along which baby plants soon appear. The fact that *Cryptocoryne ciliata* does not produce runners proves that it is not really a crypt at all. However, it is closely related, and its apple-green ovate leaves prove an invaluable addition to every aquarium where each individual leaf will often last for several months. A very desirable trait of this plant is its ability to tolerate quite a high salt-content in the water and also its powers of resistance to be eaten by vegetarian fish. Take notice all keepers of scats and monos.

Aponogetons have a resting time in the winter when they must be cooled down to the sixties if they are expected to resume life with equal vigour the next spring. They are a species of plant which never lives out of water although they will develop floating leaves, generally shiny, ovate and long. They also flower above the water, and the fact that they are true aquatics often results in them being some of the few plants that will flower under artificial lighting in an aquarium. I am speaking about aponogetons in general, but I have had experience of the flowering of *Aponogeton crispus undulatus*, and the King *Aponogeton ulvaceus*. *A. natans* is a plant that closely resembles *ulvaceus*, resulting in this more common plant being sold as the true King. Any doubt is dispelled by the fact that only *natans* will develop floating leaves. The seeds of the aponogetons are also interesting, as they differ from terrestrial plant seeds. They are as big as a green pea and they instantly germinate the moment that they fall from the ripened flower. Terrestrial seeds often take many months to germinate and are covered by a thick outer layer to stop them from drying out. Water seeds do not need this.

Red plants, like *Alternanthera sessilis* are not suited to life underwater. Their very redness means that they need more light than other plants. The red pigments are dissolved in the vacuolar sap of the plant, and are dominant to the green chloroplasts. However, the green pigments are still there and these enable a red plant to still photo-synthesise. However, this red pigment absorbs much of the valuable light that could be otherwise used by the plant, and so all red plants

must have the maximum lighting available. It is a complicated process to explain why there is the presence of these inhibitory pigments, but it is thought that they may be something to do with the waste products of the plant.

So much fun can be obtained by experimenting with these plants, and you will find the mistakes as useful as all the successes. Try growing Indian fern *Ceratopteris thalictroides*, out of water, and see the delicacy of

leaf-form. Watch the speed at which *Hydrocotyle* sends its little "umbrellas" across damp soil out of the water. I really hope that others can share that fabulous feeling that I get when spring induces all these plants to spring into activity. Why not read about all the individual traits of the different plants, where they come from, and about how they compete for life? Then maybe the plants will become personalities to you, as the fish have become, and they'll lose the insulting title of "weeds".

EXPERIENCES WITH

Nanacara anomala

by Frank Stephens

IN MY EXPERIENCE with the egg-depositing dwarf cichlids I have found *N. anomala* to be one of the easiest (or perhaps the least difficult is a better expression) species to breed. Due to this I usually recommend this species to aquarists wishing to try to breed dwarf cichlids for the first time.

There is one further aspect of the species which makes it a good candidate for experimental study and this is that breeding pairs can be disturbed to a far greater extent than members of the genera *Apistogramma* or *Pelvachromis*, without the usual resultant loss of eggs.

There is, of course, no hard and fast rule on this point and wild stock are more likely to eat their eggs or young than second or third generation tank-bred fish. This species, native to the Northern areas of South America, has been available to aquarists for many years but as is the case with many dwarf cichlids it has never become an established favourite.

For a normal breeding exercise all that is required is a small well-furnished aquarium, plenty of live foods and a mature, compatible pair—nature will take care of the rest. One recommendation which is usually made is to remove the male after spawning is completed but if a large well-planted tank is used this is not necessary. *N. anomala* females make good mothers and unless they are adolescent the chances of the progeny being eaten are quite small.

Raised on a diet of brine shrimp, cyclops and *daphnia* the fry grow quickly and are easy to maintain.

As will be seen from the following account it is possible to wean tank-bred fry on to artificial foods but wild stock will rarely eat anything but live foods. This is therefore a general illustration of the species in the domestic aquaria but now to move on to the study exercise of the species.

Towards the end of 1970 I exchanged correspondence with an American associate on the incorrect practice of some literature in stating definite egg colour characteristics in dwarf cichlids. In some cases in this country aquarists take supposed species identifications based solely on egg coloration alone.

My colleague had made some observations on the dietary effects on egg coloration and I attempted to confirm his findings by setting up a controlled feeding/breeding study. For this study I used three pairs of *N. anomala* which were raised from one spawning from tank-bred parents. All the fish had been kept in a raising tank until the sex differences were easily differentiated. When selected the pairs were approximately 24 weeks old.

Three identical tanks measuring 40 × 20 × 20 cms. were set up as follows: Temperature 82°F ± 1°F; water, slightly acid, pH 6, 8, furnished with gravel, bunches of hair grass and bacopa and one small plastic flowerpot. Illumination in each tank was supplied by a 12-watt strip light. The study area was not subjected to natural daylight and a time clock controlled the lighting giving 17 hours illumination and 7 hours darkness in each 24-hour period. Prior to selection

for the study all the specimens had been fed on a general diet of *daphnia*, whiteworm and mixed flake foods daily with *tubifex* three times weekly. After placing the pairs in the control tanks the exclusive diets were as follows: Tank No. 1, *daphnia*, whiteworm, *tubifex*. Tank No. 2, two brands of proprietary flake foods both having a vegetable base and being green in colour. Tank No. 3, egg yolk and corn meal. The first two spawnings were discarded for two reasons: (1) to ensure that there was little chance of the egg coloration being affected by the previous diet of the parents, and (2) to test the eggs for fertility by subjecting them to development determination.

*The numbers of fry have been adjusted as one youngster in each of these groups died after becoming free swimming.

In order to establish some pattern, the experiment was undertaken on a further three occasions and again the results showed a similar spread and overall figures were as follows:

Diet	Age of fry raised
	Per cent
Live foods	85 to 95
Vegetable foods	50 to 70
Egg yolk and meal	20 to 40



On the third batches of eggs being laid the following egg coloration was noted:

Tank No. 1. (Live food diet.) Brown/Red. Number of eggs 48.

Tank No. 2. (Vegetable-based foods.) Olive green with brown undertones. Number of eggs 27.

Tank No. 3. (Egg yolk and corn meal.) Translucent yellow. Number of eggs 31.

With the aid of a dropper, eggs were removed from each tank until each pair were left with 20 eggs.

The following table shows the outcome of the eggs left with the parents.

Tank No.	Temperature	Egg Colour	No. Fungused and/or eaten	No. of fry raised (to one month)
1	81.6°F	Brown/Red	None	19*
2	81.4°F	Olive Green	6	13*
3	81.9°F	Trans. Yellow	14	6

Surviving fry appeared to be equally well formed and no obvious differences in growth, finnage, etc., were apparent between the fry of each group.

As the number of breeding pairs used was limited by tank availability, it was not possible to conduct the study with a preferred sample of 20 pairs therefore these results should be treated as an indication not a conclusion.

After the study period was completed the breeding pairs were returned to the community tank and on comparison with other specimens from the original spawning it was immediately evident that only the pair maintained on the live food diet had achieved the same growth rate as the specimens kept on the general diet. The two pairs maintained on the non-live food diets could not match the colour intensity, finnage or size of the others. After a further two months on the general diet these two pairs had improved in colour

and body shape but they never quite achieved equality in size.

The indications here are that the dietary deficiencies of the non-live food diets certainly slow down growth rate and certain other body functions.

Artificial Hatching of Eggs

Another study was undertaken to try to establish the effects of artificial raising and hatching of eggs and fry. Among cichlid fanciers I have found that opinion is split almost equally on this point. Half are of the opinion that larger numbers of fry survive when natural raising is used and the other half say *vice versa*.

In my own experience with *Kribensis* I have found that the parents raise more young from a given number of eggs than are obtained when artificial hatching and rearing methods are employed. There are, however, two points to be considered: (1) Comparison of hatchings and (2) Comparison of fry raised.

It was on both these points that the second study was based. The breeding set up was as previously described and again three breeding pairs were used. These pairs came from the same spawning as the fish used in the first experiment but had been maintained continually on the general diet.

As it could not be guaranteed that there would be sufficient eggs from each pair to set up four controlled sets of eggs, specimen eggs from two spawnings were used.

At the first spawning each pair was left with 15 eggs and the number of fry raised was as follows:

- Pair No. 1 .. 13 fry.
- Pair No. 2 .. 11 fry.
- Pair No. 3 .. 15 fry.

The overall success average being 87 per cent.

From the next spawning three sets of 10 eggs from each pair were set up in the following conditions:

- (1) Three sets of 10 eggs in original aquarium water plus airstone.
- (2) Three sets of 10 eggs in solution of Methylene Blue plus airstone.
- (3) Three sets of eggs in a solution of a proprietary anti-fungicide plus airstone.

In the case of samples 2 and 3 the manufacturers' recommendations for artificial hatching were adhered to. The results are tabulated below:

Sample No.	Solution	Number Hatched Eggs	Percentage Hatched Eggs
1	Water	14	47
2	Meth. Blue	23	77
3	Fungicide	27	90

In the above cases all fungused eggs were removed, where possible on appearance. In the sample numbers

2 and 3 no clumps of eggs fungused but in the "water only" sample one group of 5 eggs and a group of 4 eggs fungused. It is possible that if the fungused eggs had been left in the "water only" sample the percentage hatch would have been much lower. Ignoring sample No. 1, the percentage differences between the other samples and the natural hatching figure are close enough to be ignored on the basis of a sampling of three sets of eggs and it therefore may be assumed that there is little or no difference between the percentage hatch in natural or artificial conditions.

The slight apparent percentage advantage of the natural hatching should be disregarded when the possibility of parental egg eating is taken into consideration. It is impossible to accurately forecast the risk of parental egg eating but even if it is as low as 1 in 5 that would reduce the natural hatching figure by 20 per cent and the pendulum would swing towards artificial hatching.

With other species of dwarf cichlid I would estimate that the parental egg eating figure would drop to 50 per cent or even less.

The figures obtained of fry raised artificially show greater differences when compared with the natural raising figures. As stated previously the percentage of fry raised by the parents was 87 per cent and tabulated below are the figures obtained on the number of fry raised to an age of one month.

Solution	No. Hatched	No. Free Swimming	No. at 4 Weeks
Water	14	14	12
Meth. Blue ..	23	15	13
Fungicide ..	27	20	19

From the above figures it can be seen that the largest number of deaths occurred in the period between the fry hatching and the fry becoming free swimming. This period of approximately 85 hours was the period in which the hatching solution was diluted. The level of dilution was 20 per cent of the volume every 20 hours. This is roughly in accordance with published recommendations and instructions.

In the "water only" solution where no dilution was required 20 per cent of the total volume was changed at the same rate and no deaths occurred.

Perhaps *N. anomala* fry are vulnerable to this rate of change while in a hatching solution but normally raised fry have withstood water changes of up to 40 per cent without loss.

Similarly other preparations may have less effect on the fry and the indications of one preparation of German manufacture seem to confirm this.

Another less important factor may be that the fry under parental care are herded towards their food by the female and on occasions have it "pre-chewed" for them. Without the female the fry have to search for their own food and this may account for the odd deaths after the dilution was complete.



THE GREEN IGUANA

by Jennifer Martin

It is now seven years since my family, in a state of considerable shock, learned that they were awaiting the arrival of a dragon. This fierce reptile, we were informed, could boast a length of six foot, whiplash tail and an appetite for nestling birds.

In fact, Ignatius, the Common Green Iguana (*Iguana iguana*) proved a cold and wan little creature measuring sixteen inches from nose to tail-tip (which latter bore close resemblance to a damp bootlace).

When he first arrived Ignatius was a rather nasty grey colour all over, but as he grew and became more healthy, he developed into a lovely golden-green lizard with turquoise stripes around his tail, a hanging dewlap under his chin and a most impressive row of thorns the length of his back, although these are actually quite soft and completely harmless.

At first Ignatius seemed to be all big eyes, coughs and sneezes, and I soon discovered the main enemy of these lizards—cold. Since they inhabit the tropical regions of South America, Iguanas need a temperature of at least 85 degrees in the daytime, at least when young, but this is easily provided with a sufficient quantity of light bulbs. I have found one ordinary 100 watt bulb successfully heats a cage measuring 3 ft. x 1 ft. x 1 ft. At night the minimum temperature is 65 degrees, and a child's low wattage night-light appears to be the most effective way of maintaining this. Warmth is extremely important to the

Iguana, as one unpleasant effect of cold can be the loss of circulation in the toes, which are over three inches long. This can result in gangrene and the beginning of a fatal infection. Iguanas can also be susceptible to chest complaints and pneumonia, but an infra-red bulb, plugged into a socket in the cage and lit for a few hours a week gives excellent results in this respect.

The adult Iguana is indeed quite capable of stalking a fledgling, and ours has been caught merrily eyeing a friend's budgie, but the staple diet should consist of every available type of fruit, including tinned, and vegetables. The leaves and stump of cabbage are among my Iguana's favourites, as are water cress, banana, orange and pineapple. The weekly diet should also include some maggots, mealworms or whatever form of live food you feel able to provide, and I believe that a wide variety of household titbits are also essential in order to ensure a balanced diet. For instance, a little buttered bread, cooked and raw meat, egg and some sugar will be very much appreciated.

The fully grown Iguana does measure about six foot, and although this is a misleading statement in that two-thirds of this are tail and an Iguana is easily held in the two hands, they are also very athletic, and mine was able to jump clear across a room at an early age. This means that a large cage is really necessary, and I found that 4 ft. x 6 ft. x 6 ft. was essential. However,

this problem will be overcome as the lizard gradually gets tamer. This can be a slow process, and involves much leaping about the room by all parties, and also some tail-thrashing by the Iguana. In a small specimen this is not dangerous provided you keep your eyes well clear of your pet, and it is a reflex action rather than one of deliberate malice, and will disappear once the animal is tame.

Quite soon an Iguana will become a charming and rewarding pet, since it will sit on the shoulder or lap, and screw its face up in delight when stroked. An Iguana is perfectly safe in a room with the windows and doors shut, and will soon learn to snuggle up in a chair just like a cat.

Obviously, the problem of housing has to be adjusted according to private means, but I would suggest that unless you can offer a full grown iguana a conservatory or a similar sized cage or run to live in, then it is best to train him to join the family in the evenings, which incidentally, takes a lot of patience and hard work but is worthwhile in the end (it may also be necessary to train your family to join the Iguana).

The cage, of whatever size, should be provided with plenty of sand which these lizards love to scabble about in; in the wild state they would lay their eggs in loose gravel and it is also wise to place a small heater in some accessible position where you can put the food. If this is always laid down in some chilly corner, the Iguana may refuse to emerge and eat. Remember, too, that he will become acclimatised only gradually to our weather and will be more susceptible to cold at first. I have found that a tropical animal does not become really used to our weather for about three years.

There should also be a large pan of water provided,

since as well as needing to drink, Iguanas love the water and will spend hours sitting in the bowl.

Another much appreciated decoration is a log of branch, preferably protruding so that he can perch precariously over the edge, and some flat rocks arranged under the heater will be welcome as a basking-place.

When including plants, be very careful, since some animals do not seem to have the sense to avoid the dangerous ones such as ivy, oleander, privet and laburnum.

The cage should, of course, be light and airy and unless you have extraordinary means, something built from wood and glass is probably the best. A good ironmonger's shop will prove invaluable as a source of supply of such items as catches for doors, light fittings, perforated zinc and its modern equivalent, perforated plastic.

To my mind, it also goes without saying that any animal should be given two things: privacy and companionship. To be isolated among vast numbers of alien creatures, especially at first, must be a terrifying experience for any animal. Also, in these days of environmental awareness, I think it very wrong for anyone to keep any animal singly. Although the chances of your breeding an Iguana are remote, that is no excuse for not at least trying, and anyway, the lizards will fare better in the initial stages of taming if there are two of them.

An Iguana is not an easy pet to keep. But it is a fascinating creature, and by no means impossible to maintain in the home with a little thought and imagination. And at least your dinner parties will never lack for topics of conversation!

ADVANCE NOTICE

THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES
are proud to announce



THE 22nd BRITISH AQUARISTS' FESTIVAL

will be held once again at Belle Vue Zoological Gardens, Manchester

on

SATURDAY AND SUNDAY - 13th, 14th OCTOBER, 1973

FURTHER DETAILS SHORTLY

From a Naturalist's Notebook

by Eric Hardy

TEN SPECIES and sub-species of minnow inhabit the freshwaters of Europe and Asia. Our British *Phoxinus phoxinus*, which tears around the garden pond carrying a morsel of food too big to swallow and pursued by its hungry companions, like a seagull with food in the park, is not usually found north of Banffshire. It ranges through western Europe and the brackish waters of the eastern Baltic to Amur, including Lake Baikal. It was probably the "shoaler" of old time writers, competing for food with young perch and trout in rivers, and it has distinctive rounded fin-edges.

A reader from Speke (Liverpool) writes: "Please tell me if there is a subspecies of minnow called the Marsh Minnow. I have never seen it mentioned in textbooks." Yes, there is a marsh or swamp-minnow (*P. phoxinus*) which shoals in overgrown, weedy, muddy ponds and stagnant lakes and rivers flowing into the Baltic (like those in Poland near Cracow, Danzig, etc.), and into the Arctic Sea. Instead of the large lateral blotches which mark the common minnow, this has spotted sides, while the adult is as stout as a young tench. It grows to between 2 and 3½ inches, the biggest being 4½ inches. It lays its eggs on aquatic plants, and feeds upon small invertebrates—waterfleas and insects. In an aquarium, where brook or canal minnows spend much time at the surface, they quickly become accustomed to artificial food; but those from running streams are more difficult to acclimatize in a tank.

Among many local names, anglers talk of Brook Minnows for semi-transparent young fish, "Pinks" for spawning fish with coloured bellies, and "Struts", the darker Trent fish; but these are all forms of the same species. Fast-stream fish feed more on *algae* than *Daphnia*, which are taken by lake fish.

Our correspondent also asks where in Lancashire does the bitterling live and breed. Although Dr. Margaret Varley's 1967 book on British Freshwater Fishes dismisses the bitterling with a cursory remark that it is "said to be naturalized in Yorkshire", its distribution has, of course, been published in Lancashire, Cheshire, Shropshire, the London area and other waters. In Lancashire, where I first published its breeding in swan-mussels in canals, lakes and industrial flashes, its origin was mainly liberation of surplus live bait by anglers using it for that purpose (Zool. Record 1954). Its Lancashire haunts are mostly around industrial St. Helens—Carr Mill Dam, St Helens Canal (Collins Green), Leg of Mutton Dam, Taylor Park Dam, Carriage Drive Reservoir, Sutton

Monastery and Mill dams, Duckery Flash (Derbyshire Hill), Bold Rock Hole, Bold and Haydock ponds, Pennington Flash (Leigh) and Wigan flashes are among waters where it has been found. But its numbers fluctuate considerably over years. Its earliest known haunt was a Moss Lane field-pond, opposite St Helens R.U.F.C. ground at the beginning of the present century. Deliberately incomplete Lancashire & Cheshire Fauna Society's reports quoted the discovery of this fish without any experience of it, and without the customary scientific acknowledgement of the original published source! A Shropshire haunt is the canal between Waterloo and Whixall.

Culturing frigate-mackerel at Kinki and Tokai Universities, Japanese biologists in 1971 could keep the fry alive for only 10 days after hatching. Last year, the fry were still alive 40 days later. They also fertilized and hatched skipjack tuna eggs for the first time known, though they had twice previously cultured yellowfin. They captured mature male and female skipjacks, obtained eggs which they fertilized and sent to laboratories which hatched them. Larvae of 2.7 mm placed in *Chlorella*-laden tanks of 27-28°C, had grown another millimetre by next day. In Britain, Ministry biologists find the wide toleration of fast-growing turbot an asset in rearing newly-hatched fish, providing problems of weaning and feeding can be overcome. The WFA is best known for rearing plaice and soles, but it has also reared cod, coalfish and grey mullet. Aquaculture may have to bolster marine food-fish production in the future. Turbot, sole, hake and halibut, inbred by geneticists for fast maturing and spawning in captivity, may provide it. Russian biologists have cultivated *algae* and marine invertebrates to aid fish-culture. By selection and hybridisation at their Arkhangel (White Sea) and South Sakhalim sea-algae labs, they make saltwater cultivation of seaweeds of the groups *Anthelia*, *Furcellaria*, *Laminaria*, *Fucus* and *Phyllospadix* for food and chemical use. They began with *Anthelia* in 1957. In the artificial fertilization and incubation of flatfish in a bay of the Black Sea, 4 or 5 day old larvae are given additional feeding in nursing ponds, but are returned to the natural bays and estuaries for rearing until 2 or 2½ months old. Half of those reared this way reached 5 or 6 years, for breeding.

The Russians continue to acclimatize Pacific hump-backed salmon and crabs in the White Sea and Barents Sea basins; but since a few of their hump-back salmon reached Britain a decade ago, there have been no

further records here, though they still claim these fish return to Norway, Iceland, northern Russia and other European rivers, which seems an exaggeration.

When the Merseyside Aquarist Society, one of the country's largest, recently kindly nominated me for a second term as president, it was an opportunity to look back on the history of freshwater aquaria in this area. Apart from Southport Winter Gardens Aquarium of 1874 with M. H. Read as curator, and one my friend the late J. W. Cutmore formed in the basement of old Liverpool Museum after the first world war, the pioneer of amateur efforts here was the late Fred Jefferies who died, over 90, in 1971. I still have my personal invitation to the March 1932 official opening of his attempt at a public aquarium, in the old Cliff House conservatory at Wallasey, Cheshire.

Jefferies' enthusiasm was too ambitious. A very practical man, he formed the old Merseyside Aquarium Society in 1926 with the principal aim of a public seaside aquarium at New Brighton, with himself as corporation curator. None of the aldermen given office in the society had any real interest in the project. When the pre-war development of the new promenade completely blocked his Cliff House aquarium, the society died a natural death. Meanwhile, neglecting his photographic studio to do nearly all the society's work (he incorporated it without a solicitor), the business was no longer profitable. He took over a shop,

which failed, and finally took a job in Liverpool. I found few people attending his society's meetings, either indoor lectures or outdoor collecting trips, mainly because they were held at his business studio in an obscure side street in Wallasey, instead of a more central Liverpool site, and had little interest in fish-shows. As my name appears in the helpers acknowledged in the council's Report for 1933-34, my interest in water life isn't anything new. I was also writing in the *Aquarist* before the war, when Jefferies was one of its aquatic plant correspondents. He offered himself as secretary to a pre-war Liverpool effort to form a zoo society, but withdrew when he found it was honorary. Unfortunately, his jumbled collection of small tanks, on stands cut from iron bedsteads, with an aerator worked by pedalling an old bicycle, earned his Cliff House aquarium a reputation of amateurishness. 10,000 (mainly schools) visited it in its first year; but public interest soon lapsed. He could not see that the place for a purely scientific aquarium society was not in Wallasey, much less a professional aquarium. He virtually threw away his job and life to learn it the hard way. When the Merseyside Aquarist Society was launched in Liverpool after the last war, he ignored an invitation to participate. Ironically, a well-displayed tropical aquarium was formed professionally in Wallasey's waterfront amusements.

MAKING AN ALL-GLASS AQUARIUM

by Jorgen Hansen

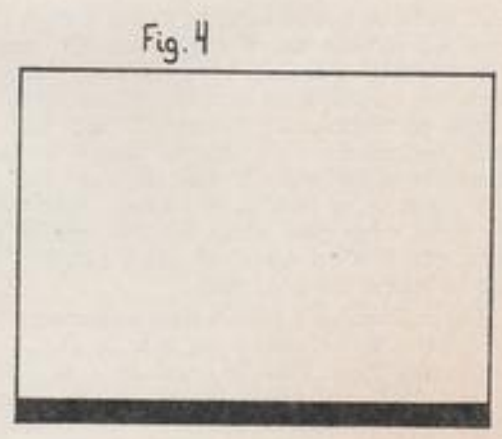
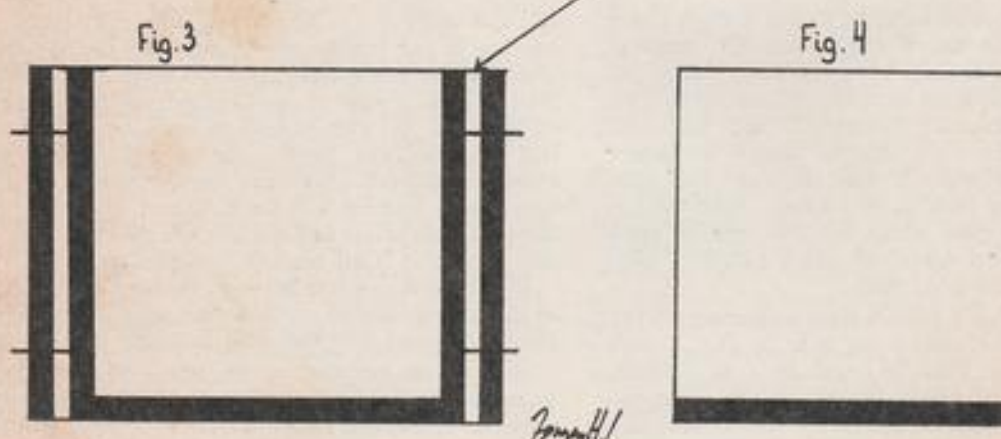
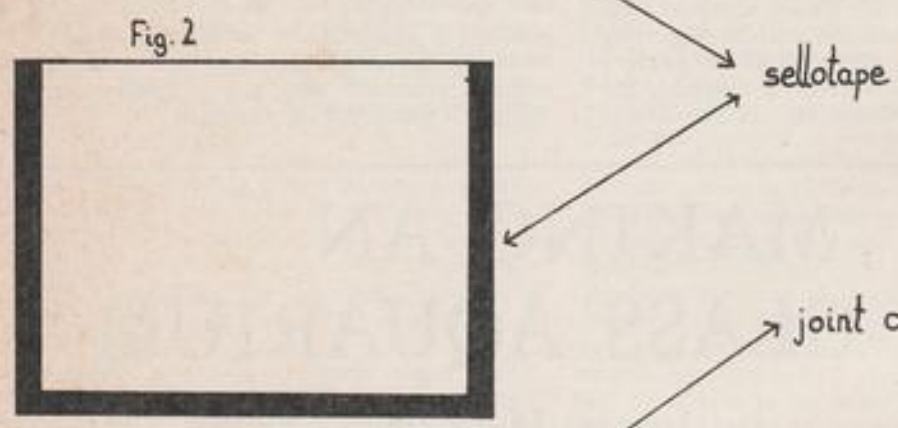
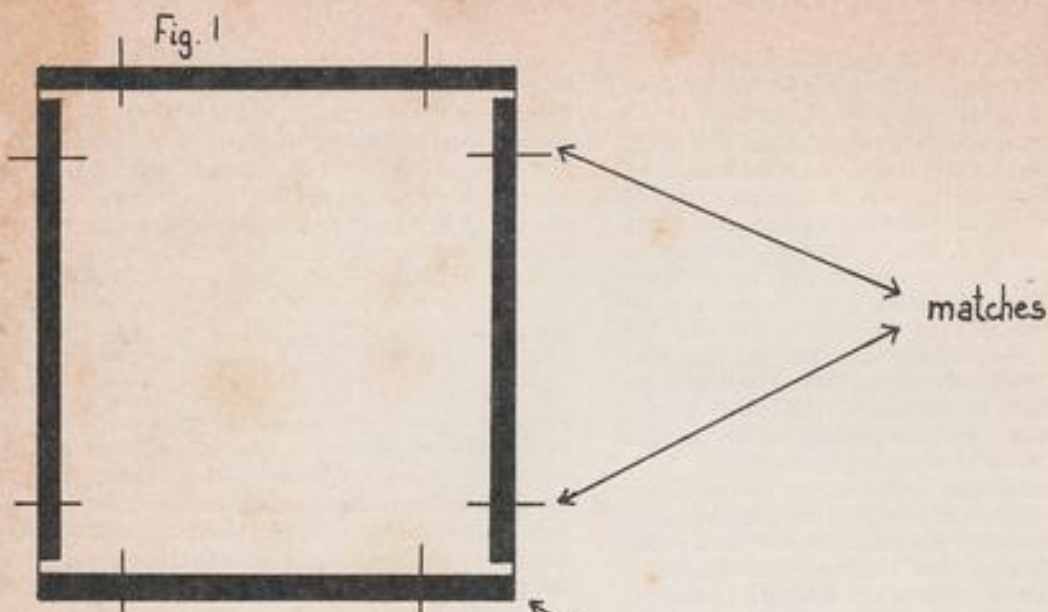
I GET MY GLASS from a technical school nearby, where every six months the window-panes are removed from their frames in order to be polished. When the sheets are turned to be polished on the other side, a little bit occasionally breaks off, and then that whole big window-pane can no longer be used—except for aquariums. If one can't get free glass then it has to be bought, of course. Most glaziers sell cheap scrap glass which one can use for small tanks, but if it's a matter of larger pieces of glass then of course the price rises.

Here in Denmark a pane of glass measuring 0.5 cm. × 80 cm. × 40 cm. costs about 36 kr. or £2. If one's buying glass 5 mm. thick for a tank 40 × 40 × 80 cm. in size it will cost about 144 kr. or £8. One will need only $\frac{1}{2}$ cartridge of glue for a tank of this size,

and this works out at 18 kr. or £1, though of course one has to pay for the whole cartridge, so it's more economical if one's making several tanks. A smaller tube of glue is also obtainable, but one has oneself to press out the glue instead of using an applicator, and this isn't so handy. So, excluding cost of applicator and other necessary tools, each tank of this size, which contains 128 litres, should cost no more than £9. As prices in Denmark are generally higher than in Britain it will perhaps cost you less.

Rough glass can also be used, except for the front of the tank. Four of my tanks are made from rough glass I obtained free but with a bought front glass.

Now we can get down to the actual details of how to make a tank. The one I deal with here is to be used for spawning dwarf cichlids, catfish, bubble-



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nest builders and various types of tetras and barbs, which is why the measurements perhaps seem a bit peculiar. The height is to be 30 cm., length 40 cm., and width 40 cm. We need 5 sheets of glass:

1. 1 bottom glass 40 × 45 × 0.5 cm.
2. 1 front glass 40 × 30 × 0.5 cm.
3. 1 rear glass 40 × 30 × 0.5 cm.
4. 2 bits of side glass 40 × 30 × 0.5 cm.

First cut the glass to the desired measurement with a glasscutter. Cut the glass on a table or other flat surface, and then move it out over the edge of the table so that the mark of the cuts runs right along the edge. Then break the glass by sudden pressure down on the part lying over the edge. Remember to hold the glass firmly, and always let the larger piece remain on the table. If the bit to be cut off is too small to break in this way, then you have to crack the glass along the mark of the cut by knocking sharply from underneath with the glasscutter.

When the glass is 0.5 cm. thick or more, it is extremely sharp on the surface of the break and so it's necessary to grind the sharp edges away with a carborundum rubbing brick (silicon carbide—one of the hardest known materials). If you wet the brick it will reduce the number of splinters flying around.

If one cuts wrongly with the glasscutter one can't do it again, as the glass will sooner or later break along the cut, so one might as well break it immediately. Glass is best kept in a standing position. Our local glazier says, "When glass is standing it's so strong that one could build a house on top of it." When it's lying it breaks easily, unless the bottom sheet is completely level.

When the glass is cut and ground, one prepares to set up and glue. First the bottom sheet 40 × 45 cm. If one has glass of different degrees of thickness, choose the thickest for the bottom glass, as it'll be the strongest.

Where the sheets of glass meet there should be a distance of about 2 mm. to make room for the injected glue. You can use Sellotape to delimit this space between the respective sides, and matches or nails can also be secured with Sellotape to keep the sides the necessary distance apart from the bottom. When Sellotape is used one gets a little edge round the tank and in my opinion this makes for a better effect. The Sellotape is intended to give straight, clean joins and should be removed as each respective join is glued and before the outer layer of glue sets, as one can otherwise risk spoiling a join. There's no reason why one can't move the sides completely out so one doesn't get the edge, and thus make full use of the glass.

You don't have to attach matches to the two pieces of side glass, but Sellotape is placed both inside and outside, to take superfluous glue.

The distance between the two strips of Sellotape,

which on each side run from top to bottom, is 0.5 cm., corresponding to the thickness of the side glass, which hits both front and back glass along this line. If you place the Sellotape correctly, then when it's glued you get a nice straight join. These are the only two joins visible when the tank is completed.

Here you should place only a strip of Sellotape at the bottom of the glass, as this is the only place the glue will touch the outer side of the front (back) glass.

Sellotape

If you use the same sort of Sellotape (about 1.5 cm. wide) for the whole tank, you hardly ever get into difficulty with the measurements. Make sure the glass isn't dusty otherwise the Sellotape will stick on to the dust instead of the glass. This is especially important when the tank is being set up ready for gluing.

Cleansing

After the Sellotape is placed, all surfaces which will come into contact with glue must be thoroughly cleansed. The easiest way to do this is to wipe with a cloth dampened with methylated spirits, and then to finish off with benzine or carbon tetrachloride. After cleansing the joins must not be touched as a thin layer of sweat from the hands can prevent attachment.

Setting Up the Tank

I always start with the bottom glass. It must be placed on an absolutely flat surface, completely free from sand or gravel. If you place a newspaper underneath you avoid unnecessary mess. Set the front glass and one piece of side glass in place so that the end surface of the side glass adjoins the join previously prepared on the front glass. Sellotape is then placed across the top of the two sheets of glass and down about 10 cm. to each side. This Sellotape will prevent the side glass from falling outwards but it can still fall inwards so don't let go. The front glass should theoretically stay in place now as the Sellotape prevents it from falling outwards and the side glass prevents it from falling inwards, but be careful, as only a single piece of Sellotape holds the whole lot together.

Thereafter two strips of Sellotape should be placed over the corner now formed, one at the top and the other at the bottom. These will prevent the side glass from falling inwards but make sure they stick on properly. Then check that the corner forms a right angle, and thereafter set up the second side glass in the same way as the first, and finally the back glass. Everything is held together with Sellotape. It doesn't pay to be miserly with the Sellotape as I once had to admit not long ago when a large back and side glass fell apart and broke into more

pieces than I care to think about. When I make big tanks now I often stick a bit of Sellotape the whole way around to ensure that the structure doesn't collapse. Now glueing begins.

Glue

The glue to be used is a silicone glue available in plastic cartridges of $\frac{1}{2}$ litre. The contents of one cartridge can stretch to three tanks measuring $80 \times 40 \times 40$ cm., if one isn't too liberal, or to a join 1,200 cm. long. The content of silicone, a high polymer substance derived from silicon and oxygen, makes the glue proof against heat, cold, and the action of chemicals, and moreover, water-repellent. The glue I use bears the following inscription:

Rhodorsil Mastic 3B (building sealant transparent)

Expansion: 600% maximum

Ultimate strength: 25-30 kg. per cm^2 .

Endurance: -30°C . to 200°C .

Elasticity module: at 100°C ., 5 kg. per cm^2 .

Insensitive to climatic ageing.

The most important of the above information is that concerning the ultimate strength and also, of course, that the glue doesn't decompose with age. If for example we consider the front glass, then we have two joins measuring $0.5 \text{ cm.} \times 30 \text{ cm.}$ which gives a joining surface of 30 cm^2 , and then there's a bottom join measuring $0.5 \text{ cm.} \times 40 \text{ cm.}$, which gives a joining surface of 20 cm^2 : thus in all 50 cm^2 , each cm^2 having an ultimate strength of at least 25 kg. For the front glass to succumb to water pressure and collapse it must therefore be acted upon by a power of at least 1,250 kg. evenly divided over the whole plane. If for convenience we assume that the water presses over the whole sheet of glass, which actually isn't the case, then the water pressure per cm^2 would have to be about 1 kilo, which would only be possible if there were at least 1,250 litres in the tank—and then we haven't at all calculated the pressure to be distributed between the other three sides and the bottom glass. The tank we're dealing with has a capacity of only 50 litres.

The Actual Glueing

The cartridge of glue should be placed in a cartridge applicator gun, complete with plastic nozzle. Pump until the glue appears, then begin glueing. Hold the nozzle right up to the join, and make sure that you fill the join completely. It's best to glue from match to match around the corners rather than stopping and starting again at each corner, as corners are otherwise apt to be incompletely glued, with resultant leaks. Superfluous glue can be wiped off by smoothing upwards with a damp finger. Then remove the Sellotape so a nice even edge is obtained. You need to wait until the glue hardens, that is at least 24 hours, before improving a rough join or filling an air bubble.

Cut into the bubble with a sharp knife and then fill it with glue.

It's important not to press the applicator so hard against the glass that the latter is pushed out of place. If that happens you may have to set up the whole thing again, and that includes removing the glue and re-cleansing the glass—assuming of course that it didn't all crash to the ground.

The matches can be pulled out after 24 hours, and the resultant spaces filled with glue. It's a good idea to fill each hole as one removes the match, as one doesn't then overlook a hole as I once did. The joins themselves need to harden for three days to be on the safe side, after which time the tank can be put into use. With glass up to 9 mm. thick a join of 2 mm. is sufficient. Thicker joins need glueing twice, first from the inside, this being left to harden for 24 hours, and then from the outside. If one is keen one can let one's imagination roam and create whatever sort of tank one likes, no matter how many sides.

The tank should be placed on a completely flat surface, as otherwise tensions can occur which can lead to the bursting of the bottom glass. I myself use two blocks of wood, one at each end about 5 cm. in, to support each of the smaller tanks, and a thick flat board fully supporting each of the larger tanks.

These tanks can be used both for fresh and salt-water, and they never leak either with age or when moved, as so often happens with framed tanks. Preben Hagenard, an aquarium dealer in Elsinore, Denmark, was the first in the world to think of making tanks with this glue, and the first five tanks he built have been in use for over four years, and are still water-tight despite removal back and forth to aquarium exhibitions and the like.

Denmark's Aquarium in Charlottenlund have made many of their quarantine tanks—both fresh and saltwater—by the above method.

WHAT DO I NEED?

by Hilary Maynard

My first is in PLASTER but not in LINT,
My second is in WHETSTONE but not in FLINT,
My third is in FINISH but not in END,
My fourth is in MAKE and also in MEND.
My fifth is in CAMERA but not in SLIDE,
My sixth is in SKATING and also in GLIDE.
My seventh is in ANCIENT but not in OLD,
My eighth is in GALEFORCE but not in COLD.
My ninth is in STUDENT and also in BOOKS,
My tenth is in PASTRY but not in COOKS.
My eleventh is in OAST-HOUSE but not in MILL,
My twelfth is in INVOICE but not in BILL.
My thirteenth is in PRICE-TAG and also in FEE,
My whole's a necessity, don't you agree?

Answer on page 482.



WHERE IGNORANCE IS BLISSFUL DISCUS

My pair of Discus are completely ignorant of the way they should behave. They cannot possibly have read any of the articles in books and magazines, because they should have been dead a year ago—it's really most worrying!

The facts are these. I was up to my eyes in Marines, so to speak, but I had a tank which fitted into the corner of the lounge, which held about 50 gallons and got no direct daylight at all and just had common freshwater tropicals in it.

Seeing a pair of approx. 3 in. Discus I bought them—turfed out the "Commoners"—washed the 2½ in. of gravel—put a 12 in. square undergravel filter in the corner—filled up with tap-water—put in some upright sandstone rock and a few plants, and in went the Discus after 24 hours. These ignorant fish have not yet noticed that NOT ONCE has the gravel been gone over with a filter. Never more than 2 gallons been replaced at a time, and that never oftener than once a fortnight. Sometimes the water has been left for 6 weeks! I never had time to bother with anything other than White Worms, so they've NEVER been given anything else.

Every detail given above is absolutely true, and I defy anyone to see finer, fitter and more brilliantly coloured brown Discus. Mind you, I have 20 boxes of White Worms, fed off the best mixed fish food, put through the wife's liquidizer, so that it is a powder, put into a very large pepper pot and sprinkled on the TWO surfaces of my worm boxes, which are merely a frame of 3 in. x 1 in. timber with sheets of plate glass both sides overlapping the edges all round. All one has to do is to turn a box upside down and scrape the worms off the glass, sprinkle the mixture on the soil, turn the box upside down, so that next time you scrape the worms off the glass that has been at the bottom.

My theory is—possibly incorrect—that whatever goes into the worms goes into the fish! Still, it's dreadful to think that I've been landed with Discus that are "All brawn and no brains"!

I must add that I introduced with the Discus, two little Catfish—Tiger Cats—I think—and one of those plastic tub things with gravel, peat and wool in it. The air goes through it, and doubtless because of the Cats and the fact that nothing but White Worms have been given, the gravel is as clean as when it was put in over

a year ago and never been disturbed. The lighting is two strips of 24 in. each, one ordinary and one Grolux.

Heavens! I've just remembered that the stuff in the plastic tub affair has not been changed YET! The brainless idiots haven't noticed that either. Doubtless I'm brainless, too, but with these fish it's paid off and I'm a truthful bloke.

V. V. PEDLAR,
Uplands,
Parbold,
Lancs.

P.S.—If you want a "STOCK POT" of White Worms to recharge your boxes, put about 6 in. of sterilised potting soil in a plastic bath. Lighten it with a little sandstone sand. Make a moist mixture of any of the following:—Mixed fishfood, oatmeal, Glaxo, egg food (as for birds), little fine sugar, soaked brown bread, and any similar stuff you find about. Put it in lumps about the size of a walnut every six inches in the soil and sprinkle plenty of worms over the top. Cover with an opaque sheet of anything non-absorbent and leave for a few weeks—quite moist but not wet. Never let your soil in boxes or stock get solid, but keep it loose with a garden hand fork.

COOL CATS

I am always surprised to read in the *Aquarist*—the January edition being no exception—of readers having trouble or losses in their community tank, and then having it revealed to them through "Coldwater Queries" that a catfish is undoubtedly to blame. I would just like to say that I have two catfish, which I have reason to believe are almost fully grown, in my community tank. They share home with a London Shubunkin, a Common Goldfish, two small Pearl-scale Goldfish and a Bronze Carp, all of which are the same size or smaller than the catfish (the Pearl-scales are less than half the size of the largest catfish), and absolutely nothing whatsoever has happened to my fish in the four years that I have had them all. I believe, however, that both the catfish could swallow any of their "room mates" if they so desired, but it appears now that this is unlikely to happen after this length of time.

When I first introduced the Bronze Carp, one of the catfish made it obvious that he was not welcome, by butting him on the side. In response to this, the carp turned on the catfish and gave it a sharp suck on the nose which sent it briskly to its hiding place!

However, I do agree with Arthur Boarder when he says catfish are no better than goldfish as far as scavengers go. The Bronze Carp does a wonderful job of this—he is always on the move—and as he passes any of the other fish—even the catfish—he calmly relieves them of anything that is sticking to their bodies, as if it were part of his daily duties!

I would be most grateful if anyone could give me

some information regarding the coldwater catfish (other than that common story of their ability to devour or annoy any other fish they are kept with!) and/or the Bronze Carp, as I can only find small snippets of information which is of very little value. Also, I wonder if there are any other readers who keep catfish and find that no trouble has arisen because of them.

I would like to end my letter by saying how much I enjoy reading the *Aquarist*, especially "Coldwater Queries" by Arthur Boarder, and "What is Your Opinion?" by B. Whiteside. The cover illustrations are excellent, being very colourful and full of life and the magazine is certainly worth every penny!

B. B. SMITH,
5 Ladywell Sawmill,
Kirriemuir,
Angus,
Scotland, DD8 5PD

Obliging Anemones

I have recently read an article in your magazine reference Anemones and Hermit Crabs, by R. T. F. Gántès, in the January issue, and although I found it interesting, I am afraid I have to say that it is incorrect, especially the statement, and I quote, "But on the other hand, it seems that *Adamsia* cannot live without *Pagurus*. Separated from its crab, *Adamsia* fixes itself to the bottom and soon dies, even if it is fed," end of quote.

It so happens that in my shop I keep a salt water tank which is stocked with local fish and invertebrates. Now over two months ago, a friend brought me a hermit crab in a whelk shell, which was covered by five *Adamsia Palliata*. Knowing the damage the crab would do in my tank, I took off the Anemones and transplanted them into the tank; they have been fed tablet food every three days and they are still in the best of condition.

I would be very happy to hear your views and Mr. Gántès' as well.

VINCE BUSUTTIL,
Coral Reef Tropical Fish Centre,
Testaferrata Street, Msida.

Fourfold Satisfaction

I would like, through your magazine, to express my sincere thanks to the following people, without whose help, my decision to change to *Marines* may never have passed the stage of thought:

To the Goldfish Bowl, who gave me a lot of time and practical demonstrations regarding feeding, etc.

To Graham Cox of SeAquariums for a very detailed and clear account of setting up a marine aquarium.

To Mr. Strong, Public Relations Officer, British Marine Aquarist Association, for a very nice and informative letter.

To Tetra Min U.K., Bradford, for the food samples.

It is very gratifying to find so many people, prepared to help a novice, and I feel that I now stand a very good chance of successfully setting up and maintaining a marine aquaria.

JOHN T. SPRAGUE,
14 Withycombe Drive,
Banbury,
Oxon.

Collecting Marine Fish

I refer to Mr. Sankey's article in the January issue of *The Aquarist* in which he condemns sodium cyanide and rotenone in particular for collecting aquarium marine fishes. I admire the way in which he has campaigned to stop this sacrilegious act and am pleased at his success.

During my recent trip to Japan I was told that it was possible to detect moderate to acute chemical poisoning by means of the red patch appearing on their side just behind the pectoral fins. Has Mr. Sankey found that this is a symptom of chemical poisoning resulting from this method of catching fishes?

J. N. CARRINGTON,
Interpet,
Curtis Road,
Dorking,
Surrey, RH4 1DP.

PRODUCT REVIEW

Two-Way Valve, and Airline Connector, costing 4p and 1p respectively, from T.F.H. (Great Britain) Ltd., 13 Nutley Lane, Reigate, Surrey. (For illustration see advertisement on page xvii of the December 1972 *Aquarist*.)

There is not much that one can say about these two new items, other than that they are soundly constructed, relatively inexpensive, and work well; they are also attractively finished, the former in white plastic with

a red screw knob, and the latter in clear plastic. The screw knobs show a pointing arrowhead which lets one see when the valves are fully open. The white valve bung in the side of the two-way valve can be removed to connect up a battery of valves and outlets.

B. WHITESIDE.

Kiho R-III Aerator, price £4, distributed by T.F.H. (Great Britain) Ltd., 13 Nutley Lane, Reigate.

Surrey. (The country of manufacture is not stated on the product.)

In the January, 1973, edition, I had the pleasure of reviewing the Kiho R-II aerator; the Kiho R-III is similar to the R-II but has a number of extra, attractive features. (For photograph of R-III see advertisement on page xxi of January, 1973, issue.) This pump is a twin outlet model, and each air outlet can easily be adjusted by turning a small, rubber knob on the outlet stems. One thing about the pump greatly pleased me: it is fitted with its own small on/off switch. No doubt there are other pumps on the market which have their own switch, but I have yet to come across one myself. Normally, when I buy an aquarium pump, I have to trot along to a chain store to pick up a switch with which to fit the pump. The Kiho R-III has solved this problem! Another attractive feature of this new pump is its compact size, and very pleasing appearance. On looking inside the pump, after removing the heavy rubber base and its fitting screws, one is struck by just how well all the available space inside the casing has been put to good use. The components seem to be soundly constructed, as do the pump's twin diaphragms.

When I carried out some tests on the pump I was impressed by how quiet the pump was considering that it gave quite a good air output. The base, which also houses the air filter, is fitted with four rubber feet; it also has two holes by which the pump can be suspended.

The Kiho R-III is attractively finished, and is very pleasing to the eye. It gives a good air output and is relatively quiet in operation. It is soundly constructed, has twin adjustable outlets, and its own on/off switch. It will please a lot of aquarists. One small criticism: about 29 in. of wire is not very long; it wouldn't even stretch the length of a 30 in. tank. Twice this length would be more appropriate, and surely wouldn't cost much more. However, it's a very minor point—but one which all manufacturers of electrical equipment for use in, on or around aquaria could note, as I have suggested so often before in reviews.

I found that either outlet from the Kiho R-III could operate at least four, small filters with ease—but as I said before, such figures have little meaning.

As standards for testing aquarium pumps would surely be of advantage to manufacturers and distributors, as well as to hobbyists, I wonder that still no such standards have been formulated. We can measure the size of our tank, how much water it holds, the pH and DH of the water, the temperature of the water, the wattage of the tank's heater, the wattage of the tank's light bulbs, etc. Should we not also be able to measure the work which could be done by any given aquarium pump? I feel that we should! What do you feel personally? If you feel as I do, you could consider letting manufacturers and distributors know!

B. WHITESIDE.

Reliant Test Kit, for testing the pH of marine water; price 80p; manufactured by Reliant Products, 150 Clayhill Road, Basildon, Essex, and distributed by C. J. Skilton, Great Gibcracks Chase, Butts Green, Sandon, Chelmsford, Essex.

Those who read my review of Reliant products, in the January, 1973, edition, may have wondered what the penultimate paragraph was about. When I wrote the reviews for that edition, I included reviews of two different types of pH testing kits—Wardley's and Reliant's. Unfortunately, for some reason, after the reviews left me, the Wardley review was omitted in print, and this made the comparison in the penultimate paragraph nonsense as there was nothing else in print with which to compare the Reliant kit. I hope that the full Wardley's review will appear in print—if it has not already done so by now.

In the Reliant review I ended by saying that I was unable to test the marine pH testing kit as I did not have a marine aquarium. This brought a letter from Mr. P. Kertesz, B.D.S., L.D.S., a dental surgeon whose residence is at 149 New Bond Street, London, W1Y 9FE. Mr. Kertesz wrote: "I was disappointed that your 'New Products' reviewer did not have a marine aquarium to test the Reliant marine test kits . . . I hope you shall be able to publish one in the future as your readers should know about these excellent kits, which I feel are superior to anything else on the market."

Like Mr. Kertesz, I too am disappointed that I do not have a marine aquarium. I cannot afford one! However, since last writing, I have met two aquarists who live quite near my home, and who have both got marine aquaria. One of these aquarists kindly tested the Reliant marine pH testing kit, and compared the results with those of a more expensive kit. The results were identical, and he was entirely satisfied with the Reliant marine pH testing kit. Unfortunately, as I did not receive a Reliant nitrite level test kit, I was unable to have it tested.

B. WHITESIDE.

Silver Stream Fluorescent Control Unit, made in Britain, and distributed by Norwood Aquarium, 24 Knights Hill, London, S.E.27, price £2.49; postage and packing 25p extra.

This new fluorescent control unit should be of interest to those who prefer fluorescent lighting for their tanks, or for those who, like me, seem to be replacing ordinary tungsten light bulbs far too often. The unit is very compact in size, being only approximately 9 in. by 2½ in. by 2 in. It is provided with a length of three core lead so that it can be earthed. Unfortunately the lead is only about 52 in. long, and if your tank is any further than this from a power point, the lead will have to be extended. The leads from the unit to the fluorescent tube (not supplied), are each 40 in. long—a much more useful length. The unit is housed in an attractive, aluminium case, in the back

of which is a tapered hole by which the unit could be hung on to a screw in the wall.

The makers list the following points about their product: "earth provision on mains lead; clips supplied for tube; models available for all sizes of aquarium fluorescent tube; one-piece sealed V leads; easy to attach to back of aquarium; fluorescent lighting cuts your electricity bill; low price; smart non-rusting aluminium case; sealed construction; individual components removable for easy replacement."

This is a handy and compact unit which seems to work efficiently—but I would prefer to hang such a unit on a wall beside a tank, rather than on the back of a tank as the manufacturers suggest.

B. WHITESIDE.

Armitage/Gussie Fish Foods, manufactured by Armitage Brothers Limited, Armitage House, Colwick, Nottingham, NG4 2BA.

Few aquarists, either old or new, will not know at least some of the range of Gussie fish foods; not so many, perhaps, may know that Armitage Brothers Limited, the manufacturers, have recently decided to market their flake foods under the name of Armitages Food Flakes, and to package such foods in lightweight, watertight, mildew-proof, plastic containers with push-on lids.

Armitages Food Flakes—staple diet for all tropical fish—are supplied in standard, large, breeder and 10 oz. size drums, costing, respectively, 9½p, 13½p, 25p and £1.14 per drum. The food contains fish liver, insect eggs, aquatic plants, fish meat, fish roes, cod liver oil, "and other necessary minerals and vitamins, carefully blended and balanced by a scientific process to provide first class natural food for all tropical fish in an easily digested form. Feed twice daily, with only as much as your fish will eat in five minutes." The guaranteed analysis is given as protein (min.) 46 per cent; fat (min.) 5 per cent; and raw fibre (max.) 9 per cent.

Armitages Food Flakes—staple diet for all coldwater

fish—are supplied in standard, large and breeder size drums: costing 8p, 12½p and £1.10 respectively. This food is made from fish liver, insect eggs, aquatic plants, fish meat, fish roes and cod liver oil. Guaranteed analysis is given as: protein (min.) 20 per cent; fat (min.) 3 per cent; and raw fibre (max.) 9 per cent.

Both the above foods were greedily eaten by all the fishes to which I gave them, and I consider the foods to be of good value for money. (Bearing in mind a remark made some time ago, that hungry fishes will eat any foods, I made sure that all the fishes on which I tested the foods had been well fed on live foods soon before the test feeding—although such could not be counted as a scientific test.)

Gussie Fish Food is a granular food for all goldfish and coldwater fish. A small drum costs 4p and a large one 7½p. Gussie daphnia is suitable for goldfish and tropical fish, costing 5½p and 10p per drum. Gussie shrimp is suitable for all goldfish and for tropical fish. Gussie turtle food is suitable for all types of turtles. (I do not know the price of these two foods.) These are only those foods which I was able to examine myself; I understand that there are several other types of food available—e.g. Gussie pond food, Gussie tubifex worms, Gussie ant eggs, etc.

This wide range of foods is made in Britain, and is such that most aquarists could find in the range something to suit their own fishes' needs. Quite honestly, I see no reason to buy expensive foreign made foods if one can buy similar British ones which are less expensive—unless your fishes prefer one brand to another.

This firm's "know-how," gained from almost 200 years of experience, enables aquarists to buy good quality goods at very competitive prices. If you have not already tried their range of fish foods, I suggest that you do. You could possibly cut down on the cost of feeding many of your fishes, without cutting down on the quality!

B. WHITESIDE.

What is Your Opinion?

continued from page 455

the eggs were attacked by fungus, so Mr. Blount fed them to the adults. He has now put a glass partition in the tank and will leave the adult "rams" to themselves when they spawn again. Mr. Blount has promised to tell us about his "exotic bullheads" in his next letter.

Ian Logan is 15 years old, and his address is 2 Bijou Close, Greenway Estate, Tiptree, Nr. Colchester, Essex, and he offers a suggestion in answer to a point which I raised some months ago regarding "rams" and

copper. Ian suggests that a lot of "rams" imported into this area contain infestations of an internal worm. After many tragedies, copper sulphate was added to the water. "Perhaps this is where the idea of a penny in 'ram' tanks comes from." Ian has six golden and two ordinary "rams," and they have never given any bother. He feeds them on a very varied diet. As Ian would like to be an ichthyologist when he grows up, he wonders what subjects he should take at "A" level. (Quite honestly, I don't know if any British university turns out a species of scientist with this particular

label—although American aquarium magazines seem to have an absolute fetish about how few ichthyologists are in existence. Possibly the Ministry of Agriculture and Fisheries could supply you with an answer, Ian, but I should imagine that zoology, botany, chemistry and mathematics would be appropriate subjects to take at "A" level. The former two could possibly be replaced by biology, depending upon the particular examination board whose examinations you decide to take.) Ian ends his letter by saying that he recently spent £1.25 on a foreign-made outside filter; the carton did not contain any instructions, and the set-up shown on the carton Ian found impossible to follow. He writes: "Surely it isn't too much to ask to have instructions in these contraptions!" (I agree, entirely! Why not write to the firm concerned and complain? I feel that if more of us complained about bad service—and praised good service more when we received it—then standards would rise even higher than they now are. After all, it only costs 2½p to post a letter—at the time of writing, anyway!)

The controversy about *P. kribensis* continues with a letter from Mr. J. Rayner, of 27 Brixham Crescent, Ruislip, Middlesex, HA4 8TU. Mr. Rayner has a pair of *P. kribensis*, and these were placed in his 30 in. community tank. Over a period of a few days they chased and killed two barbs, and hunted the other occupants of the tank. On closer inspection, Mr. Rayner found about 30-40 small fry in a flower pot which had been put there especially for the "kribs." Mr. Rayner removed all the other fishes from the tank. These events took place six weeks ago; now Mr. Rayner has 35 1½ in.-2 in. young *P. kribensis*. He thinks that the "kribs" only become "nasty" when they are spawning or raising a brood of youngsters.

16 Woodlands Crescent, Turriff, Aberdeenshire, AB5 7DD, is the home of Mr. J. R. Davidson, who sent a late tip. He wrote: "If your airstone loses its efficiency owing to a coating of *algae*, put it in a jar of water and add a few snails. Float the jar in your tank and in a couple of days it will be like new."

Photograph 3 shows a convict cichlid (*Cichlasoma nigrofasciatum*) which belongs to another aquarist friend, Mr. Sandy Bodles, of 23 Ballysnodd Road, Lane, Co. Antrim. My thanks to Sandy for permitting me to photograph his fish. I'd be interested to hear of readers' experiences with the keeping and breeding of this species.

I was pleased to receive another letter from Mr. Jim Burtles, who lives at "Nicosia," Cyprus Road, Burgess Hill, Sussex. One of Mr. Burtles' paragraphs paints an interesting picture of W.I.Y.O.? Mr. Burtles writes: "May I say that I still thoroughly enjoy your column, which always gives an insight into the way the average hobbyist tackles problems rather than the theoretical or academic approach. As so few of our fish can read, it seems they ignore what the books say

about them most of the time." (I must say I do like that last sentence!) Writing about rocks, Mr. Burtles says that for aquarium rocks use must be insoluble, have smooth surfaces with no sharp corners, and ideally should have interesting shapes. Mr. Burtles' answer (and my own) seems to be flint nodules gathered from an exposed beach where they have been well weathered. All his rocks and gravel are collected from a beach near Brighton. Regarding lace plants, Mr. Burtles says that his plants grow best in pure rain water, with only subdued lighting from above. He grows one show specimen each year—in a container that is 18 in. by 10 in. by 10 in. The plant is set in a small flower pot of soil and gravel. No heating is supplied, and very little lighting, yet the plant finally completely fills the container with at least a dozen 9 in. leaves on 10 in. stems. Mr. Burtles' favourite new items in 1972 were the book: "The Cichlid Fishes of the Great Lakes of Africa," and the "Algae Magnet" aquarium glass cleaner. Writing about marine invertebrates, Mr. Burtles says that his present collection includes six varieties of anemones, five varieties of shell fish, prawns, crabs, squat lobsters, chitons, and starfish. Several of the anemones are reproducing quite freely, but he has not been successful with the snakelocks variety. The creatures are kept in "straight" sea water, all seem to do well, and most have survived for over a year; all are from native waters and were collected from rock pools. Their diet is scraped ox-heart and small shrimps. In the kitchen, Mr. Burtles has a sweet jar containing a colony of brine shrimp—and two types of marine *algae* are growing very nicely in the jar also. Mr. Burtles' most amusing creatures are hermit crabs.

Since beginning this month's features, I've received several more batches of your letters from the offices of *The Aquarist*. I now have a further twenty odd letters to add to my unused pile, as I have used up all this month's space. For next month, please send me your opinions on the following: (a) What have been your experiences with the keeping of the axolotl, and do you know of any text book which discusses this peculiar amphibian in detail? (b) What is your favourite make of motor filter, and what are its advantages? (c) Under which conditions—coldwater or tropical—have you found that hornwort grows better, and what do you use to weight the plants down in your aquaria? (d) Which brand, and type, of tungsten bulb have you found to give best plant growth in your particular tanks? (e) In your opinion, how do British goods, etc., compare with foreign equipment, books and foods, etc.? Please write to me c/o *The Aquarist*. PRINT your name and address, date your letter, and enclose an S.A.E. if you require a personal answer. Will your letter be used next month? Look out for the latest in readers' news and views in next month's feature! Goodbye until then.

Pseudotropheus elongatus—

—A LAKE MALAWI

MOUTHBROODER

by Jorgen & Pamela Hansen

Introduction

Very few areas of the world have in the past 10-15 years produced as many exciting new fishes as the Great Lakes of Africa, and new species are continually being discovered, about whose behaviour little or nothing is known. Both in Lake Malawi and Lake Tanganyika are to be found many endemic cichlids, i.e., cichlids found only in a particular area of the lake in question, and nowhere else in the world. These fish are characterised both by their small number of young, and by the large interval between each brood, but compensate for these factors by more intensive care of the young.

By 1959 23 genera of cichlids had been found in Lake Malawi, and these comprised altogether 180 species, of which all except 4 were endemic. Of these 23 genera, 9 were so similar that they were regarded by native fishermen as belonging to one group, called "Chindongo" in Chinyanja and "Mbuna" in Chitonga. This Mbuna group, as it is more commonly called, comprises the following 28 species:

Cyathochromis obliquidens

Genyochromis mento

Gephyrochromis lawsi

" species

Labidochromis caeruleus

" *vellicans*

Melanochromis melanopterus

" *vermivorus*

Three other *Melanochromis* species

Labeotropheus fuelleborni

" *trewavasae*

Pseudotropheus auratus

" *elegans*

" *elongatus*

" *fuscoides*

" *fuscus*

Pseudotropheus livingstonii

" *lucerna*

" *macrurptalmus*

" *minutus*

" *novemfasciatus*

" *tropheops*

" *zebra*

" *williamsi*

Petrotilapia tridentiger

Cynotilapia afra

Lake Malawi is the third largest of the African lakes, after Lakes Victoria and Tanganyika, and although the total surface area varies from season to season, it is generally cited to comprise about 30,800 square kilometres. It is nearly 600 kilometres long and varies in width from 25-80 kilometres. This is large enough for the formation of considerably-sized waves when it is windy. The lake is 786 metres in depth at the deepest point, and lies 480 metres above sea level. The water is slightly alkaline, with a pH of 7.5-9.5, and quite hard, with a DH of up to 35. (Where we live the water is of a DH 14, which is satisfactory for Malawi cichlids).

At about 60 metres' depth, a big fall in temperature suddenly occurs, as the wind, whose force is dulled by the mountains surrounding the lake, is unable to circulate the water at deeper levels. Water can absorb more oxygen at low temperatures, but in this case nearly all the oxygen is consumed by bacteria which attack the dead creatures and plants. Very little is known about life at these depths, although sometimes very large fish are caught there. There are, however, presumed to be many undiscovered fish out in the middle of the lake in the warm surface areas, and also along the coast, where most of the known fish were found.

According to Fryer, the coast of Lake Malawi can



be divided into four types of environment, each with its distinguishing forms of life. These types are as follows:

- (1) *Rocky coast*, with rocks containing micous and quartz.
- (2) *Sandy coast*, with *Vallisneria* covering 12-15% of the lake bottom, but no patch of growth exceeding an area of 10 square metres. Two further plant species have been noted there, one a species of *Ceratophyllum*, and the other not yet identified.
- (3) *Interzonal region*, which is the area bounding the rocky and sandy coastal areas, and which is characterised by a sandy bottom covered with both large and small rocks. *Vallisneria* grows over 25% of the lake bottom in this area.
- (4) *Crocodile Creek*, which is one particular lagoon at the mouth of the Nkata river, where at certain times of the year the only way through the massive growth of vegetation is by means of channels made by crocodiles.

All of the Mbuna group are to be found in or near the rocky coast area, where they eat the thick layer of *algae* growing on the rocks, and also consume microscopic creatures living amongst the *algae*. This layer of *algae* comprises innumerable species, including two species of blue-green *algae*, *Calothrix*, which is actually distinguished from true *algae* in that its cells lack typical *mucoi*, and is thus classified along with the bacteria. The main nutritional distinction between the various species in the Mbuna group is that some eat

this *Calothrix*, which is indigestible, while others, e.g., *P. elongatus*, avoid it.

The Mbuna group can moreover be divided into those that keep close to the coast and those that do not, with *P. elongatus* belonging to the latter type.

Pseudotropheus elongatus

We were presented with our first *elongatus* male as a gift from our aquarium dealer, who in turn had been presented with it by its former owner, who claimed it was decimating the occupants of his tank. Although neither the former owner, the dealer, nor we ourselves knew the identity of the fish, we jumped at the chance of getting it, as we had an idea that it was from Lake Malawi and thus something of a rarity. Once home we found a photo in a Danish aquarium book of a fish identical with our specimen, and another photo in T.F.H. looseleaf pages (F-494.14/15), which together made us certain that we possessed a *P. elongatus* male. After a month's time we were able to procure a large female, for which we paid 25 Swedish kroner (L2).

The male is 12 cm in length, with as its name suggests a slender elongated body. The head is completely black, except for violet lips, with the black colour continuing along the body almost to the ventral fins, while over the rest of the body can be counted 6 thick black vertical bands over a lightish blue and violet background. In the T.F.H. pages it states that the male has 3 vertical bands, so to check up on this we took a trip to the Danish Aquarium in Charlottenlund, where they keep *P. elongatus* in a special tank for Lake Malawi cichlids, and there found that the



males had also 6 vertical bands. It might therefore be correct to state that the male has from 3-6 such bands.

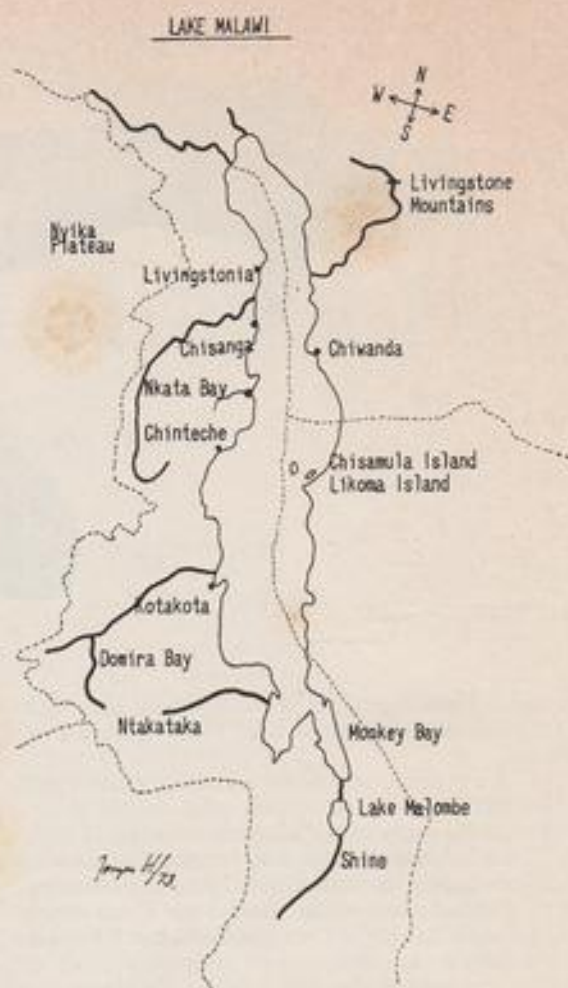
The fish has a rounded snout, with the mouth set so low that the lower jaw forms a straight line with the body, but there is no protruding upper jaw, as for instance, in *Labeotropheus fuelleborni*. It is possible to make out numerous but tiny teeth, used to gnaw algae from the rocks. The eye has a golden iris.

The male's anal fin is dark blue, almost violet, with a 1 mm wide light blue edge along the bottom. The last 5 mm of the fin however is practically colourless and at the top of this area is a large (3 mm) yellow egg-spot. We have never observed more than one such egg-spot in *P. elongatus* either in life or in photos.

The dorsal fin is black with again a 1 mm wide light blue edge running the length of the fin. Both the caudal and pectoral fins are also black, with light blue lines along the fin rays. The ventral fins are black with a very fine light blue edge.

The female is less aggressive than the male, and can easily be distinguished, as she is smaller (10 cm), with a weaker violet colouring and with 9 instead of 6 dark vertical bands. In the dorsal fin a narrow yellow rather than light blue edge is present, which also occurs now and then on the anal fin. The caudal fin is dark violet with yellow edging. On the gill-cover a black spot, about 3 mm in diameter, and encircled by an almost luminous light blue ring, can generally be seen but disappears when the female deepens her violet colouring to black.

We kept the pair in a specially prepared mouth-brooder aquarium together with 5 *Tilapia mossambica* and 8 *Haplochromis burtoni*, which is one of the reasons



why the female is still alive, and also accounts for the fact that, far from proving an inveterate killer, the male has only one life on its conscience, and this was more our fault than his, as the incident occurred before the tank was properly set up, and lacked both rocks and plants.

If the male is left alone with the female, the fish's typically poor blood supply and the resultant slow transport of oxygen to the muscles results in the collapse and death of the female, who when hunted is forced to exert herself much more than the male.

Our mouthbrooder tank has been previously described in "Notes on development and behaviour in *Haplochromis burtoni*" in the September 1972 issue of *Aquarist and Pondkeeper*. Two days after the pair were introduced into the tank it became apparent that the male had established his territory in an area measuring 40 x 50 cm, which made up that half of the tank which was well-furnished with various pieces of slate,

forming differently-shaped caves and crevices. Another of the Mbuna group, *Pseudotropheus auratus*, was observed to have a territory in Lake Malawi measuring 60 cm long by 20 cm broad, so it can be seen that it is possible to satisfy the male's territorial needs in a reasonably large tank, as long as one doesn't keep too many males together. It is more difficult to ensure enough space for the females, so that they can avoid the male's attentions when necessary, especially when carrying eggs in the mouth.

The female is permitted to remain in the male's territory only for as long as she shows interest in him, in which case she swims around her in rapid jerking movements, with the aim of forcing her down to the spawning area. If she does not respond she is roughly chased away again.

Breeding

We fed our *elongatus* with fish balls, *Daphnia*, duckweed, dry food, and oatmeal, of which the latter should be good for them as plant food is their main natural diet.

We had kept the pair for almost three months when on about 2/10/72 the male began to clean a spot of slate over which hung a larger slate. The female approached the area a few times but was always chased away as she was unwilling to spawn. The male always completed the ritual in a lopsided position with his hindquarters hanging obliquely. On 5/10/72 most of the other fish in the tank were removed to be displayed in an exhibition, leaving only 4 or 5 *T. mossambica* and *H. burtoni* females besides the *elongatus* pair. On 8/10/72 the fish returned from the exhibition, and conditions were as before. The *elongatus* female had no eggs in the mouth on this date. On the following day however, she didn't come to eat the evening feed, but lay near the surface of the tank amongst the leaves of the Amazon sword plant. There was a slight bulge in her lower jaw, and this, together with her refusal of food, signified that she had eggs in the mouth.

The next day we placed her in a small plastic container and thus moved her to a small tank (40 cm × 40 cm × 30 cm), with a temperature of 26-28°C, and constant light. The water level was only 20 cm high, which was thus not too deep for the baby fish, and which made a faster turnover of water through an inside filter. The bottom was covered with rough gravel, planted with *sagittaria*. *Pistia stratiotes* floated on the surface, and the tank also contained thread *algae*. When placed in the tank the bulge in the female's lower jaw seemed to disappear, which made us afraid that she had swallowed the eggs; but half an hour later we could see from her chewing movements that the eggs still remained.

On 12/10/72 we could see the eggs when she opened her mouth a little. They were similar to the egg-spot on the male's anal fin, large, nearly 3 mm in diameter,

and off-white with a yellowish tinge. This fitted in with descriptions of eggs from other species in the Mbuna group.

16/10/72. When the female opened her mouth one could see a black spot on one of the eggs, which might have been the beginning of the development of eye pigmentation.

We neither observed the female eating nor was there any sign of excrement from her vent, so it seemed as if she were continuing her fast.

17/10/72. Through the slightly transparent skin hanging from the throat, we could make out at least one clearly developed eye.

It was quite exciting to await the moment for the fry to be released, as the period of oral residence in this species was stated nowhere, and this period varies quite considerably in the various species. In *Haplochromis burtoni*, *Hemihaplochromis multicolor*, *Tilapia mossambica*, and many others the period is from 14-15 days, in *Pseudotropheus auratus* 27 days, and in *Labeotropheus trewavasae* as much as 36 days.

23/10/72 (14 days later). The fry had not yet been released, but through the skin of the throat one could see a dark shadow of young stretching from mouth to eye and from there perpendicularly down to fill out the whole throat-lower jaw area.

25/10/72. Still no fry released. Since certain mouth-brooder species feed their fry while they are still in the mouth, we offered the female some brine shrimp, but she didn't touch them.

26/10/72. Until now the female had mostly confined herself to the *Pistia stratiotes* roots, but now she investigated an open space at the front of the tank, where she cleaned an area 10 cm in diameter, by wiggling with her body and tail. Later she spent quite a lot of time at this spot.

27/10/72 (The 18th day). At 7.30 a.m. one baby fish was to be seen swimming amongst the thread *algae* on the bottom. When approached the mother took it again into her mouth. 11.30 a.m. one baby fish out again. 12.30 p.m. two baby fish out. 7 p.m. five out and more to come.

28/10/72. At least 12 fry were released, and we could see that this was the final total, as the female's mouth looked normal again, the dark shadow in the throat had disappeared, and she had begun to eat again.

The fry

The fry were miniature replicas of their parents, violet with dark vertical bands, and with all the fins developed. Two of the fish were considerably darker than the others. They were all large (15 mm in length). When the mother wanted to take them into the mouth, she nipped at them carefully, whereupon they swam in themselves. The last one's tail hung out for a moment until space was made for it to get right in. If one of the young wandered too far away from the small cleaned area, it was immediately caught and

spat out again in the correct place.

We moved the female away from the young on the same day they were released, as they were her and our first lot, and we wanted as many as possible to survive, partly to check eventual colour variations, which were very rare in *P. elongatus*.

The fry were fed brine shrimp, microworms, and dry food, and grew quite fast. At the age of 6½ weeks they had reached lengths of between 1¼-3 cm, and the number of perpendicular bands varied between 3-9. The largest fish was very dark and had 3 bands. This fish had light blue edging to its fins which together with its dark colour seemed to indicate that it was a male, but no egg spot could be seen. At the age of 9 weeks, this fish had reached a length of 4 cm, had even stronger colours than the other presumed male, and dominated the tank, by for instance driving the others away from the food. The others ranged from 2 to almost 4 cm in length.

Further spawning

On 18/11/72 the female was again seen to have eggs

in the mouth. We observed the tank carefully every evening but not before 13/12/72 (25 days later) was the first baby fish released. On the following day all were released: of these 2 were light violet in colour while the others were dark violet to black.

The female was removed immediately as she no longer protected them, but hunted them like a predator its prey. She was very thin and looked weak after her 26 days' fast.

The fry are now three weeks' old and 2 cm in length. The perpendicular bands are barely distinguishable.

The differing periods of time the fry were kept in the mouth can no doubt be partly attributed to the fact that with the first brood the prevailing temperature was from 26-28°C, while with the second brood only 25°C. However, it must be noticed that in the first case the female continued to care for the fry after their release, whereas the second time it seemed as if she had already given them their quota of maternal care while in the mouth, and rejected them as soon as released.

BOOK REVIEW

Goldfish Guide by Dr. Yoshiichi Matsui, published by The Pet Library Ltd. £2.

This book will appeal greatly to goldfish enthusiasts who are interested in breeding specimen fish of the recognised fancy varieties and it is the first work of its kind to deal comprehensively with the origin and development of the fancy strains. It includes a chapter on goldfish breeding in Great Britain which has been written by Capt. L. C. Betts, President of the Goldfish Society of Great Britain, who is also responsible for editing the book.

A chapter on carp which deals with the development of Koi is also included at the end of the book by way of an interesting and colourful bonus to an extensively colour-illustrated book.

Carp and cows would seem to have little in common but, seemingly, researchers studying carp nutrition have concluded that "their degree of digestion is astonishingly similar to that of a cow." While the digestive enzymes of a carp are only one eighth as efficient at digesting protein as are those of a pike (which is carnivorous), its carbohydrate digestion is one thousand times more efficient than the pike's.

While the veiltail holds pride of place among the affections of goldfish fanciers in Western countries, the Lionhead or *Ranchu* is regarded as the goldfish king in Japan and represents the culmination of the breeder's art in that country.

According to Sterba, among many others, ". . . the

goldfish is the domesticated Asiatic sub-species of *Carassius auratus*," and he describes it as "having a Crucian carp-like tendency to produce unadulterated red-golden coloration." The author of the book under review, however, states that "the Crucian Carp is the common ancestry of all goldfish" and that "almost all varieties of goldfish prove their common ancestry by reverting to Crucian carp-like fishes in a few generations when left unattended by man." No one could disagree with that; uncoloured "common" goldfish are certainly Crucian carp-like but the author becomes more categorical when he goes on to say: "Cuvier and Valenciennes in 1842 named the goldfish *Carassius auratus*. So, according to the international rules of zoological nomenclature, the goldfish is *Carassius auratus* and the scientific name for the Crucian carp is *Carassius carassius*. Actually, since Crucian carp and goldfish are identical, they should have the same scientific name, or alternatively goldfish should be *Carassius carassius*, var. *auratus*. But traditionally *Carassius auratus* is used for goldfish and *Carassius carassius* for Crucian carp." As Capt. Betts says in his preface: "To European and English-speaking peoples the identification of the species and the translation of the oriental names will fill a long-felt want whilst the background of explanation on where and how the fishes first came into being will make for a better understanding between East and West in the universal cult of the goldfish."

Key to British Freshwater Fishes by Dr. Peter S. Maitland. Published by the Freshwater Biological Association at £1.20 to non-members who should apply to the Association at the Ferry House, Ambleside, Westmorland.

This book should be of inestimable value to all who are actively interested in our native freshwater fish and in particular to conservationists, ecologists and anglers. It contains a check list of fifty-five species and a figured key to all species of fish known to occur in freshwater in the British Isles. There is also a series of maps each of which shows the distribution of a species in every 10 kilometer square of the Ordnance Survey National Grid where it occurs.

Consulting the key to species it is interesting to note the references to the Crucian carp and the goldfish:

"*Carassius carassius*. More than 31 scales along the lateral line. Less than 34 gill rakers on the first gill arch. First dorsal ray feeble, weakly serrated. Dorsal fin convex.

"*Carassius auratus*. Less than 31 scales along the lateral line. More than 34 gill rakers on the first gill arch. First dorsal ray strong, coarsely serrated. Dorsal fin concave."

In such fashion is each species described with, where necessary, additional figures to illustrate small characteristics for accurate identification as with Cyprinidae where differences in pharyngeal bones are highlighted.

The Fishing Handbook to end all Fishing Handbooks, by Cliff Parker. Published by Wolfe Publishing Ltd., price £2.

Aquarists who don't angle and anglers who don't keep fish in aquaria (to say nothing of those underprivileged people who neither angle nor keep fish in aquaria) will all enjoy this fishy book. Cliff Parker, a dedicated angler (during the quiet hour), sends up his second favourite hobby as only a man in love with his affliction can. In essence the book is factual with occasional embroidery and some angler's hyperbole—directed here, however, not at the size or weight of truant catches but more at the machinery and background of the messing-about-in-water pursuit. The chapter on Tackling Up, for instance, contains a piece on worms from which the following is lifted: "A worm, however, cannot fertilise itself: it needs another worm. This is just as well, otherwise they would not put so much effort into tunnelling all over the garden. They would just lie there, smirking." Chapter Seven comprises a B to Z of British Freshwater Fish of which the following are examples: "Chub. Greedy, bone idle and dead crafty. Loafs about under trees knowing that some idiot is bound to come along sooner or later with a bucketful of groundbait. Likes crayfish, worms,

slugs, grasshoppers, breadpaste and Danish Blue cheese. Does not like hooks and spits out anything remotely resembling one. Anglers interested in fish anatomy can poke a finger down the throat of a big chub and observe the mincing effect of the pharyngeal teeth. For a more objective and less painful observation, ask a friend to do it. Grayling. Supposed to smell like thyme. Smells like fish. Beautiful fish but can't make up its mind whether it's coarse or game. Dray flay men look down on it. Cloth cap lads think it's too good for them. So on the whole it doesn't do too badly."

From a comprehensive chapter on Angling Terms, one may select this sample: "Ancient wife. Another name for the Ballan Wrasse, also known as Old Ewe, Sea Swine and Sweet Lips.

"An affectionate term used by sea-anglers for their spouse, along with Old Moo, Sea Swine and Vinegar Chops."

In the section on Sea Fishing, the conger eel makes occasional appearances. For example: "The only sure way to deal with a big one is to gaff it with two gaffs—one at the head and one at the tail—bash it on the tail to keep it quiet, and then cut through its spinal cord, just behind the head, with a sharp knife. Be careful with the knife. Don't lunge. If ever you see a party of anglers trooping off a boat, carrying one of their number and singing:

Hi Ho!

Hi Ho!

Old Fred has lost a toe . . .

you can lay even money that Fred was a lunger."

Yes, it is meant to be a fun book and it is a funny book. It is aimed at fish-catchers more than at fish-keepers but any of the latter who duck may be missing out.

CLARIFICATION

AN EXCELLENT PLANT SERVICE—

Mr. Jack Hems, who contributed the review printed under the above heading in our issue for February, 1973, would like it known that though plants bought through the post can be variable in quality, the plants sent out by Mr. John Chalmers are not necessarily unique. In fairness to our regular advertisers, we feel it should be pointed out that Mr. Chalmers is one of several excellent plant suppliers whom we would have no hesitation in recommending to our readers.



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

by Jack Hems

My dealer is expecting some barbels called *B. puckelli*. I cannot find any reference to this barb in my books. Can you tell me anything about this elusive species?

B. puckelli is an African species very little known to aquarists in this country or abroad. It has a pair of silvery barbels as fine as hair and a slender body coloured olive brown on the back shading to silvery white on the belly. The middle sides are greeny to gold suffused with red. There is a black spot in the bottom half of the dorsal fin and a black spot near the base of the tail. The fish is a fast swimmer and frequents the lower levels of the water, though it will rise to the surface for food. It eats anything and is inoffensive. It reaches a length of about 2½ in. I have no information about breeding, but imagine it would oblige given a fairly high temperature, plenty of plants and clear, well-aerated water. It is reasonable to assume that the more gaudily attired of these barbels are males.

Is it possible to mate *Brachydanio rerio* with other members of its genus?

I suppose all the brachydanioids will hybridise. As long ago as 1952 crosses between *B. rerio* and *B. albolineatus* and *B. rerio* and *B. nigrofasciatus* were mentioned in *Freshwater Tropical Aquarium Fishes*, by G. F. Hervey and J. Hems.

Which is the largest growing of the gouramis?

Undoubtedly *Osphronemus goramy* from the Greater Sunda Islands. This gourami attains about two feet in the wild and not much less in the spacious aquarium.

I have a heap of dried oak leaves. How long should I soak these leaves before using them as planting medium (under washed grit) in my aquarium?

Give them about a week's soaking in three or four changes of water to rid them of excess acidity.

Would lumps of coloured glass be safe to use as decoration in my aquarium?

Provided you smooth down any sharp edge and points with a carborundum stone all will be well.

What food can I feed to my archer fish during the coldest months of the year?

Buy the smallest quantity of maggots from your local anglers' supply shop and hatch them into flies in a wide-necked bottle or jar covered over with a piece of nylon or muslin. The jar should be kept at a temperature in the sixties (°F) to encourage rapid hatching.

What is the life span of the tyre track eel?

We have no records of the life span of spiny eels, but the tyre track eel (*Mastacembelus armatus*) has a longevity of five years at least.

I have a tropical plant in my aquarium that has developed ferny foliage on the lower portions of its stems and water-cress-like foliage near or at the surface of the water. Please could you tell me its name?

I think the plant you have is *Synmmema trifolium*, popularly known as water wistaria. This attractive water plant from India and the Malay Peninsula was first grown and introduced to aquarium keepers by the famous water plant specialist, Colin D. Roe, in 1954.

What is an aeroplane fish?

The aeroplane fish is a popular name given to the young of the flounder or sole (*Achirus fasciatus*), commonly found in fresh, brackish, and salt water along the Atlantic Coast of North America. It makes an interesting aquarium inmate but seldom lasts very long in the freshwater tank. It is not suitable for a community tank housing smaller species.

I have a snakehead greeny brown on the back shading to light amber or pale beige on the belly. There are two horizontal black stripes with red in between on the sides. Could you

please tell me the scientific name of this species?

I hazard the guess that your snakehead is *Ophichthys micropeltes*.

I moved five jewel fish (*Hemichromis bimaculatus*) to another tank furnished exactly like the first, that is with rocks at both ends and in the middle and good illumination given by a Gro-Lux fluorescent lamp. But since moving them the fish have become increasingly shy and nervous. What has gone wrong?

It sometimes happens that fish take a week or two to adjust themselves to freshly drawn water. Obviously, then, they will act differently in new water than in old. Provided your fish are taking their food readily and are showing no external signs of disease, I think it is safe to assume that there is nothing much wrong.

I have just started with cichlids and have purchased four striped convict fish and two white convict fish. I wonder if you could tell me the name of their country of origin and whether they are easy to keep and breed?

Cichlasoma nigrofasciatum, to give the convict fish, alias the zebra cichlid, its formal name, is found in Central America. It is quite easy to keep providing you give it plenty of swimming space in a tank furnished with a thick carpet of well-washed sand and some lime-free rockwork. But it is a pugnacious species ever-ready to get into a fight with its own kind or another species. Therefore a true pair are best given a tank to themselves. Breeding follows as a matter of course if the temperature is raised to the upper seventies or low eighties (°F) and the fish have been

conditioned for a fairly lengthy period on a rich diet in meat, small or chopped earthworms, raw white fish and a wheat germ food such as Bemax.

I should like you to tell me the maximum size, preferred food, and country of origin of the catfish called *Schilbe mystus*.

Given a spacious aquarium this catfish, which is found in Africa from the Zambezi river system in the east to the Nile in the north and the rivers of Angola and beyond in the west, may attain a length of about a foot. In the wild state it lives on small fish, crustaceans, various aquatic larvae, and the like. In the aquarium it will flourish well on the regular live foods, meat and better quality flake foods.

What is a Monterey Platy?

The Monterey Platy is known to science as *Xiphophorus couchianus*. This species has nine rays in its dorsal fin, as has *X. maculatus*, the Moon Platy. But whereas *X. maculatus* is found in southern Mexico, in the Rio Papaloapan system, *X. couchianus* is confined to the north, about a thousand miles away, in the Rio Santa Catarina and its tributaries.

Does *Morulius chrysophekadion* make a satisfactory community aquarium fish?

Most certainly so provided the aquarium in which it is placed is large enough to support it in comfort; for *M. chrysophekadion*, better known as the black shark, attains a length of nearly two feet within the space of some seven or eight years and though in its larger sizes it will eat very much smaller species it is not an aggressive fish and will mix well with the larger characins and medium-sized barbs.

COLDWATER QUERIES

I have had five goldfish in my tank which holds ten gallons of water. Two have recently died. They just lie on their sides and then two days later die. What did they die of?

Although I have had years of experience of fish-keeping and have come up against problems galore, I am not psychic. To be able to diagnose the cause of death of a fish with so little information is quite beyond my capabilities. You do not say the size of the fish, nor the surface area of the tank. No mention is made as to what kind of food has been given and how often the fish have been fed. If only enquirers would give me a few basic facts it would be much easier for me to be able to state, with any degree of confidence, the cause of death.

I would like to know the surface area of the tank, the number and sizes of the fish; the length of time since purchase; whether any fresh plants or live foods have been introduced; the type of water, tap, rain

by Arthur Boarder

or from copper pipes. Then some indication as to the type of food given and how much or often. Given these facts it would be much easier for me to be able to help.

In the present case under discussion it may be that the fish were overcrowded or that the water had become impure through some particular cause. Let us be quite clear about one point. Fish do not just die without reason. As long as they are healthy and put into a healthy tank, they can live for weeks without being given any artificial food. As soon as food is given the trouble often starts. This is because more is given than the fish can eat in a short space of time. Some aquarists feed the same amounts at the same times each day, irrespective of whether the fish are on the feed or not. If only they would refrain from giving the usual feed until they had tested the reactions of the fish, I am sure that there would be less trouble. If fish are ready for food they will come up immediately to take the first tiny piece offered. If the fish do not respond at once, no more food should be offered that

day. It would also be a good idea to change some of the water for fresh. There is little that can bring the fish into feeding condition again better than a partial change of water.

Even if I do not know what killed the fish for sure, I can make a very good guess that the water must have become lacking in oxygen, or over-charged with foul gases. This could have come about through over-crowding or over-feeding. Do not try to keep more than an inch of body length of fish to each 24 square inches of surface area. Be careful not to feed when the fish are not on the feed and do not introduce anything from the wild without making sure that no disease or pests are present.

I have two green tench with a small goldfish. The tank is aerated. Just lately the tench have gone off their food and are always at the top of the water mouthing for air. Why is the reason?

The water in your tank is foul and lacks sufficient oxygen. Although tench can, usually, live in water which is not too pure, there is a limit. The fact that any fish mouths at the surface is a sure sign that the water is impure. Even an aerator cannot filter the water and if foul gases are there is it not possible for the aerator to completely clear them. I suspect that part of the trouble is that the fish are too large for the tank, and neither the tank nor the fish size was given. Another point which could have an important bearing on the case is that tench, like many other fishes, do not eat as much food once the water cools down as they did when it was warmer. Once the temperature of the water drops, so should the amounts of food given be lessened. Refill the tank with fresh water, see that you have not got too large fish for the size of the tank, and then go easy with feeding and all should be well.

I have a pair of veiltail goldfish. The male keeps getting four or five mattery spots on its head. I do not know if they burst but they appear to go away for a time and then come back again. Why is this please?

If the spots are containing a form of matter there is something very wrong with the fish. It suggests by the description you give, that there is some type of parasite which is attacking the fish. It is strange though that only the one fish is affected. This fish should be isolated and treated as follows: Prick any subsequent pus containing protrusion, with a sterilised needle and after pressing out any matter, dab the spot with neat T.C.P. Take care that none gets in the eyes of the fish. Whilst treating the fish hold it carefully in a wet cloth and do not place it back immediately but allow the chemical to take some effect before it is washed off. It is possible that any parasite which may be present will be killed, but in case any fresh ones have been

hatched, the treatment should be repeated, and if no more spots are seen, the fish could have a bath in a solution of a tablespoon of sea-salt to a gallon of water. Leave the fish in for four days and then gradually reduce the strength of the solution.

I have been trying to keep goldfish for some time without success. I have a two-gallon tank which I obtained with trading stamps. My fish do not seem to live very long although they seem healthy when I purchase them. Why do you think they die?

There seems little doubt that your troubles are brought about by the fact that your tank is too small to function properly. By the size given it appears to be little more than a toy. Even an experienced aquarist would be hard put to be able to keep fish in your tank. A tank which holds two gallons of water cannot have a very large surface area of water. A tank of a cubic foot only holds six gallons of water and if with a square foot of surface would only hold six inches of fish. Instead of trying to keep fish healthy in your tank, I suggest that you get one of at least 20 in. by 10 in. surface area. Keep the small tank for spare plants or for stocking a small supply of *Daphnia* (water fleas).

I have four small goldfish in a tank, 27 in. by 10 in. by 17 in. I can only keep it over a radiator and the temperature of the water is 69°-71°F. Can I keep some tropicals with the goldfish at this temperature or would the goldfish take more heat? Which tropicals would be suitable?

Although goldfish are classed as coldwater fishes, they thrive better in warm water as long as it is well oxygenated. They certainly put up with cold water but I have always found that they can stand temperatures up to the higher seventies (F). After all, many goldfish ponds are up to 80°F in hot weather and the goldfish are not inconvenienced. You can keep many tropicals at the temperature you have at present. Try the cheaper ones as they are usually the more hardy. Paradise fish (*Macropodus opercularis*) are ideal but only have one male or fighting could take place. I have kept and bred these handsome fish in a coldwater tank with fantail goldfish in an unheated room. You could also have White Cloud Mountain Minnows (*Tanichthys albomaculata*); Rosy barbs (*Barbus conchonus*); Guppies (*Lebistes reticulatus*); and *Platy variatus*. There are many more tropicals you could keep and at the temperature you have it is probable that they would live longer than if they were kept at higher temperatures. You would have to make sure that your tank did not lose heat and reduce the temperature below 65°F.

*Answer to: What Do I Need?
Swimming Space*

BRITAIN'S AQUATIC MOTHS

by David C. Wareham

IN THE British Isles there are several species of water-plant, the leaves of which float upon the surface of the water. Examination of some of these leaves during the summer months will very often show that a circular or oval piece has been cut from them. On turning the leaf over we find that the culprit is a *larva* which has constructed for itself a case with the missing piece. This *larva* is the caterpillar of an unusual and interesting moth belonging to the family *Pyralidae*.

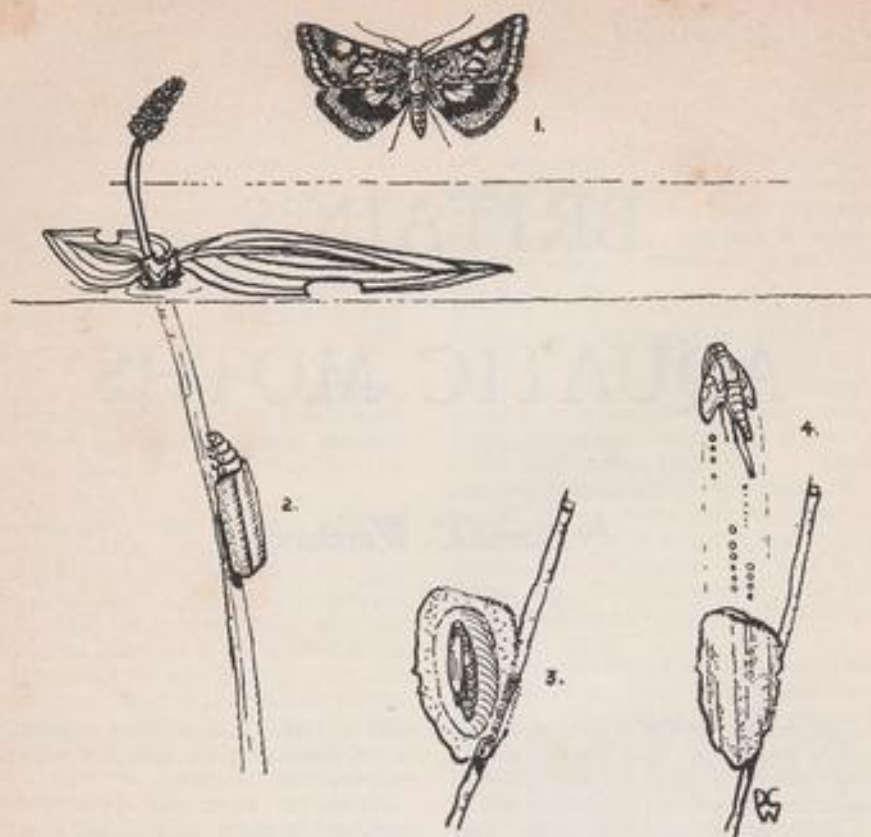
This family contains two or three members which are rarities in the world of butterflies and moths in that much of their life is spent under water. Locally they are known as water-lily nymphs, but their correct name is China Marks moths, so-called because their markings resemble those made by potters on the bottoms of certain pieces of china.

The Brown China Marks, *Nymphula nymphacata*, deposits its eggs on the underside of the leaves of a variety of plants, including water-lilies and *Potamogeton*. On hatching from the egg the young *larvae* mine into the leaves where they remain for three or four days. They do not have gills, and appear to absorb oxygen through their skin at this time. After several moults the *larvae* develop spiracles and a covering of hair on their bodies. They then cut from the leaves a piece, about an inch in length, which they secure with silk to the underside. The opening of this case is so small, and the hairs on the *larva's* body so close, that no water enters when the *larva* extends its head in

order to feed. It is therefore constantly surrounded by air, and if a case is opened it will be found to be completely dry inside.

During the winter the *larvae* hibernate in their cases, and re-start to feed the following Spring. The cocoons in which the *larvae* of this species pupate are normally secured to the stems of plants either just above or just below the surface, and camouflaged with pieces of leaf.

The *larvae* of a somewhat larger species, *Nymphula stratiotata*, possess tuft-like gills and extract the oxygen they need from the water. They feed submerged on a number of plants, namely, *Potamogeton* and *Ceratophyllum*. Unlike the previous species, the larval case is not water-tight, the *larva* being surrounded by water at all times. Pupation in this species also takes place under water in a silken, air-filled cocoon which the *larva* constructs on the stem of a plant. The *pupa* has spiracles and it is through these that it breathes the air contained in the cocoon. When ready to emerge some three or four weeks later, the adult moth collects all of the remaining air in the cocoon by trapping it under its still unfolded wings. Buoyed up by this trapped air, the moth crawls from the cocoon and shoots towards the surface. During its brief ascent a waxy substance, covering its wings to prevent them from getting wet, is stripped off. This wax follows the moth upward through the water, and as it breaks the surface stands upright for a few



1. China Mark moth (*Nymphula nymphaeata*) 2. Larva and its case
3. Cut-away of cocoon showing Pupa 4. Newly emerged moth on
its ascent to the surface.

seconds on top of the water. Any males in the vicinity come down to investigate this white column of wax to see if a female has emerged. The newly-emerged moth flaps its way over the water until it reaches a reed or plant stem which it climbs in order to pump blood into its wings and dry them. The mortality rate at this time must be extremely high, with large numbers of them being taken by fish and other predators.

Cataclysta lemnata is a smaller species and its tiny larvae are found on duckweed. The cases which they make are not unlike those of certain caddis-fly larvae, in that they consist of several duckweed leaves bound together.

Adult China Marks moths are usually on the wing in June, July and August over most of the country, although *N. stratiotata* is commoner in the South.

They inhabit the vegetation bordering ponds and lakes and take flight at dusk. They can be collected either by sweeping the waterside plants with a net or by attracting them to a bright light when it is dark. Larvae can be collected from ponds and transferred to a tank in which their food plant is growing, but if this is done the larvae should not be removed from their cases. Instead, the whole leaf should be taken, and the larvae will make the change-over themselves.

Keeping these insects presents no real problem provided that the water in the aquarium is kept well oxygenated. The moths can be paired quite easily in a cardboard box, and the female allowed to deposit her eggs on the leaves in the aquarium. One can then sit back in comfort and observe the unusual, almost unique, life cycles of these fascinating insects at close quarters.

WHITE SPOT DISEASE

by Philip Swindells

WHITE SPOT is a universally prevalent parasitic disease in freshwater caused by a member of the group of single celled creatures known as Protozoa. The actual parasite is known as *Ichthyophthirius multifiliis* or, more familiarly to fish fanciers, as "Ich." It is an extremely troublesome disease in aquaria where the water temperature is relatively high, as in raised temperatures the life cycle of the creature becomes accelerated and death becomes a much more rapid and inevitable thing. It can be equally pernicious in the garden pool, but with the lower water temperatures the life cycle is slowed down and treatment can be effected before too much damage has been caused.

Ichthyophthirius is not a particularly large creature, seldom as much as a millimetre across, but its presence for at least part of its life cycle embedded in the skin of a fish does have considerable effect upon its host. Badly infested fish look as if they have white measles, generally take on a pinched appearance and swim in a drunken manner. Heavy attacks such as this are seldom curable, and the best one can do is to despatch the poor unfortunate fish as soon as possible. If a light sprinkling of spots is noticed on the tail or fins of an adult fish then this is usually curable, but where odd parasites are noticed on fry, the young fish are best removed and destroyed as the presence of only a couple of these tiny assailants on very young stock inevitably leads to death.

Ich shows various stages of development which must be known in order to combat it effectively and with the utmost safety to the troubled fish. In the initial stages of growth the "spores" or "swarmers" are roughly pear-shaped and bore their way into the skin of living fish. Here they feed on their host until of adult size when they are visible to the naked eye as white spots.

The mature parasites leave the fish through a hole in the skin and then become free-swimming eventually to become encysted. Inside the cyst they divide into upwards of a thousand "spores" which leave the cyst as free-swimming creatures in search of another host.

From the foregoing one can appreciate the Ich can only be destroyed in the swarming stage. The white spots that are plainly visible on the fish are embedded in the skin and quite safe, so efforts have to be made to destroy the creature while it is still in the water. It is known that in certain temperature range the free-

swimming stage must find a host within forty-eight hours or else perish, so therefore by removing all the fish to tanks or bowls of clean water, and then changing from tank to tank each day, the free-swimming parasites can either be starved of fish life or washed away. When a pool is involved, and the temperature of the water is obviously quite low it has to remain without fish for upwards of six weeks as development of all stages can be very slow in these lower temperatures.

Apart from the clean water method there are several chemical white spot cures on the market that are quite effective. Most are based on an acriflavine solution, or else quinine salts such as quinine hydrochloride and quinine sulphate, and in particularly stubborn cases a combination of acriflavine and methylene blue. Fish are kept in such solutions until all spots have left the skin, the free swimming stage of the parasite then being killed by the chemicals. Several schools of thought exist as to the usefulness of chemicals, particularly quinine as it is thought to sterilise fish, but to date I have still to be shown some sound evidence to support this theory.

White spot is, unfortunately, a widespread disease and there can be few garden pool owners or aquarists who have not experienced trouble with this menace at some time or other. However, much can be done to restrict the opportunity for its incidence by observing several precautions. Firstly, make sure that any fresh stock of fish is absolutely free of the visible signs of the disease before introduction to the existing community. If white spot is suspected, quarantine the new purchases in a solution of quinine sulphate and raise the temperature to 65° or 70°F for a few days. If latent parasites are present, they will soon emerge and break free. Secondly never collect aquatic plants from the wild and introduce them to the pool or aquarium as these are often smothered with parasites. And, finally, try to avoid topping up a pool with tap water, as white spot cysts can often be found in this and chlorination does not seem to destroy them. August is the worst month for the disease being introduced this way as the reservoirs are low and the number of cysts to the volume of water is greater. Rain water is better, unless you have an assurance from your water board that there are no fish in the local reservoir, which is very unlikely.



from AQUARISTS' SOCIETIES

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

THERE was an entry of over 500 at the **Horsforth A.S.** third open show held in December. Results were as follows:—Highest pointed Society: Sheffield. A.O.V. Livebearers: 1, Mrs. Hislop (Swillington); 2 and 3, J. S. Hall (Aireborough). Guppies A.V.: 1, M. Laycock (Sheffield); 2, P. Stanforth (Don Valley); 3, Mr. and Mrs. Toyne (Sheffield). Mollies A.V.: 1, J. Snowden (York); 2, Mrs. Foster (Creswell); 3, J. S. Hall (Aireborough). Swordtails A.V.: 1, Mr. and Mrs. Charlton (Castleford); 2, S. Clarke (Independent); 3, J. Thickbroom (Welbeck). Platys A.V.: 1, M. Foster (Creswell); 2, Mr. and Mrs. Gates (Castleford); 3, Mr. Stead (Swillington). Anabantids (Small): 1, Mr. and Mrs. Cohen (Castleford); 2, Mr. and Mrs. Gates (Castleford); 3, G. Ibbotson (Keighley). Anabantids (Large): 1, Mrs. Blades (Creswell); 2, Mr. and Mrs. Armstrong (Independent); 3, Mr. Parker (South Leeds). Fishbairns A.V.: 1, A. Curchin (Swillington); 2, J. S. Hall (Aireborough); 3, Mr. and Mrs. Milne (Doncaster). Corydoras Catfish: 1, Mr. and Mrs. Downey (Sherwood); 2, Mr. and Mrs. Clarke (Independent); 3, T. Smith (Sheffield). A.O.V. Catfish: 1, J. Baker (Welbeck); 2, T. Smith (Sheffield); 3, Mr. and Mrs. Copley (Doncaster). Loach A.V.: 1, V. Wright (Alfreton); 2, P. Hornshaw (Harrogate); 3, T. Smith (Sheffield). Barbs (up to Rosy): 1, Mr. Dickinson (Castleford); 2, J. Wright (Alfreton); 3, Mrs. Blades (Castleford). Barbs (Large): 1 and 2, L. S. Hunter (York); 3, A. Vause (Castleford). Characins (up to Bleeding Heart): 1, M. Laycock (Sheffield); 2, Mr. and Mrs. Daines (Doncaster); 3, Mrs. Blades (Creswell). Characins (over Bleeding Heart): 1, J. Thickbroom (Welbeck); 2, J. Smith (Sheffield); 3, J. Kinson (Aireborough). Breeders (Egglayers): 1, A. Curchin (Swillington); 2, Mr. and Mrs. Cohen (Castleford). Will the person winning third prize please contact Show Secretary, Miss J. Helms, 29 Wellington Road, New Wortley, Leeds, 12. Tel: Leeds 21025. Breeders (Livebearers): 1, Mr. and Mrs. Cohen (Castleford); 2, J. Igoe (Sherwood); 3, J. S. Hall (Aireborough). Cichlids (Dwarf up to Kribensis): 1, R. Hislop (Swillington); 2, Mr. and Mrs. Gates (Castleford); 3, Mr. and Mrs. Caslake (Swillington). Cichlids (Large): 1 and 3, Mr. Taylor (Harrogate); 2, Mr. and Mrs. Caslake (Swillington). Angels A.V.: 1, Mrs. H. Blades (Creswell); 2, Mr. and Mrs. Clarke (Independent); 3, B. Hamburg (Swillington). Pairs (Egglayers): 1, Mr. and Mrs. Blizard (Sheffield); 2, T. Smith (Sheffield); 3, L. and P. Graham (Loyne). Pairs (Livebearers): 1, Mr. and Mrs. Toyne (Sheffield); 2, Mrs. H. Blades (Creswell); 3, R. Hislop (Swillington). A.O.V. 1, K. Kennedy (Keighley); 2, G. Thickbroom (Welbeck); 3, F. Wright (Alfreton). Ladies (A.V.): 1, Mrs. R. Foster (Creswell); 2, Mrs. Cohen (Castleford); 3, Mrs. Charlton (Castleford). Sharks and Flying Fox: 1, T. Smith (Sheffield); 2, Mrs. Hall (Aireborough); 3, G. Thickbroom (Welbeck). Rasbora and Danio: 1 and 2, T. Smith (Sheffield); 3, Mr. and Mrs. G. Shaw (Morecambe Bay). Toothcarp: 1 and 2, A. Curchin (Swillington); 3, Mr. Greenhall (Tadcaster). Carps and Minnows: 1, 2 and 3, J. Smith (Sheffield). Coldwater A.V.: 1 and 3, J. S. Hall (Aireborough); 2, L. and P. Graham (Loyne). Fancy Goldfish A.V.: 1, 2 and 3, J. S. Hall (Aireborough). Junior A.V.: 1 and 2, A. Barrett (Welbeck); 3, J. Thickbroom (Welbeck). Novice A.V.: 1, Mrs. R. Foster (Creswell); 2,

M. Wilde (Accrington); 3, Mr. Parker (South Leeds). Best in Show: Master A. Barrett (Welbeck) with a large leaf fish.

THE January meeting of the **Keighley A.S.** was addressed by Mrs. S. Gear and J. Mosley on Top Spawning and Bottom Spawning Killifish, respectively. The results of the table show were as follows:—F.O.M. (Livebearers): 1 and 2, Mr. Ibbotson; 3, Master Barton. A.O.V.: 1, Mrs. Taylor; 2, Mrs. Gear; 3, D. Mosley. N. A.O.V.: 1 and 2, D. Mosley; 3, Mr. Lydon. Junior A.V.: 1 and 2, Master Bardgett; 3, Master Murray.

THE **Stevenage A.S.** January meeting was well attended. A very interesting talk on Wood and Root in the Aquarium was given by Mr. Robinson. The next meeting will be held at Bedwell Community Centre at 8 p.m. on the 7 March.

THE Inter-Society contest between **Alfreton A.S.** and **Derby A.S.** was won by Alfreton by 52 points to 20 points. Derby Regent, however, win this year with an overall 70 to 64. 130 fish were benched in 12 classes. Results were as follows:—Swords and Mollies: 1, A. Cox; 2, M. Darrington; 3, R. Harlow. Small Barbs: 1, Mr. and Mrs. Jowle; 2, S. Hill; 3, J. Wright. Large Characins: 1, S. Hill; 2, J. Wright; 3, B. Hickling. Fishers and Anabantids: 1 and 2, S. Hill; 3, R. Harlow. Large Cichlids: 1, R. Harlow; 2, J. Wright; 3, D. Robertson. Killifish: 1 and 2, S. Hill; 3, Mr. Blanch. Minnows and Danios: 1, A. Dean; 2 and 3, M. Footitt. Rasbora: 1 and 2, J. Wright; 3, R. Harlow. Livebearer (Pairs): 1, G. Stringer; 2, J. Wright; 3, S. Hill. A.V. Juniors: 1, P. Norman; 2, A. Bull. Breeders (Egglayers): 1 and 2, J. Wright; 3, M. Footitt. Loaches and Botias: 1, Mrs. V. Wright; 2, R. Holmes; 3, P. Bousset. Best Fish in Show was a Clown Loach owned by Mrs. V. Wright of Alfreton A.S.

ANNUAL general meeting election of officers for **Dukeries A.S.** were as follows:—President, J. Hutchinson; chairman, D. Jackson; treasurer, J. Dermie; secretary, M. Rotherham, 93 Clowes Road, Sandrove, Chesterfield, telephone 405-00; show secretary, M. Woodley, 115 Rains Ave, Weekop, Notts.

THE **East London Aquarist & Pondkeepers' Association** held their annual general meeting recently, when the following officers were elected. Chairman, M. Pearson; vice-chairman, G. Green; secretary, Mrs. P. Harris, 86 Leigh Road, East Ham, E.6; treasurer, A. Harris; show secretary, F. Vicker, 13 Irons Way, Collier Row, Romford, Essex; show organiser, J. Boss; social, Mrs. I. Boss; programme, D. Plack; editor, A. Pither; press, K. Wrightson; library, C. Sweeting; equipment, G. Arrow; lay members, L. Baker and E. Carter; F.B.A.S. delegate, J. Boss; auditors, Mr. and Mrs. F. Arnold. Re-elected once again was the president, P. Campkin, with Messrs. Arnold, Bryden, Field, Peto, Taylor, vice-presidents. A very varied and interesting programme of events is planned and in addition to the nu-

merous table shows, inter-club competition with North Kent, Southend and Thurrock Societies, the home-furnished aquaria and fry-rearing competitions, many social functions are planned. The Society meets every first and third Friday in the month at Ripple Road School, Ripple Road, Barking, Essex. New members are assured of a friendly welcome.

AT the **Bracknell A.S.** second meeting in November a twelve-a-side match was staged with Slough A.S. at which Slough were the victors. The results were: 1 and 2, W. Orslow; 3, L. Little; 4, D. Jeffrey; 1st and 2nd places were taken by Slough and third and fourth by Bracknell. The December meeting was the club's annual Xmas social which was also attended by members of other Three Counties Clubs. The first meeting in January was a first-class slide show and talk on Cichlids of South America given by members of the Hendon Club.

RESULTS of the third **E.A.F.A.** show were as follows:—Barbs: 1, Mr. Canham (Yarmouth); 2, Mr. Lacey (Yarmouth); 3, Mr. Holland (Norwich). Characins: 1, Mrs. Gard (Ipswich); 2, Mr. Johnson (Yarmouth); 3, Mr. Jerry (Ipswich). Cichlids: 1, P. Hunt (Thetford); 2, Mr. Watson (Yarmouth); 3, Mr. Johnson (Yarmouth). Cichlids (Dwarf): 1, Mr. Weekly (Yarmouth); 2, V. Green (Ipswich); 3, Mr. Bobbin (Norwich). Labyrinth: 1, R. Green (Norwich); 2, Mr. Watson (Yarmouth); 3, Mr. Adcock (Norwich). Toothcarps: 1, Mr. Bobbin (Norwich); 2, Mr. Seaman (Yarmouth); 3, R. Green (Norwich). Catfish: 1, Mr. Howard (Ipswich); 2, Mr. Bobbin (Norwich); 3, Mr. Turner (Ipswich). Rasbora: 1, Mr. Holland (Norwich); 2, Mr. Wood (Bury St. Edmunds); 3, Mr. Dack (Thetford). Cyprinidae: 1, Mr. Jerry (Ipswich); 2, Mr. Chapman (Ipswich); 3, Mr. Dack (Thetford). A.O.S. (Egglayers): 1, Mr. White (Yarmouth); 2, Mr. Adcock (Norwich); 3, Mr. Bobbin (Norwich). Pairs: 1, Mr. China (Yarmouth); 2, Mr. Aufreit (Ipswich); 3, Mr. Bobbin (Norwich). Guppies: 1 and 3, Mr. Clarke (Bury St. Edmunds); 2, Mr. Cooke (Ipswich). Swordtails: 1, D. Keen (Thetford); 2, V. Green (Ipswich); 3, R. Andrews (Yarmouth). Botias: 1, Mr. Clarke (Bury St. Edmunds); 2, V. Green (Ipswich); 3, Mr. Jerry (Ipswich). Mollies: 1, Mr. Clarke (Bury St. Edmunds); 2, Mr. Andrews (Yarmouth); 3, Mrs. Pitts (Yarmouth). A.O.S. (Livebearers): 1 and 2, Mr. Canham (Yarmouth); 3, Mr. Aufreit (Ipswich). Breeders: 1, V. Green (Ipswich); 2, Mr. Kirby (Yarmouth); 3, Mr. Weekly (Yarmouth). Juniors: 1, Mr. Keen (Thetford); 2, Mr. Clarke (Yarmouth); 3, Mr. Saunders (Yarmouth). Coldwater: 1 and 2, Mrs. Gard (Ipswich); 3, Mr. Lacey (Yarmouth). Best in Show: Mr. Bobbin (Norwich).

RECENTLY the **Freelance A.S.** had an interesting evening watching a slide show by Mr. Pye on different types of plants. S. Cowell was also kind enough to come down one evening and show how to set up an aquascene.

THE **Wrexham Tropical F.S.** held their annual dinner and presentation recently when members and guests had a most enjoyable evening. C. Pritchard, the show secretary, presented the trophies to P. Oliver, winner of the Endeavour Trophy for the most points gained in the year, Miss V. Jones second and T. Found third. The Paramount Trophy for the best fish of the year was won by P. Oliver. The Caniff Trophy for the home aquarium competition was also won by P. Oliver. As can be seen, P. Oliver has won all the major trophies and this is quite an achievement as he has only one tank. Meetings are held the second and last Thursdays each month at The Fellowship Hall, Bradleys Road, Wrexham, and all are welcome.

RESULTS of the table show of Anabantids held at the first meeting of the **Bamby and District A.S.** in January were:—Juniors: 1 and 2, A. Wyatt; 3, P. Hall; 4, H. Jones.

Seniors: 1, I. Ward; 2 and 3, E. Holmes; 4, B. Hall; 5, P. Hill. A report was given by Miss H. Keen and B. Hall, who attended the seminar held in Derby. At the second meeting there were slides on setting up an open show supplied by Brighton and Southern A.S., followed by a discussion.

MEETINGS of the Lewisham and District A.S. are held on the second and fourth Mondays, 8 p.m., at St. Laurence Church Hall Club Rooms, Bromley Road, Catford, London, S.E., new members welcome. Secretary, A. Jamieson, 69 Hook Lane, Welling, Kent.

CLUB show results of the Stockton A.S. held 2 January, 1973, were as follows:—Furnished Jars: 1 and 2, A. Saunders; 3 and 4, Q. Watt. A.V. Labyrinths: 1 and 4, L. Osman; 2, D. Connelly; 3, A. Saunders. Large Cichlids: 1 and 3, D. Connelly; 2, K. Hornby; 4, B. Smith.

THE West of Scotland Exotic F.C. recent table show results were:—Livebearers: Sword-tails: 1, G. McKene; 2, J. Campbell; 3, J. Ferguson. Platies: 1, T. Gillespie; 2 and 3, J. Pyke. Mollies: 1, I. Cameron; 2, G. McKene. Best Fish in Show: T. Gillespie. The club has also had a visit from the Greenock Aquarium Club and some of their members participated in the film quiz.

TABLE show results of the Billingham A.S. held in January were:—Open Class: 1 and 3, J. Ryan; 2 and 4, D. Sudron. Breeding Pairs (Egglayers): 1 and 2, Mr. and Mrs. D. Anderson; 3, A. Crossley; 4, D. Sudron. Corydoras: 1, D. Sudron; 2, Master T. Corbett; 3 and 4, J. Ryan.

AT the January meeting of the Accrington A.S. a very interesting talk and film show was given by the president, H. Smith, and vice-president, A. Isherwood, on the fish establishment of Messrs. G. H. Wardlow of Driffield, Yorkshire. Later, presentations were made to the members with the most points gained during the past twelve months and these went to T. Hallett (senior) and Master D. R. Johnstone (Junior).

OVER fifty members were present at the Newbury and District A.S. annual general meeting when the chairman, G. Swait, reported on a very successful first year and looked forward to an equally successful 1973, the highlight of which will undoubtedly be the first open show on 9 September. During the course of the evening the John Wilson Trophy was presented to G. Foster for the highest number of points gained at table shows during the year. Runner-up, only one point behind, was Miss M. Bance; third, P. Legg; fourth (equal), Mrs. S. Lloyds, G. Carter and P. Bousfield.

Officers elected were: Chairman, G. Swait; vice-chairman, K. Lloyds; secretary, G. Taylor, 7 York Close, Newbury, Berks.; treasurer, R. K. Lloyds; show manager, P. Legg; show secretary, G. Foster. Other committee members, G. Dixon (F.B.A.S. delegate), B. Barrett, P. Bousfield, G. Turner and R. Ralph.

THE Abingdon A.S. recently held its first annual general meeting when the following officers were elected. Chairman, J. J. Dixon; treasurer, A. Watson; secretary, G. Hall, 24 Lower Radley Park, Abingdon, Berks.; show secretary, M. White; committee: D. Higgs and D. Blundell. Meetings are held on alternate Fridays (9 and 23 March) 8 p.m., at "The Grapes," High Street, Abingdon.

It is planned for the near future to make a "behind the scenes" visit to the London Aquaria, coupled with a trip to one of the bigger aquarist shops. New faces will be welcome at the meetings or interested fishkeepers can contact the secretary.

SPEAKER at the January meeting of the Gloucester Fishkeeping and Social Club

was F. C. Scriven of the B.C.A.S. He gave a very interesting and informative talk on Guppies. The attention of the members was held as he showed that this fish could give aquarists an enormous amount of pleasure and interest especially when selective breeding was used to try to breed specimens to show standard. The table show was for live breeder pairs, and was judged by P. Greenwood, also of the B.C.A.S. This show was a triumph for one of the junior members, Clive Dyke, who came first and second. T. Collier was third and G. Pattison fourth.

The meeting discussed ways of extending the table shows to give more interest and participation to the lady members and juniors. The chairman on behalf of the members, thanked the speaker and judge for their attendance, and said that they were always pleased to welcome interested visitors to the meetings which are held the last Thursday each month at 8 p.m., at the Hucklestone Community Centre.

THE G.K.N. Pond and A.S. got off to a good start at the January meeting. A panel of the more experienced aquarists dealt with various sections of the hobby and these were discussed in some depth. A "growing-on" competition also had enthusiastic backing in as much as members have purchased *Pelmatochromis Klugei* in order to have them judged at the July meeting and discuss the results and methods of best raising the fish to maturity. The results of the winter table show were:—Barbs: 1, T. Saunders; 2, A. Horne; 3, D. Penwright. A.O.V.: 1 and 3, T. Saunders; 2, D. Rickhus.

OFFICERS for Hendon A.S. this year are as follows:—Chairman, H. G. J. White; vice-chairman, K. L. Purbrick; secretary, R. A. Maynard, 90 Cotswold Gardens, London, N.W.2; show secretary, R. S. Thompson, 17 Highfield Avenue, London, N.W.9; treasurer, H. Watts.

IN January, Brighton and Southern A.S. held their annual general meeting, and three new committee members were elected, as follows: Chairman, R. Rice; secretary, E. Fountain, 8 Downland Road, Woodingdean, Brighton; press officer, S. Peck. Trophies were also awarded for 1972 table shows, and fish of the year went to Mrs. J. Dawes with a Blind Cave fish. The annual buffet dance was held at the end of January, and a very enjoyable evening was had by all.

AT the twice-monthly table shows of the Grimsby and Cleethorpes A.S. the results were as follows:—Breeders (Egglayers): 1 and 2, B. Pulford; 3, D. Hughes. Angels: 1, E. Kirk. Female Platies: 1 and 3, L. Evans; 2, B. Pulford. Female Platies (Junior): 1 and 2, G. Wilson. E. Kirk won Best Fish in Show. Rasboras Danios and Minnows: 1, B. Pulford; 2 and 3, D. Norton. Coldwater: 1, 2 and 3, M. Robinson. A.O.V. Livebearer: 1, 2 and 3, P. Atkinson. Junior: 1 and 3, T. Hughes; 2, G. Wilson. B. Pulford won Best Fish in Show.

NEW officers of the Mount Pleasant A.S. are as follows:—Chairman, J. Robertson; secretary, V. Davison, 100 Wordsworth Street, Gateshead, 8.

AT the recent annual general meeting of the Bath A.S. the following members were elected to serve for the coming year. President, L. Emery; vice-president, P. Grogan; chairman, T. Callow; vice-chairman, C. Phipps; secretary, E. A. Short, 22 Caledonian Road, East Twerton, Bath, BA2 3RB; asst. secretary, C. Russell; show secretary, Mrs. W. Short; treasurer, J. Webb; committee, Mrs. V. Russell, P. Rowell, T. Fowler, K. Overment, Mrs. K. Press.

THE annual general meeting of the Birmingham Section of the Fancy Guppy Association was held in January, when the following officers were elected. Chairman, G. Stedman, vice-chairman, S. Croft; treasurer, Mrs. J.

Croft; secretary, G. Bescham; show secretary, D. Beacham; assistant show secretary, D. Stedman; P.R.O., A. C. & J. Truman. Other committee members: D. Cartledge, M. DeLingpole, P. Jinks, T. Smith; catering, Joy Johnson and Megan Stedman; monthly broadsheet editors, P. and B. Walker.

A very full programme is being arranged for the year and many of the newer members are coming along well with their Guppy breeding. The speaker at the January meeting was T. Manning from the Edmonton Section, who gave an interesting talk on pumps and their maintenance.

Best male award went to G. Fletcher of Pelsall, near Walsall. Best Opposite Sex: W. Iwart of Leamington Spa. Best Breeders: Mr. and Mrs. D. Phillimore who also gained their advanced Masters Breeders Badge. Best in Show: W. Iwart for his Albino Female. The Association meet on the fourth Sunday afternoon of each month at the Glebe Farm Community Centre, Stechford, Birmingham, and are always pleased to welcome new members.

RESULTS of a recent inter-club show between Lincoln and District A.S. and Gainsborough A.S. were as follows:—Best in Show: Mr. and Mrs. Gilding (Gainsborough). Characins: 1, 2, 3, Mr. and Mrs. Harris (Gainsborough). A.O.V.: 1, Mr. Kuhn (Lincoln); 2, Mr. and Mrs. Gilding (Gainsborough); 3, Mrs. Rowling (Lincoln). Cichlids: 1, Mr. and Mrs. Gilding (Gainsborough); 2 and 3, Mr. Sellars (Lincoln). Livebearers: 1, Mr. Borrill (Lincoln); 2, Mr. Portman (Lincoln); 3, O. R. Smith (Lincoln).

EARLY in January Ealing and District A.S. held their annual general meeting and the new officers are as follows:—Chairman, J. Healey; vice-chairman, R. Sellers; secretary, V. Valley, 39 Oaklands Road, Hamwell, W.7; treasurer, W. Scrase; show secretary, John Batts, 99a Valetta Road, Acton, W.3; social secretary, D. Carvie; general members, K. Wakeford, J. Irvine; F.B.A.S. delegate, John Batts.

Results of the closed show also held in January were as follows:—Class AB: 1, J. Batts; 2, D. Cruickshank. Class Am: 1, R. Searls. Class B: 1, 2 and 3, D. Cruickshank; 4, J. Healey. Class C: 1, J. Batts; 2, V. Valley; 3, J. Irvine; 4, E. Tagg. Class D: 1 and 4, R. Searls; 2 and 3, V. Valley. Class E: 1, J. Healey. Class F: 1, V. Valley. Class G: 1, E. Tagg; 2, J. Batts. Class H: 1, D. Cruickshank; 2 and 4, J. Batts; 3, J. Healey. Class J: 1, R. Sellers; 2, J. Batts; 3 and 4, D. Carvie. Class L: 1, J. Batts; 2, V. Valley. Class M: 1, J. Batts. Class N: 1, L. Sandfield; 2 and 4, V. Valley; 3, J. Batts. Class O & P: 1, 2, 3 and 4, V. Valley. Class Q: 1 and 3, D. Cruickshank; 2, J. Healey. Class S: 1, R. Sellers. Class W: 1, T. Cruickshank; 2, V. Valley. Class X-b-m: 1, R. Searls. Class X-o-i: 1, R. Sellers.

Meetings are held every first and third Tuesday in the month at Northfields Community Centre, Northcroft Road, Isling, London, W.13.

MEMBERS and friends at the January meeting of the Bristol Tropical Fish Club heard a lecture given by L. Doubleday, of Torbay, his topic being "Tropical and Native Marines." This proved to be very interesting and informative. The Club's open show was booked for 28-30 June at the Congregational Hall, Stapleton Road, Bristol. Prospective members who wish to have any further information about the Club should contact M. Illick, 3 Burrington Close, Nailsea, Bristol, or attend the Club meeting at the Black Horse, Old Market, Bristol, on the third Thursday in the month.

**A FRACTION
A DAY, KEEPS
ALGAE AWAY**
Hillside Aquatics London N12

THE open aquaria show, organised by the Borough Council in association with the Essex, North and East London Aquarists Association, will be held in the King's Hall, Lower Clapton Road, E.5, on Saturday, 17, and Sunday, 18 March, 1973.

The show will comprise an inter-club furnished aquaria class; and individual aquascapists; an individual miniature furnished aquaria class; 23 tropical fish classes; 6 cold-water fish classes; a plants class and various trade exhibits. The show secretary will be Ron Kerridge of Harlow; entries close on Saturday, 10 March, 1973. Show schedules are available from this office and it is usual for about 500 fish to be exhibited.

THE Border A.S. held their annual general meeting in January. The members of the committee are as follows:—Chairman, J. Collier; vice-chairman, G. Burton; treasurer, A. Hunt; secretaries, Mr. and Mrs. R. Jones; show manager, E. Hodgson. D. Robin, I. Powley and J. Irving complete the committee. G. Burton won the Tropiscorium Shield for collecting the most number of points in the show. The meeting ended with an auction of spare equipment.

RECENT committee changes of the Ashton-under-Lyne and District A.S. are: President, I. Hill; chairman, L. Dunn; secretary, A. Axon, 7 Springbank Avenue, Audenshaw, Manchester; treasurer, H. Walton.

AT the January meeting of the Dorchester and District A.S. the chairman of the club, A. Cornick, gave a talk entitled "Electricity plus H₂O," describing how to wire up a fish tank. This was followed by a slide and tape report of the furnished aquaria entered for the Weymouth A.S. competition and which was judged by B. Cornick.

Table show winners were as follows:—Danios: 1 and 2, M. Cleal; 3, Miss N. Voss; 4, D. Norman. Mollies: 1, Master T. Fitz-Gerald; 2, R. Christopher; 3, M. Cleal; 4, Master P. Jeffries.

RESULTS of the Loughborough and District A.S. annual aquarium show held in November were as follows:—1, D. Lindsey; 2, I. Peadar; 3, E. Farry; 4, D. Keeley. There were thirteen tanks on display. During the show the club held an instant raffle to raise money in aid of John Stoner House Ambulance Fund and as the society's next general meeting, A. Whyman, chairman of the Ambulance Fund Committee, was presented with a cheque for £65 by I. Purdy, chairman of the society.

THE annual general meeting of the South Park Aquatic Study Society was held at the new and now permanent meeting place at the Wimbledon Community Centre, St. George's Road, S.W.19, on the 16 January with subsequent meetings on the third Tuesday of every month. Officers elected were:—Chairman, D. Pearson; secretary, Mrs. M. Dudley; treasurer, R. Trim; show secretary, G. Strutt; P.R.O., G. Herring, with D. Crisp elected as lay member.

Plans for 1973 were discussed, these to include table shows, lectures by many prominent people in the fish world, the possibility of a further combined open show with the Kingston and District A.S. and the Society's invitation show, the date to be announced later. Plans were also made to visit some of the other clubs in organised parties, and a number of open shows throughout the country.

halamid IN
WHITE SPOT OUT
Hillside Aquatics London N12

As a point of interest, it would be nice to know how many coldwater fishkeepers throughout the country who will read these notes and wonder how they can get in touch with the only known wholly coldwater club in the country. This can be remedied by contacting Mrs. M. Dudley, 163 South Park Road, S.W.19, 01-540 5662. All are welcome at any of the meetings and the next will be held on 20 March, when J. Pollard will judge the selection of native and foreign class.

THE Severn Side Ichthyological Society started off the New Year with two interesting meetings. At the first members of the society spoke about their own experiences in fish-keeping under the heading of "Meet the Aquarist." At the second meeting a good attendance enjoyed a unique lecture by M. Price on starting with marines. He brought along all the necessary equipment to start a marine aquarium. As he gave his lecture he set up the tank stage by stage and at the end he had a complete marine aquarium, and to finish it off he had three fish feeding by the end of the evening.

Meetings are held on alternate Fridays (2-16 March) at the Labour Club, Abbey Forge, Shrewsbury, and anyone interested in fishkeeping will be most welcome. Results of table shows were as follows:—A.O.V.: 1, M. Pitches; 2, B. Hollies; 3, R. Jones. A.O.V.: 1, S. Austin; 2, G. Ralph; 3, D. Mason.

THE British Aquarist Study Society (B.A.S.S.) is holding its first meeting of the year on 31 March at the Meeting Room of the Zoological Society, Regents Park, N.W.1. Dr. David Scott, of St. Andrews University, will be talking on the Bony-tongued Fishes of Asia and America. The lecture will be illustrated with slides and films made by the speaker on his visits to these parts of the world. B.A.S.S. is extending a special invitation to non-members for this meeting. Tickets are available from P. Keens, Highcliff, Old Hill, Woking, Surrey. The price of £1 includes refreshment.

EARLY in January the Brentwood A.S. held their annual general meeting when the following officers were elected for the coming year. Chairman, L. Dwight; vice-chairman, H. Green; secretary, R. Platford; treasurer, H. Green; show secretary, L. Dwight; assistant show secretary, K. Canham; publicity, R. Platford; librarian, P. White; raffles officer, B. Dwight, IRE. At the second meeting this month the society welcomed back Eddie Nichol. He explained the principles and methods of judging and also answered queries on judging. His talk helped members to understand the problems that confront a judge at a show. The table show was for livebearers. Results were as follows:—1 and 4, L. Dwight; 2 and 3, R. Platford.

THE following committee was elected at the annual general meeting of the Borehamwood and District A.S.: Chairman, J. Crucifix; vice-chairman, H. Turner; treasurer, R. Waldbridge; secretary, P. R. Long, 74 Canterbury House, Borehamwood, Herts, WD6 1NT, 01-953 2150; show secretary and P.R.O., D. Hounsell, 33 Kenilworth Drive, Borehamwood, Herts, 01-953 3540. The club meets at 8 p.m. every second and fourth Monday in the month at the Community Centre, Allum Lane, Borehamwood, Herts. Everyone welcome.

AT the Witham and District A.S. annual general meeting the election of officers resulted as follows:—President, D. Willet; chairman, D. Malton; vice-chairman, M. Seago; secretary, M. Jones; treasurer, J. Rusben; committee members, D. Moyes, J. Moyes, R. Moyes, L. Cole, T. Guest. The table show was for Guppies, and the results were: 1, M. Seago; 2 and 3, P. Nobes.

OFFICERS elected at the annual general meeting of the Creswell and District A.S. were: Chairman, B. Rodgers; treasurer, N.

Pogson; secretary, Mrs. A. Bull, 47 Carlton Close, Worksop, Notts.; show secretary, Mrs. R. Foster, 15 Hemmingfield Crescent, Worksop, Notts.

FOLLOWING the annual general meeting of the Sheffield and District A.S., members elected to serve on the Committee for this year were: Chairman, H. Baxton; vice-chairman, E. Smith; secretary, Mrs. S. Blizard, 62 Alnwick Road, Sheffield, S12 2GE; treasurer, E. Stanton; show secretary, T. Smith, 176 Woodbourne Road, Sheffield 9; social secretary, M. Keightley; editor, J. Blizard; committee men, D. Sanderson and R. Wilburn; president, Ken Colton.

AT the Ilford and District Aquarist's and Pondkeepers' Society January meeting held at Fulwell Cross Library, Backingade, H. G. Berger gave reports on the achievements and awards gained by the Society in various inter-club and open shows. This was followed by a talk on filters, rounded off with detailed instructions on constructing a filter for 3ip using plastic containers from familiar household products. At this meeting every year a Furnished Show Jar competition is held and has proved to be a popular addition to the club's ventures. Results were as follows:—1, C. Hackshall; 2, D. Seaman; 3, H. Berger; 4, Mrs. P. Reade. Anyone who is interested in fish-keeping and would like to know more about the Society can obtain further information from the honorary secretary, R. Ruth, 103 Heath Road, Chadwell Heath, Romford, Essex.

MEMBERS elected at the annual general meeting of the Bristol A.S. were: President, J. Phillips; vice-president, S. Lloyd; secretary, H. Thomas; treasurer, W. Ham; committee: D. Sappire, C. Leong, E. Bowden, A. Venn, B. Jacobs, H. Jago, G. Stone and Mrs. H. Thomas. The registrar remains the same in the person of Miss H. Morgan.

After the general business was completed S. Lloyd gave a very interesting illustrated talk on fish management and breeding and he also brought along a film of "Spring Fields in Spalding." Although this film is nothing to do with fish it is thoroughly recommended as an entertaining change for any society.

THE Loyne Aquarists, Lancaster, recently held their Fish of the Year Show when members from Blackpool, Fleetwood, Accrington and Morecambe Bay societies attended. R. Francis won a first in the A.O.V. section with a Knife fish and also the Fish of the Year Trophy. Lynda Nicholson won the Fish of the Year Trophy in the junior section. Plaques were won by the following members. Guppies, Mrs. S. Nicholson; Goldwater, L. Graham; Livebearers, Miss L. Peel; Cichlids O, Mrs. P. Graham; Sharks and Flying Foxes, J. Gardner; Catfish, Mrs. H. Batchelor; Junior section Livebearers, K. Nicholson. The winner in the senior section for points throughout the year was Miss L. Peel and in the Junior section K. Nicholson. The winner of the Furnished Home Aquarium was Mrs. S. Nicholson. The judges were T. Hallert from Accrington and I. Peck from F.G.A., Lancaster section. While judging was in progress the members and their visitors were entertained by a slide show on Marine Fish provided by J. Swain of Cleveleys. Officers elected at the annual general meeting for the forthcoming year were as follows: President, D. James; vice-president, G. Smith; chairman, L. Hodgson; vice-chairman, P. Batchelor; treasurer, J. Gardner; secretary, Mrs. N. Gardner; committee, F. Nicholson, M. Earnshaw and Miss L. Peel; junior committee member, Lynda Nicholson.

A very successful year in the trophy field and a good year of club nights is reported from Hull A.S. The officers for this year are: President, R. Pool; vice-president, G. Rooms; chairman, T. Douglas; vice-chairman, A. Douglas; secretary, J. Parker; assistant secretary, Mrs. B. Batch; show secretary, G.

Andrews; assistant show secretary, Mrs. J. Stabler; librarian, Mrs. A. Haggard; publicity officer, G. Hancock; treasurer, G. Bach; committeemen, K. Jenney, B. Stabler, K. Dunn. Meetings are held every first and third Wednesday of each month. Correspondence to J. Parker, 79 Springfield Avenue, Brough, East Yorks, or Mrs. B. Bach, 32 Hazelbrow Drive, Wolfreton Road, Anlaby, East Yorks.

OFFICERS for Morecambe Bay A.S. this year are:—Chairman, G. Shaw; secretary, L. R. Booker, 18 Gringley Road, Westgate, Morecambe; treasurer, Mrs. V. Shaw; show secretary, Mrs. B. Booker, 18 Gringley Road, Westgate, Morecambe.

IN December members of the Severn Side Ichthyological Society enjoyed a lecture by M. Pinches on "Books for the Aquarist." He brought along a wide range of books and divided them into groups—freshwater, marine, plants. He then went on to give his opinion on them and their good and bad points and this gave members a chance to see a variety of books to suit their needs. The society would like to thank Salop Aquatics Ltd. who loaned the books.

A new committee was voted in for 1973 and is as follows:—Chairman, K. Parry; vice-chairman, B. Hollis; secretary, M. Pinches; assistant secretary, P. Warham; treasurer, M. Price; assistant treasurer, S. Austin; public relations officer, B. Jones; assistant P.R.O., D. Griffiths; show secretary, L. Brain; assistant show secretary, G. Ralphs; committee member, D. Massion. Meetings are held fortnightly at the Labour Club, Abbeyforegate, Shrewsbury. All will be made welcome.

THE second annual open show of the Havant and District A.S. was an outstanding success despite a drop in the number of entries from last year's figures. Detailed results are as follows:—Furnished Aquaria (Class Ad): 1, Mrs. D. Booker (Havant); (Class Agh): 1, K. Bisson (Basingstoke); 2, N. Davis (unattached); 3, R. Dean (Havant). Barbs: 1, B. Bisson (Basingstoke); 2, A. Marshall (Basingstoke); 3, D. Jones (Southampton). Hypheobrycon, Hemigrammus, Cheirodon: 1, B. Bisson (Basingstoke); 2, N. Gorratt (Rochampton); 3, S. Crabtree (Havant). A.O.S. Characin: 1, C. Fuller (Havant); 2, A. Bridger (Havant); 3, P. Spashart (Havant). A.O.S. Characin: 1, C. Fuller (Havant); 2, A. Bridger (Havant); 3, P. Spashart (Havant). Angels: 1, A. Tracey (Gosport); 2, N. Gorratt (Rochampton); 3, N. Davis (Havant). Apistogramma, Pelmatochromis, Nannacara: 1 and 2, J. Willis (Portsmouth); 3, R. Bennett (Yate). Rift Valley Cichlids: 1, K. Clough (Gosport); 2 and 3, D. Haines (Gosport). A.O.S. Cichlid: 1, S. Freemantle (Gosport); 2, K. Taylor (Havant); 3, J. Hughes (Rochampton). Siamese Fighters: 1, Mr. and Mrs. K. Etheridge (Gosport); 2, K. Rees (Gosport); 3, A. Ford (Havant). A.O.S. Labyrinth: 1, J. Hughes (Rochampton); 2, D. Tull (Salisbury); 3, N. Davis (Havant). Egg-laying Toothcarps: 1, G. Foster (Newbury); 2, N. Franklin (Havant); 3, D. Jones (Southampton). A.O.S. Tropical Catfish: 1 and 2, K. Taylor (Havant); 3, C. Beets (Unattached). Corydoras and Brochis: 1 and 2, Fiona Etheridge (Gosport); 3, K. Taylor (Havant). Rasboras: 1 and 2, D. Tucker (Salisbury); 3, N. Franklin (Havant). Danios and W.C.M.M.: 1, B. Bisson (Basingstoke); 2, S. Crabtree (Havant); 3, K. Holmes (Havant). Loaches: 1, S. Crabtree (Havant); 2, R. Adams (Salisbury); 3, K. Bisson (Basingstoke). A.O.S. Tropical Eglayer: 1, D. Riley (Havant); 2, N. Davis (Havant); 3, T. Fisher (Havant). Guppy, Male: 1, Mrs. Le Cuirot (Rochampton); 2, D. Tucker (Salisbury); 3, C. Beets (Unattached). Guppy, Female: 1, C. Beets (Unattached); 2, M. Mansbridge (Southampton); 3, A. Marshall (Basingstoke). Sword-tails: 1, W. Spashart (Unattached); 2, D. Riley (Havant); 3, Mrs. Le Cuirot (Rochampton). Platys: 1, D. Tucker (Salisbury); 2, K. Bisson (Basingstoke); 3, A. Marshall (Basingstoke). Mollies: 1, N. Davis (Havant); 2, A. Ford (Havant); 3, Mrs. D. Booker (Havant). A.O.S.

Livebearer: 1, B. Bisson (Basingstoke); 2 and 3, N. Mansbridge (Southampton). Goldfish and London Shubunkins: 1, 2 and 3, R. Cowley (Gosport). Singletails and Comets: 1 and 3, J. Hopping (Unattached); 2, E. Binstead (Portsmouth). Twintailed Goldfish: 1 and 2, Mr. and Mrs. J. Lamboll (Portsmouth); 3, V. Hunt (Havant). Sunfishes: 1 and 2, E. Binstead (Portsmouth); 3, V. Hunt. A.O.S. Coldwater: 1, D. Stokes (Portsmouth); 2, V. Hunt (Havant); 3, W. Ryder (Portsmouth). Plants: 1, W. Ryder (Portsmouth); 2, J. Hughes (Rochampton); 3, D. Haines (Gosport). Breeders (Tropical Eglayer): 1, P. Willis (Portsmouth); 2, D. Jones (Southampton); 3, N. Franklin (Havant). Breeders (Tropical Livebearer): 1, 2 and 3, K. Bisson (Basingstoke). Breeders (Guppy): 1, C. Beets (Unattached); 2, D. Tucker (Salisbury); 3, D. Riley (Havant). Breeders (Coldwater): 1, D. Stokes (Portsmouth). Number of entries in show: 350.

OFFICERS elected at Salisbury and District A.S. were Chairman, T. Blanchard; treasurer, D. Adams; show secretary, C. Lennox, 69 St. Francis Road, Salisbury; Wilts; secretary, P. Grant, 16 Parsonage Green, West Harnham, Salisbury, Wilts.

RESULTS of the Dudley and District A.S. January show were as follows:—Class G: 1, J. Goodman; 2 and 3, J. Millard. Class L: 1 and 2, S. Cartwright; 3, J. Goodman. Novice Class G: 1, D. Price; 2, D. Vickery; 3, Mrs. S. Fleetwood. Novice Class L: 1, D. Price; 2 and 3, M. Beckingham. Best Fish in Show: D. Price. The judges were G. Brockhouse, Lower General, and R. Clarke.

AT the December meeting of the Manchester Section F.G.A. there was quite a good gathering of members and their families for this informal Christmas get together. On the table show the major awards went to T. Hallett for Best Male and Best in Show with a Long-dorsal Veil. Best Female and Best Breeders awards to A. Charlton with a Natural Tail Female and his Gold Snakeskin Top Swords. The January meeting was the section's annual general meeting. The chairman, R. Young, reviewed the previous year's activities, stating that it had been quite a successful year and hoped that the coming year would see even greater progress. Officers for 1973 are as follows:—Chairman, R. Young; secretary, D. Glen, 16 Nuttall Avenue, Whitefield, nr. Manchester; treasurer, A. Charlton; show secretary, J. Heslith; assistant show secretary, P. Campbell; P.R.O., T. Hallett.

There were 55 entries in the show bench. Mrs. P. Young was awarded Best Male and Best in Show with a Top Sword. Best Female went to F. Lowe, Albino Natural Tail and Best Breeders award went to A. Charlton's gold Snakeskin Top Swords again. Also at this meeting the Breeder of the Year Trophy was presented to Mrs. P. Young for the second year in succession. The final results being: 1, Mrs. P. Young; 2, T. Hallett; 3, M. Delingpole.

THE Weymouth A.S. annual general meeting in January was attended by 42 members. The following officers were elected:—Chairman, D. Rogers; vice-chairman and show committee, J. Fancy; secretary and show secretary, A. Worth, 67 Queens Avenue, Dorchester; treasurer, Mrs. R. Fitzgerald; raffles and show manager, A. Billington; trophies and equipment, G. Fitzgerald; press and public relations, Mrs. E. Hart; committee members, D. Kelly and Mrs. M. Rogers. Changing of time and venue was discussed and unanimously decided to remain the same. Among this year's coming events were planned a lecture on electric and general aquarium equipment. At the December meeting, B. Cornick of Dorchester gave a slide show of the month's home aquaria competition which was won by Mr. and Mrs. Hart. Mr. Cornick judged the competition and the Society thanks him for his excellent slide and tape show. Visitors and new members will be very welcome at the monthly meetings at 7.30 p.m. on the first Tuesday of the month at The Assembly Hall, The Waverley Arms Hotel, Abbotsbury Road, Weymouth.

THE Welwyn Garden City A.S. elected the following committee at their first annual meeting. Chairman, S. Matthews; secretary, Miss J. Edwards, 155 Howlands, Welwyn Garden City; programme secretary, P. Sweet; sales and discount secretary, P. Taylor; show secretary, D. Collis; assistant show secretary, B. Hancock; treasurer, J. Wagnall; junior representative, A. Margrove; senior representative, R. Noble; librarian, G. Lewis; catering officer, Miss L. Green; public relations officer, M. Graham; F.B.A.S. delegate, B. Hancock; auditors, B. Stevens and L. Bracey. Awards: The Matthews Cup, presented for the Fish of the Show, was won by D. Pitts, with a thick-lipped Gourami. The Bracey Cup, presented for the highest total points in 1972, was won by G. Tipping.

One of the highlights of the evening was a series of 8 mm. colour films showing interesting facets in the life of tropical marines. These showed close-up spawning sequences, and different stages of progress up to about eight weeks. A general film on Coral Fish introduced the novice and expert alike to some of the species one can keep in an aquarium. Four films were shown in all and they were all very well received by members and guests alike. The Society would like to thank W. Taylor of Manchester for the use of his films and wish him a happy retirement when he moves to New Zealand this year. The Society will continue to meet on the first and third Monday of each month at 8 p.m. at the Scout Hut, Great Dell, Welwyn Garden City. New members will be made very welcome. For further details contact the Secretary, Janice Edwards, 155 Howlands, Welwyn Garden City, 21350.

SECRETARY CHANGES

Northern Goldfish and Pondkeepers Society: B. Ogden, 29 Cumberland Road, Urmston, Manchester.

Independent A.S.: P. Coyle, 100 Salford Road, London, E.17. Tel: 521 0936.

Valley A.S.: D. Austin, 10 St. Pauls Street, Rambsbottom, nr. Manchester.

Rushden Fishkeepers Association: R. Wilson, 21 Barnwell Drive, Rushden, Northants.

Lincoln and District A.S.: Mrs. B. Sellers, 24 Hawthorn Avenue, Cherry Willingham, Lincoln.

Newbury and District A.S.: G. Taylor, 7 York Close, Newbury, Berks.

Rugby Fishkeepers Club: P. Sharman, 122 Freemanle Road, Rugby, Warks.

Irish Tropical Fish Society: J. P. Naimith, Kilgobbin, Sandyford, Co. Dublin.

Fancy Guppy Association (Manchester Section): T. Hallett, 68 St. Huberts Street, Great Harwood, Lancs.

Medway A.S.: J. Marshall, 97 Dargets Road, Waddeslade, Chatham, Kent. Medway 63712.

Stone A.S.: B. Hughes, 4 Haven Crescent, Werrington, Stoke-on-Trent, Staffs, ST9 0BY. Tel: Ash Bank 2194.

Blackpool and Fylde A.S.: K. Walker, 38 Lonsdale Avenue, Blackpool.

Dunstable and District A.S.: D. H. Oakley, 36 Hillyfields, Dunstable, Beds., LU6 3NS. Tel: Dunstable 66571. Venue: The Kings Arms, Houghton Regis, Beds. Meetings held first Tuesday of each month commencing at 8 p.m.

Creswell and District A.S.: Mrs. A. Bull, 47 Carlton Close, Worksop, Notts.

Dukeries A.S.: M. Rotherham, 93 Clowen Road, Standree, Chesterfield. Tel: Bolsover 2458.

Four Star A.S.: G. N. Douglas, 10 Michaels Estate, Grimthorpe, nr. Barnsley, Yorks.

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Grimsby and Cleethorpes A.S.: E. Holmes, 4 Sussex Street, Cleethorpes, Grimsby.
Tottenham and District A.S.: L. F. Clements, 47 Winchelsea Road, Tottenham, N.17 6XJ Tel: 01-808 1220.

Dudley and District A.S.: C. James, 11 Holcroft Road, Grange Estate, Stourbridge, Worcs.

Hounslow and District A.S.: H. Parish, 18 The Barrows, Twickenham, Middx.

Newcastle Guppy and Livebearer Society: Mrs. J. Renton, 128 Dunstan Tower, Garth 18, Killingsworth, Newcastle upon Tyne.

Exeter and District A.S.: A. J. Wijaszko, 38 May Street, Exeter, EX4 6LL.

Workshop Aquarist and F.S.: T. Handley, 27 Rydal Drive, Worksoop, Notts.

Fleetswood and District A.S.: N. D. West, 40b Mowbray Road, Fleetswood.

Erith and District A.S.: Mrs. M. Cullum, 10 Sunland Avenue, Beesleyheath, Kent.

Hyde A.S.: A. Darby, c/o 17 Longridge Avenue, Stalybridge, Cheshire. Tel: 061-368 4868.

West of Scotland Exotic Fish Club: J. F. Campbell, 28 Durockstock Crescent, Foxbar, Paisley.

NEW SOCIETIES

Recently formed is the **Barnstaple and District A.S.** The meetings are held on alternate Wednesdays at the Barrington Aqua Centre, Barnstaple, starting at 8.30 p.m. New members would be welcome. Any information can be obtained from either the Aqua Centre or G. Clemment, 14 Gwyther, South Molton, Devon.

A new Society has been formed in Minchinhampton, Glos., and will be known as the **Cotswold A.S.** Meetings will be held on the last Wednesday of each month, at the Library, Tetbury Street, Minchinhampton, nr. Stroud, Glos. Affiliation to the F.B.A.S. has been made by the Society. New members welcome. Officials are: Hon. chairman, W. Weir; hon. secretary, Mrs. S. Dodson, 12 Gibson Close, Stroud, Glos.; treasurer, R. Dodson; committee members, F. Dodson, K. Hodges, Mrs. W. Weir.

OBITUARY

Members and friends of **Ealing and District A.S.** were shocked by the news of the sudden death of Mrs. Violet Marsh. Although she only joined Ealing in 1971, the club was always sure of a helping hand as she was a true club member in every sense of the word, and will be sadly missed by all her friends.

CHANGE OF NAME

At the annual general meeting of the **Carshalton and District A.S.** the name was changed to "Carshalton, Sutton and Mitcham A.S." Meetings are held on the first Monday of each month at Hill House, Bishopsford Road, Morden, Surrey, at 8 p.m. The new secretary is L. Lovell, 39 Brumfield Road, West Ewell, Epsom, Surrey, tel. no. 397 8141, to whom enquiries regarding membership should be addressed. New members are particularly welcome, and a full programme for the forthcoming year has been arranged.

The name of **Welbeck A.S.** has now been changed to **Castleford A.S.** and this society has no connection with the old Castleford and District A.S. The meetings are to be held in the British Legion Club, Welbeck Street, Castleford, on the third Wednesday of each month at 7.45 p.m. New members and visitors welcome. All correspondence to the secretary, Mrs. J. E. Asquith, 32 Lower Oxford Street, Castleford, Yorkshire, WF10 4AE.

VENUE CHANGES

Scarborough and District A.S. now hold their meetings on the second and fourth Thursday in the month at the Delmont Social Club, New Queen Street, Scarborough.

Hinckley and District A.S. The new meeting place is now The Westfield Youth Centre, Rosemary Way, Hinckley, Leics. Third Thursday in every month, at 7.30 p.m.

The **Cleveland A.S.** meetings will now be held at the Albion Club, Kirkleatham Street (behind York Hotel), Redcar, Teesside.

AQUARIST CALENDAR 1973

18th February: Rotherham and District A.S. Fourth Open Show at Brinsworth Manor School, Brinsworth Lane, Brinsworth. Details from Secretary, Mrs. J. Airon, 9 Bent Lathes Avenue, Rotherham, Yorks S60 4BL.

4th March: Keighley A.S. Open Show, Victoria Hall, Victoria Park, Laskholme Lane, Keighley.

11th March: Stretford and District A.S. Open Show will be held at Gramham Brothers, Chester Road, Stretford, along with a motor show. Show secretary, A. Stear, 63 Derbyshire Lane, Stretford, Manchester.

11th March: The Gainsborough A.S. will hold its First Open Show at the Town Hall, Gainsborough. Judging to F.N.A.S.

17th March: Riverside A.S. Annual Open Show at St. Saviours Church Hall, Cobbold Road, W.12. Show schedules available from W. Netherhall, 13 Greyhound Road, Fulham S.W.6. 1385 0276.

17th-18th March: London Borough of Hackney Open Aquaria Show at King's Hall, Lower Clapton Road, London, E.3.

18th March: Don Valley A.S. First Open Show at British Steel Corp. Staff Dining Rooms, Stockbridge, nr. Sheffield. Schedules obtainable from G. A. Hoyland, 36 Haggstones Road, Oughtibridge, Sheffield.

25th March: Nelson A.S. Annual Open Show at the Civic Centre, Stanley Street, Nelson.

25th March: Worksoop A.Z.S. Open Show at North Notts College of Further Education, Carlton Road, Worksoop, Notts. Show schedules will be available from the show secretary, Mr. P. E. Spittlehouse, 8 Dennis Street, Worksoop, Notts, S80 2EL.

25th March: East Kilbride A.S. Second Open Show.

1st April: Houghton and District A.S. Further details later.

7th April: Thurrock A.S. Open Show, Arthur Street School, Arthur Street, Grays, Essex. Schedules from A. L. Riddles, 2 Pym Place, Grays, Essex.

7th April: Yate and District A.S. Open Show. Details from R. A. Bennett, 22 Kents Green, Kingswood, Bristol.

7th April: G.S.G.B. Annual General Meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London. Goldfish for Beginners, Part Two. R. Whittington. The Merits and Demerits of Handspawning. Panel. Table Classes. Refreshments available.

8th April: Scunthorpe Museum Society Aquarist Group Open Show. To be held at the T.A. Drill Hall, Cotteragebeck Road, Scunthorpe, Lincs. Schedules available from A. Shucksmith, 3 Salmonby Road, Scunthorpe, Lincs.

8th April: Warrington A.S. Open Show, F.N.A.S. rules. St. Benedict's Y.C., Bell Hall, Orford Lane, Warrington. Show Secretary: J. Higham, 42 Hood Lane, Sansley, Warrington, Lancashire. Tel: 56939.

8th April: Uxbridge and District A.S. Open Show at the G.P.O. Social Club, Willow Tree Lane, Yeading Lane, Hayes, Middlesex. Schedules will be available from show secretary, Mrs. S. Whitehead, 31 Berberis Walk, West Drayton, Middlesex.

14th April: Independent A.S. Open Show will be held at the Public Hall, Ilkington Town Hall, Upper Street, Ilkington, N.1. Schedules from B. Mason, 70 Myddleton Square, London, E.C.1. S.A.E. please.

14th April: Bath A.S. 25th Anniversary Open Show to be held at St. Peter's Hall, Dorset Street, Bath. Schedules available from the show secretary, Mrs. W. Short, 22 Caledonian Road, Bath, BA2 3RB. Tel: Bath 26028.

15th April: Coventry Pool and Aquarium Society Open Show, Foleshill Community Centre, Foleshill Road (A.444), Coventry. Details from Show Secretary, S. Woodbridge, 32 Ridgeway Avenue, Styvedrale, Coventry, or Secretary, C. J. Grant, 26 Cecily Road, Cheylesmore, Coventry.

15th April: Sheffield and District A.S. Open Show at Granville College, Granville Road, Sheffield 2 (nr. Midland Station). Schedules and show information available from show secretary, Mr. T. Smith, 176 Woodbourn Road, Sheffield, 9.

15th April: Stockton-on-Tees A.S. Eighth Annual Open Show at St. Peter and Paul School, Durham Road, Stockton (adjacent to Mile House Hotel). Details and schedules from C. Buck, 22 Danby Grove, Thornaby, Teesside.

15th April: Stanley and Consett A.S. First Open Show, South Stanley Community Centre. Details from R. R. Elliott, 25 Berryhill Close, Ilkech Green, Winton, Blaydon-on-Tyne. Tel: Blaydon 3416.

21st April: Runnymede A.S. Full details later.

22nd April: Hyde A.S. Easter Sunday Open Show. Venue to follow or telephone secretary, A. Darby—061-368 4868.

22nd April: York and District A.S. Open Show at The Folk Hall, New Barwick, York. Schedules available shortly from show secretary, P. Rees, 30 Don Avenue, Dringhouses, York.

23rd April: Southampton A.S. Open Show, Avenue Hall, Southampton. Show secretary, P. J. Brown, 215 Spring Road, Sholing Southampton.

28th April: Blakeborough and Sons Ltd. Open Show at the J. Blakeborough and Sons Ltd. canteen, Brighouse, Yorkshire. Further details later.

28th April: Trowbridge and District A.S. Eighth Annual Open Show at the Nelson Haden Boys School, Trowbridge. Schedules available from show secretary, Mrs. J. A. Burton, 17 Polebarn Road, Trowbridge, Wilts.

29th April: Ilfracombe and District A.S. Open Show, Holiday Inn, Ilfracombe.

29th April: Loynes A.S. Third Open Show, Priory Hall, China Street, Lancaster. Three large car parks. Show secretary, Mrs. H. Bachelor, 52 Lythefell Avenue, Halton-on-Lune, Lancaster. Tel: Halton-on-Lune 625.

29th April: Medway A.S. Open Show. Note: New venue to be announced for 1973.

6th May: Oran A.S. Open Show will be held in the Oran Recreation Hall, Refuge Street, Shaw, Oldham.

6th May: Rochampton A.S. Open Show. Further details to follow. Any information, contact show secretary, Derek Lambourne, 7 Wheeler Court, Prough Road, SW11 2AX. Tel: 01-223 2630.

6th May: Dukeries A.S. Open Show. Full details later.

12th May: Port Talbot and District A.S. Annual Open Show at the Y.M.C.A. Buildings, Port Talbot. Show secretary, A. E. B. Fouracre, 3 Cross Street, Velindre, Port Talbot, Glam.

13th May: The Second Annual Open Show of the Gloucester A.S. will be held at the Gloucester Education and Leisure Centre, Painswick Road. Schedules from the show secretary, Mike Brooks, 114 Melbourn Street, Gloucester, from February on.

13th May: Corby and District A.S. Open Show, at the Corby Civic Centre. F.A.B.A.S. Details and schedules from the show secretary, A. Slow, 176 King Street, Kettering, Northants.

13th May: Croydon A.S. Open Show, full details later.

13th May: Derby Regent A.S. Open Show. Sherwood Foresters Recreation Centre (Normanton Barracks), Osaston Road (A5111), Derby. R.A.C. sign posted. Show Secretary: R. G. Hazlow, 180 Mansfield Road, Derby. Tel.: 44322.

17th-19th May: The Second National Welsh Open Show will be held at the Central Hall, Tonypany, Rhondda. Show secretary, M. Williams, 122 Top Trebanog, Trebanog, Rhondda, Glam.

19th May: Southend, Leigh and District A.S. Open Show, to be held at St. Clement's Hall Rectory, Grove, Leigh-on-Sea. Schedules available from Show Secretary, D. C. M. Durrant, 172 Trinity Road, Southend-on-Sea, Essex. Tel.: Southend 610576.

19th May: Whiteway and District Fishkeepers Society First Open Show, Whiteway Community Centre, Kelton View, Whiteway, Bath. Schedules available from secretary, S. V. Daniels, 21 Haycombe Drive, Whiteway, Bath, BA2 1PG.

20th May: Yeovil and D.A.S. Open Show, the School Hall, Church Street, Martock, nr. Yeovil. Schedules from M. Hulbert, 62 Meadow Road, Yeovil, Somerset.

20th May: Goole and District A.S. Open Show. Provisional date.

20th May: Merseyside A.S. Annual Open Show. The British Legion Club, Holyoake Hall, 2 Cranwood Ave., Liverpool, L18 1EG.

27th May: The 1973 Fancy Guppy Association World International will be held at the Glebe Farm Community Centre, Stechford, Birmingham. Show schedules are available from the show secretary, D. R. Beacham, 17 Pedmore Close, Woodrow South, Redditch, Worcs. Open to the public at 3 p.m.

27th May: Weymouth A.S. Open Show will be held at The Small Sidney Hall, Weymouth. Show Secretary, A. Worth, 67 Queens Avenue, Dorchester, Dorset.

27th May: Boston A.S. Open Show, Blackfriars Theatre, Boston. Schedules from S. Noble, 175 Wood Farm Road, Boston, Lincs.

3rd June: Bournemouth A.S. Annual Open Show at Kinson Community Centre, Pelham Park, Bournemouth. Show Secretary, J. V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth, BH6 4JF.

3rd June: Accrington and District A.S. Open Show at St. John Ambulance Drill Hall, Bull Bridge, Accrington, Lancs. Schedules, etc., from S. Walsh, Show secretary, 133 Lammack Road, Blackburn, Lancs, BB1 8LA.

3rd June: Loughborough and District A.S. Open Show will be held at the Sports Centre, Granby Street, Loughborough. Details to follow.

3rd June: South Derbyshire and District A.S. Annual Show (Members), Good Companions Club, Church Gresley, nr. Burton-on-Trent. Show secretary, R. Brabbins, 42 West Mead Road, Barton, nr. Burton-on-Trent.

9th June: Vauxhall Motors Aquarist Section first Open Show; in conjunction with the Vauxhall Motor Sports Day Spectacular. All enquiries to A. Philip, show secretary, 15 Hollybush Road, Luton, Beds.

9th June: Llanrwit Major A.S. Open Show, The Town Hall, Llanrwit Major. Show secretary, J. J. Edwards, "Glanafon," Mill Park, Llanblethian, Cowbridge, Glamorgan, CF7 7BG.

9th June: Havant and District A.S. Third Open Show at St. George's Hall, Waterlooville. Show secretary, V. R. Hunt, "Caeglas," 120 London Road, Widley, nr. Portsmouth, Hants.

10th June: Lincoln and District A.S. Show Secretary, H. Kuhn, 44 Scorer Street, Lincoln.

10th June: G.K.N. Pond and Aquarium Society second Open Show at G.K.N. Canteen, Salisbury Street, Darlaston, Staffs. Show details available from Ken Rowley, hon. show secretary, 156 Wolverhampton Street, Darlaston, Staffs.

10th June: High Wycombe A.S. Open Show. The venue will be Lane End Village Hall, Lane End, High Wycombe, Bucks.

10th June: Bishop Auckland A.S. Fifth Annual Open Show to be held in the Y.M.C.A., Proudfoot Drive, Woodhouse Close Estate, Bishop Auckland. Details later.

17th June: Swillington A.S. Annual Open Show will be held at John Smeaton's School, off Barwick Road, Leeds, 14.

17th June: Freelance A.S. Open Show, Amersham Community Centre, Thurlow Street, S.E.17. For details contact J. Stamp, 72 Redmond House, Lant Street, Borough, S.E.1.

17th June: Hetton County A.S. Third Annual Open Show, at the Hetton Community Centre in South Market Street, Hetton-le-Hole. Details later.

17th June: Bishops Cleeve A.S. Open Show at the T.A. Centre, Arle Road, Cheltenham, Glos. Schedules from show secretary, Mrs. J. Hawkins, 44 Burton Street, Cheltenham, Glos.

17th June: Salisbury and District A.S. Open Show at the City Hall, Fisherton Street, Salisbury, Wilts.

17th June: Chelmsley A.S. Open Show. Schedules and further information from show secretary, Mr. J. Aidney, 4 Shenton Walk, Kingshurst, Birmingham.

23rd June: Dunmow and District A.S. Open Show at the Foakes Memorial Hall, Gt. Dunmow. For further details please contact show secretary, D. McMurdie, 37 Capel Road, Rayne, nr. Braintree.

24th June: Littlehampton and Bognor A.S. Inter-Club Show and Annual Exhibition, Western Pavilion, Littlehampton, Sussex. The Exhibition may be extended to Saturday, 23rd June. More details later.

24th June: Alfreton and District A.S. Annual Open Show, to be held at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, B. Hickling, Parkview, 13 Coppice Drive, Eastwood, MG16 3PW. Tel.: Langley Mill 5104.

24th June: Mount Pleasant A.S. third Annual Open Show. Details to follow.

24th June: Dudley and District A.S. First Open Show at the Blind Institute, Wolverhampton Road East, Sedgley, Dudley. Full details later.

1st July: Thorne A.S. Annual Open Show.

1st July: Exeter and District A.S. Open Show. Further details later.

7th July: G.S.G.B. Quarterly Meeting, 2.30 p.m. Conway Hall, Red Lion Square, Holborn, London. Goldfish for Beginners, Part Three, R. Whittington. A talk by our Technical Director, J. Bundell. Feeding the Young Goldfish. Panel Table Classes. Refreshments available.

7th-8th July: Dagenham Town Open Show, Central Park, Dagenham. Show schedules from show secretary, D. G. Kent, 74 Lynwood Drive, Collier Row, Romford, Essex, RM5 2QT. Tel: Romford 67804.

8th July: Grantham and District A.S. Fourth Open Show, at the Walton Girls County Secondary School, Kitty Briggs Lane, Grantham. Details from the show secretary, C. J. Shipman, 40, New Beacon Road, Grantham, Lincs. A "Y.A.A.S." Show.

8th July: Ashington, Blyth and District A.S. Second Annual Open Show. Details to follow.

14th July: Basingstoke A.S. Open Show.

15th July: The Sandgrounders' A.S. Third Annual Open Show. Full details later.

12th August: North Staffs. A.S.

12th August: Grimby and Cleethorpes A.S. second Open Show at the Memorial Hall, Cleethorpes. Schedules can be obtained from the Show Secretary, T. P. Walker, 51 Cheshire Walk, Willows Estate, Grimby, Lincs.

18th-19th August: Harwich and District A.S. Annual Show to be held at The Queens Hotel, Dovercourt High Street.

19th August: Huddersfield T.F.S. Annual Open Show. Details to follow.

19th August: Valley A.S. Open Show to be held at Civic Hall, Ramabotrom. Show secretary, M. Berry, 8 Leyland Street, Blackford Bridge, Bury, Lancs. Tel: 061-766 8574.

26th August: Fleetwood A.S. First Show at The Fleetwood Grammar School, Poulton Road, Fleetwood.

8th September: Three Counties Group Annual Open Show. Show secretary, John Horsey, 4 Rickman Close, Woodley, Reading, Berks.

9th September: Nuneaton A.S. Sixth Open Show.

9th September: Newbury and District A.S. Open Show. Full details later.

9th September: Barnsley T.F.S. Ninth Annual Open Show at The Mappleswell, Staincross Village Hall.

15th September: Weston-super-Mare and District T.F.S. Fourth Open Show at St. Ichra Hall, Oxford Street, Weston-super-Mare. Show manager, J. Clarke, St. Jules, North Street, Cheddar.

16th September: Grimwood A.S., Skelmersdale, Lancs. Second Annual Open Show to be held at the Quarry Bank Community Centre, Ormskirk Road, Skelmersdale. Details from J. B. Handford, secretary, 55 Thurston, Skelmersdale, Lancs. Tel. 24900.

16th September: Buxton and District A.S. Third Open Show at the Pavilion Gardens, Buxton. Schedules from the show secretary, A. Holland, 8 Midland Terrace, New Mills, Via Stockport, Cheshire.

23rd September: Torbay A.S. Open Show, at the Torquay Town Hall. Further details later.

30th September: Northampton and District A.S. Open Show at the Drill Hall, Northampton. Schedules will be available shortly from G. Allatt, 80 Chiltern Avenue, Northampton.

7th October: Eboracum Aquarists First Open Show. Further details available at a later date.

4th November: The Mixenden T.F.S. Open Show.

3rd November: G.S.G.B. Quarterly Meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London. Goldfish for Beginners, Part Four, R. Whittington. The Bristol Shubunkin. L. Emery. Choosing next year's Breeders. Panel Table Classes. Refreshments available.