

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



In this issue: **Colour features**

Behaviour and Reproduction of Clownfishes

***Amphiprion ocellaris* Also Keeping Koi**



THE AQUARIST

AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

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The Editor accepts no responsibility for views expressed
by contributors.

What is Your Opinion?



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

I WILL BEGIN by wishing all my readers a happy and enjoyable Christmas. My thanks go to everyone who read my feature during the past twelve months; and especially to those who took the time and trouble to send me their letters for publication. Without such kind contributions this feature could not continue. I'd like to send a special word of greeting to Mr. Jack Hems, who has been ill for some time. Jack has been a regular contributor to *The Aquarist & Pondkeeper* for a lot longer than I have been alive and I feel sure that readers will wish to join me in sending Jack best wishes for a speedy and complete recovery. I hope he and his wife Joan have a pleasant Christmas and that it won't be too long before we see his interesting and scholarly articles in these pages once again. All the best, Jack!

Mrs. Anne Wade resides at 22 Silverdale Avenue, Minister, Sheppy, Kent, ME12 2EP, and she writes: "In answer to Mr Whitesides' comments on the slaughter of dolphins and baby seals, I can see the need to conserve fish stocks; but it is man who has over-fished, not seals and dolphins. Seals and dolphins were eating fish long before man could make a net or fish hook; and there were still plenty of fish around when he learnt. Therefore I believe that it is man who should reduce his fish consumption, not dolphins and seals. Man has also reduced the number of killer whales, which are also the natural predators of seals and dolphins, again upsetting the balance of nature.

"Mr. Whiteside, I do not think you are too much of a romantic; but I am in the minority in that I am a strict

vegetarian—not drinking milk, eating cheese or eggs either because they indirectly still involve the slaughterhouse. The brutality of the slaughterhouse is the same whether it is concealed in an abattoir or openly filmed on an iceflow or Japanese beach. It all shows how uncivilized man is.

"I even feel a twinge of conscience when I feed my fish with meat products containing food (sic) and *Daphnia*, but I try—notice 'try'; I do not always convince myself—to justify myself because it is their natural food. I breed as many of my own *Daphnia* in china sinks as I can, so I know how they are treated. I bet you think I am a real 'nutter' now! I feel that just the shape of our teeth shows we are not dedicated carnivores. We are said to have taken up the carnivorous diet in the ice age when our natural food of seeds, nuts and fruits became scarce. I suppose it is because I am not a serious breeder of fish that I am not against amphibians coming into my pond. My main reason for a pond in the first place was to replace a natural habitat for wild creatures and water and bathing facilities for birds. I would take it as an honour to be visited by amphibians even if I did lose a few fry."

Amphibia

Master Noor Ali is 14 years old and a very neat writer. He lives at 112 Oxford Road, Smethwick, Warley, West Midlands, B66 2DJ. Noor says: "I was delighted when you mentioned amphibians in the July *Aquarist*. I have kept amphibians on and off for seven years. My first pet was a common frog, *Rana temporaria*, that I kept for a year before it died during hibernation. When I was ten I kept a common toad for a good few years. When it died I started off on coldwater fish, which I still keep; but when my mother sold her tropicals I made good use of the spare tank as a vivarium. A reptiliary is out of the question because the tremendous number of stray 'moggies' would wreck my livestock. At the moment I have a fire-belly newt that is brown dorsally, and red with black blotches ventrally. He is now very tame, going for 'walkies' and responding when I look at him. When I feed him, the food is gone in minutes; and when next I look he is asleep behind his favourite piece of cover. I hope to purchase a fire salamander next because I admire this species and the vivarium conditions are perfect for one.

"The garden yields a great variety of foods and maybe this is a main factor in my successes. The newt loves centipedes, jumping or bouncing joyfully when he sights one. I would like to see more about amphibians in *The Aquarist*. Keep up the good work with *W.Y.O.*"

In the July issue Mr. G. W. Spencer mentioned how a baby kribensis survived in the \bar{J} in air-lift tube of his filter. 13-years-old Master David Cobb's home is at 6 Thornton Close, Flore, Northants. David tells us: "Having just received my July issue of the magazine I immediately turned to *W.Y.O.* I noticed a letter on pages 22-23 regarding odd places in which to find young fry. I had a pair of convict cichlids (*Cichlasoma nigrofasciatum*, photograph 1) that lived in a 30 in. tank with a jewel cichlid (*Hemichromis bimaculatus*). The male—which is still with me—is a 6 in. pink convict and he was at the top of the pecking order in



Convict Cichlid
Cichlasoma nigrofasciatum

the tank, while the female, a 3 in. striped convict, was at the bottom of the order. When they grew older they paired up and began to breed continuously even though the pH of the water was 7.4. This was probably due to their being tank-bred specimens.

"I reared on many fry; but was amazed when one day the devoted parents' eggs disappeared without a trace. I looked everywhere and found that the eggs had been sucked under the U/G filter and had developed into 1 in. specimens! I took the tank apart and rescued about 20 fry and sold all but one—which I named Tiger. P.S. Sorry about the poor writing! (Your writing is perfectly legible, David, which is the main thing. B.W.)

No. 31 South View Road, Walton, Peterborough, Cambs., heads the following letter written by Mr. R. J. Beard. "I have been looking for something that looks natural, other than rock, to make caves in my 36 in. tank. About six months ago my wife bought two coconuts. After cutting them in half and scraping out the inside I had the idea of scraping the hair off the outside of them. After doing that I soaked the four halves in water for 48 hours to get rid of any loose matter and then put them into my tank. The fish have since made them their homes. I thought that other readers might like to try this. Have any readers made similar discoveries?

"I also keep marine fish; and because there is not a marine fish club in this area I should be interested to hear from anyone locally who keeps marine fish. Contact me on Peterborough 72913. Perhaps some of us could get together to help each other with problems that may occur; also to have a look at different tanks so we can get an idea of different layouts etc."

Kribensis

Kribensis are the subject of the following letter written by Mr. A. Patel, whose address is Eaton House Farm, Wharncliffe Side, Sheffield. "Just over three weeks ago I bought a pair of kribensis (*Pelvicachromis pulcher*). These were a colour strain that possessed more eggs spots in the dorsal and caudal fins than usual. I placed them in a 36 in. tank that contained two caves constructed from granite rock. Along the back I had planted *Cabomba* and *Hygrophila*. Farther forward I planted a few groups of *Vallisneria* and a

bunch of small *Cryptocoryne*. All grew and are growing well except the latter, which are only just beginning to pick up. The water is slightly acidic and very soft—DH3°. Anyway, after only a week the male began to treat the female a little roughly. This behaviour soon ceased and together they began to investigate the two caves, as well as flowerpot that I put in.

"On Saturday afternoon they spawned in the smaller of the two caves. The eggs, of which there were about 70, were laid on the back wall. In the close confines the male had difficulty in fertilizing them. From then on the female rarely ventured from the cave; and, contrary to some reports, the male stayed nearby. His horizontal bar faded as he became a universal brown, hovering behind the cave. Two days later the first eggs hatched and then nothing more was seen. The parents remained by the cave; and eight days later the fry emerged into the light. The fry were guarded by both parents as they wandered in search of food. The tank contains a lot of infusoria which, up to now, have kept the 23 fry with full bellies.

"I attempted to raise brine shrimps; but baby *Daphnia* seem a lot easier. (I caught some adult *Daphnia* which I put into jars containing rotting leaves.) I have also started a micro-worm culture and the fry should be able to take the micro worms in a week or so. The fry are almost transparent and speckled dark brown; each day they venture farther afield. Keep up the good work; and could you publish some letters on breeding annuals, i.e. *Aphyosemion* etc.?" (I invite killfish enthusiasts to send me details of their experiences—and information about the B.K.A. B.W.)

Scottish reader Mr. Steve Key sent me the following letter from 9 Commercial Street, Perth PH2 7DT. "I have been keeping tropicals for about eleven years now and have gained many useful tips from your *W.Y.O.* column. At the moment I have three 27½ in. × 15 in. community tanks filled mostly with small tetras. I also have one 36 in. × 12 in. and one 24 in. × 15 in. that I use for breeding and rearing purposes. The 36 in. is full of 2p size marble angels at the moment. The parents spawned in March; and because of eggs eating I removed the eggs into a bare 24 in. × 15 in. with an air stone and some acriflavine in the water. I reckon that about half of the original number

of about 150 have survived. I really must think about thinning them out.

"Recently I cleared out one of my community tanks. I replanted with species of *Cryptocoryne wendtii*, *malinckrochii* and *affinis*. They arrived by post in excellent condition, with good roots, from a firm advertising in *The Aquarist*; but after about two days they started to go brown and all the leaves rotted off. The temperature is 78°F and the tank is lit by a strip light for about 13 hours daily. Any suggestions on why this happened?

"To feed fry I hatch brine shrimps in three Hygro type pan hatchers to keep enough brine shrimps going to feed three times per day. I supplement this with crushed flake food, which I grind into powder. I bought a micro-worm culture, and the worms reproduced very well; it was subsequently split a few times into petri dishes, using Farex and water as the medium. All went well until I tried to rush one of these new cultures and did not allow the fresh culture medium time to cool, thus killing the lot. I have a good white-worm culture fed every day on bread soaked in water. I am waiting for a grindal-worm culture and would like some tips on culturing grindal worms. Having recently bred kribensis and angels I would like to turn my attention to some smaller fish. I have seven *Nannostomus axonotus* pencilfish and would like some tips on breeding these. Finally, would it be advisable to inter-breed some of my young angels; or would this produce too many runts? Information about people's experiences of inter-breeding young fish would be appreciated. By the way, I work as an assistant scientific officer in a government-run salmon rearing unit so I am among fish almost 24 hours a day! What is this Java moss anyway? Keep up this interesting column. Good fishkeeping!"

Grindal worms can be cultured in a small, rectangular seed pan—such as the plastic ones that may be obtained in large chain stores. A mixture of loam, peat and leaf-mould, suitably moistened, and about 1½ in. deep, should suffice. A piece of glass, smaller than the area of the seed pan, should be used to cover the culture. Remember that a plastic seed pan, unlike wood or clay, isn't porous; so keep the compost moist, but not wet. Grindal worms thrive best around 75°F or so and may be fed on small amounts of powdered breakfast cereal—a suitable one is the type of powdered porridge that one mixes with boiling water. A small amount of the dried powdered cereal may be sprinkled over the compost. Don't add too much or it will go sour; sprinkled on more when the previous lot has been eaten. Grindal worms are suitable for smaller tropicals—or young fish of any kind.

N. axonotus was the first egg-layer that I managed to spawn and raise. I placed a pair in a tank containing fairly soft water and plenty of plants with fine leaves. The fish spawned and I removed the parents. When the eggs hatched I fed the fry on Liquifry. Some experts recommend peaty water. What is Java moss? That would make an interesting inscription for a badge—possibly the aquarists' equivalent of the J.R. craze! Java moss is an aquatic moss, *Vesicularia dubyana*, that can grow well in many tropical aquaria. Once established it can cling to

rocks, heater cables, filter tubes, aquarium frames etc. In several of my tanks this moss grew up and over the top of the frame. In one case it caused water to drip onto the floor by capillary attraction. It swamped, i.e. smothered, the higher forms of plant life in a couple of my tanks. I must be honest and admit that I have totally removed it from four of my six tanks; and I intend to clear it completely from a fifth tank today. Incidentally, I've found that a wad of it, together with filter wool, can be useful in an outside filter as a filter medium. A layer of Java moss can be placed on top of a layer of synthetic filter wool, making a living layer of filter material. Collected debris can be washed from the moss at intervals. Don't use the moss in filters operating on tanks where you wish to exclude the moss from the interior of the tank. (Photograph 2 shows Java moss, *V. dubyana*.)

Prices of chemicals

I was somewhat taken aback today when I went to a local chemist's shop to buy small amount of potassium permanganate crystals with which to sterilize an aquarium in which a diseased fish had died. The shop assistant had to ask a more senior assistant what potassium permanganate is; and she was then shown a shelf where small, labelled jars of the chemical were stored. I was handed a small jar of the purple crystals and gave the assistant a 50p piece without asking the price. I got quite a shock when I discovered that the 25gm. of $KMnO_4$ retailed at 32p. I'm not a great mathematician but if 1gm. is equal to 0.035oz. then I paid 32p for 0.875oz. of the chemical. Sixteen ounces still make one pound, therefore 16 divided by 0.875 equals 18.28571—which, multiplied by 32, makes the astounding price of £5.85 a pound for potassium permanganate sold in 25gm. jars. I should have thought one could have turned the Red Sea purple with £5.85's worth of $KMnO_4$! I clearly remember the days when 6d would have bought a lot of permanganate crystals. I wonder what other purchasers of $KMnO_4$ at 32p for 25gm. use it for.

Oh dear! By chance I've just come across a price list, from last year, of chemicals prepared for use by aquarists. Potassium permanganate is listed at 5gm. for 45p. If I'd bought enough 5gm. amounts to equal one pound in weight the cost would have been £40.82. Had I purchased my original 25gm. in 5gm. amounts at the latter rate the cost would have been £2.25. Perhaps I got a bargain after all; and, most certainly, I'm completely out of touch with current prices of pure chemicals.

Flake Food

If you are one of those fishkeepers such as I am who don't bother, or don't have time, to feed fish on live food but just continue to feed the same flake food to the fish several times per day, week in and week out, for months on end, you may have forgotten that fish, like humans, like variety in their diet. I've found that tropicals can live quite happily and in good health on just one good brand of flake food—and there are numbers from which to choose; however, recently I began to review some items for the magazine after a few years' break and the products sent to



Java Moss
Vesicularia dubyana

me included several new foods. I've been quite surprised at the response to these foods by my fish. Larger fish tend to eat any brand of food with relish; but I've noticed that smaller fish tend to be somewhat more choosy. One particular brand of vegetable flake has become—from the word go—particularly popular with guppies, neons, cardinals and small pencilfish. When offered it in place of their usual flake food they become very active, rushing round to grab pieces before others do. Obviously they appreciate the change from their usual food. I must say that the closure of the only aquarium shop in the town in which I live was a big disappointment to me; and obviously my fish miss the benefits that resulted when I had easy access to a variety of foods, remedies, equipment—and, indeed, fish themselves. If you've been feeding your fish on only one brand of flake food, drop a hint or two in the hope that Santa Claus will present you with two or three different ones so that you can vary your fish's diet. It's useful in general as Christmas approaches to make a little list of aquarium products—including book titles—that you would not refuse if offered to you as Christmas presents. Younger members of the family, with only pennies to spend could stretch to a tin of fish food; while richer relatives—if there are any in 1980—might be able to manage that power filter or one of those beautiful books about fish or plants. How about a subscription to *The Aquarist & Pondkeeper* to keep you abreast of all the latest developments in the field?

I'm not often stuck for words when I'm writing but I always find it difficult to find a variety of ways to refer to fish in my photographs. "Photograph X shows..." or "See photograph Y..." tends to become rather monotonous. Would you care to suggest some variations, please, if you can think of any? I think a few alternatives would please our Editor...

I must send my good wishes to the girls at Brentford who receive and open all your letters and forward them to regular contributors such as I am. Thanks for your help, girls. I hope you have an enjoyable Christmas. My thanks also to those readers who send me Christmas cards. I appreciate your thoughtfulness.

I intended to mention another point, especially for beginners, about feeding flake foods to aquarium fish. When

putting food into an aquarium use your forefinger and thumb. A *small* pinch is adequate first time. If it is all eaten up quickly you can easily add another pinch. Some foods have a rather strong smell and one can be tempted to shake such foods into the tank straight from the tin to avoid dirtying one's fingers. On most occasions this method can work perfectly satisfactorily; but sometimes one gently taps the tin and only one or two flakes drop out, so one taps a little harder—and suddenly a poised mound of flakes tumble from the tin and the fish in the aquarium are surrounded by what looks like swirling snow storm. Many of such flakes will remain uneaten and will have to be removed from the tank with a siphon. A second's tapping can quickly lead to many minutes spent siphoning out flake-filled water—which will have to be replaced with fresh water. A *small* pinch dropped in by a finger and thumb prevents such problems. Incidentally, the type of food tin that has to have its metal lid prised off with a coin each time one wants to feed one's fish probably ensures that the food remains fresh; but it can be a nuisance if one does not have a coin or screwdriver handy. I keep a few small plastic drums with screw tops handy and transfer small amounts of food from metal-topped tins to them as necessary. This means that I don't have to use a coin to get at the food when I wish to feed my fish; and the bulk of the food, in the metal-topped tin, remains fresh. Use plastic containers that are opaque—as opposed to transparent. The latter, if left in sunlight, allow the light to shine on the food, and if I recall correctly some vitamins can be spoiled by exposure to sunlight.

Reference Book

Most of my reference books were published before many of the currently-available species of Rift Valley cichlids became more common in shops; hence I often find it difficult or impossible to check the spellings of proper names that readers use in their letters. I find the F.B.A.S. *Dictionary of Proper and Common Names of Freshwater Fishes* (National Booklet No. 9) useful to check the spellings of many names of different species; but it's possible that the section on Rift Valley cichlids—pages 25 to 30—would benefit from being brought up-to-date and, if necessary, extended. Fortunately the booklet is a loose-leaf publi-

cation and it would be perfectly easy to remove older pages and insert newer ones. Perhaps my friend Dick Mills and his F.B.A.S. colleagues would consider producing a new set of pages on Rift Valley cichlids. The original booklet was published in 1976 and I find it extremely valuable in many cases when I want to check a common or a proper name of a specific fish. The only fish name in the booklet that caused me a little confusion was that of the emperor tetra, *Nematobrycon palmeri*, which was given correctly in the first section (proper names), but appeared as *Mematobrycon palmeri* in the second section (common names)—obviously a minor printer's error that went unnoticed.

I must admit that numbers of those who write to this column are rather careless about the spelling of proper names of fishes. A copy of the above booklet would be useful to any aquarist!

"Among the first fish that I ever kept were a pair of female guppies," said Mr. Ken Smith, of Post Office Stores, Tittleshall, Kings Lynn, Norfolk, PE32 2PJ. He continued: "My joy was intense when on the third day they had reproduced. A mad scramble resulted in my having caught five in a teacup before the inmates of the tank had eaten the rest. A dash to the nearest aquarium shop and I was equipped with infusoria and baby food, plus heater etc. for a spare tank that I had. In just three days I had become a tropical fish breeder. Not too many weeks had passed before I had so many guppies that I could not give them away. I vowed never to purchase any more guppies.

"In February I bought an 8 in. long spiny eel, *Macropodus aculeatus*; in a subsequent issue of *The Aquarist* I read a reply, to a reader's query, that said: 'They will soon starve to death without live food. I have never known a spiny eel take shredded meat or dried food.' Oh dear! What do I do now? With small bags of live food costing 10-15p each, and with the ten tanks I had in use, this meant £1.50 a meal—and that just isn't on. Once more I bought two female guppies and once more in three days they had started to reproduce; so now I had live food. My eel, it would seem, did not like guppies; and now the babies are reproducing within the tank. Apart from those in with the eel the others just go on and on having babies. I managed to give about 50 to one of my friends. I am not sure if he is still my friend any longer. As for the rest, I am at a loss to know what to do with them. I still have the eel, now over six months older and about 1 in. longer. It still has only dry flake food but I can assure you it is very much alive. You just can't win!

"You asked about the advantages, if any, of feeding live food. The forgoing will indicate my feelings. I have been in the tropical fish keeping hobby for about seven years only so I am no expert; but as my interest grew so did the number of tanks I bought. At one stage I had 16; now I use a dozen, normally. I keep a great variety of species and have bred from many of them. In the early days I tried most types of food—dried, frozen, freeze-dried, etc. I noticed no particular difference in the condition of the fish which ever type I was using. Two years ago I bought some of the cheaper, bulk-priced food advertised and have

stuck to it ever since, using nothing else. My fish are still healthy and still breed so for me it's dried food for ever.

"I read with envy a tropical query from someone who wanted to know how to eradicate a small colony of *Tubifex* worms from his tank. Oh that I could start one let alone get rid of one. My attempt to breed them resulted in my getting less out of the so-called culture than I put in to start it." (Mr. Smith's letter was written last year; and he spelt correctly the name of the spiny eel. B.W.)

Punctured Pond

This evening I received a telephone call asking me if I would visit the home of some people who live in a village situated a few miles from where I live. The couple whom I was asked to visit had inherited a garden pond when they moved home several years ago; and when they returned home yesterday, after a holiday, they found the water level in their pond had dropped considerably. They used their garden hose—running for about an hour—to top up their pond again; but by this evening the water level had again dropped considerably. I'm not an expert on garden ponds, never having had one, and the problem sounded as if it might be more mechanical than aquatic; so a friend who is much more mechanically inclined than I am joined me on the visit.

We arrived at the home of the couple who own the pond and learned that, on previous occasions, they had had to chase children who were throwing stones over a wall and into their pond. The couple concluded that, in their absence, some children had probably thrown stones into the pond making a hole in the bottom.

An examination of the attractive pond, complete with waterlilies and a variety of other plants, and a selection of mature goldfish, showed it to be lined with butyl rubber sheeting. The strong growth of plants in the pond—including blanket weed algae—made it impossible to see the bottom; and there were no signs of holes in the sheeting in the visible section. I concluded that it was probably not a stone that had holed the pond—unless it was something about the size of a brick. My suggestion was that one or more young people had probably decided to become fishermen and had probably attempted to spear the goldfish, using wooden sticks for spears. Such 'spearing' activities could easily result in the pond's lining becoming punctured in a number of places. However, all these suggestions remain conjecture. The pond will have to be emptied before the probable cause of the leak is assessed.

The couple are not aquarists and don't have any aquaria into which the fish and plants could be put while the pond is being repaired; and I knew the obvious question that was going to be asked: "What could we keep the living things in until we try to repair the pond? That's the sort of question that takes one's brain on a cold, damp evening! Buckets, dustbins and baths were the first items that sprang to my mind as we adjourned indoors to ponder the problem.

It was at that stage that I was glad I had gone along with a mechanically inclined friend. He and the couple who own the pond share an interest in sailing; and it wasn't very long before he came up with a suggestion: "What about

keeping the fish and plants in a rubber dinghy until you solve the problem of the leak?" The suggestion sounded like a perfectly sensible one: and as long as there is no frost it should work reasonably well in practice. I hope to keep in touch to find out how the problem of the leaking pond is eventually solved. I'll let you know what evolves. No doubt some of you have had to deal with leaking ponds. How did you approach the problem; and how successful was your solution?

I'm writing this prior to the F.B.A.S. National Fishkeeping Show—and after hearing the news that Alexandra Palace has been destroyed by fire. It's sad to think that the Federation will no longer be able to hold their show there—although I've never had the pleasure of attending this famous event. My only visit to Ally Pally was made some years ago when I made a rushed trip there one day to appear on a TV programme and returned to N. Ireland the following day. That would appear to have been my first and last television appearance. There's nothing like it for making your mind go a complete blank!

Fish psychology

Mr. P. M. Millson wrote this letter from his home at 19 Beauchamp Gardens, Middleton Road, Rickmansworth, Herts. WD3 2EF. "I would be interested to hear other readers' observations on 'fish psychology', particularly with regard to the parental behaviour of different cichlids, and also the 'pecking order' in tanks. I have two 36 in. tropical tanks and one small coldwater tank. In one tropical tank I keep an assortment of fishes: angels, tetras, swordtails and firemouths. In the other tank I have kribensis and blue acaras. I was both interested and amused to note that the kribensis made superb parents, herding the young together at all times and driving them back into their sea-shell nest when the lights were turned out. None of the young was lost to predators. On the other hand, the blue acaras did not cope so well. Their young proved an unruly and undisciplined lot and just wouldn't keep together. Father blue acara seemed less efficient than his kribensis counterpart, worrying more about satisfying his own appetite than carrying out his parental obligations. Only six of at least 50 babies survived.

"Into my tank containing assorted fishes I recently introduced a pair of paradise fish, *Macropodus opercularis*, and have noticed that the male has very speedily assumed the dominant position in the tank. In the cichlid tank the female kribensis was the matriarch until I introduced a Chinese algae eater, *Gyrinocheilus aymonieri*, which now seems to enjoy pursuing every fish around the tank, though doing no apparent harm.

"In my coldwater tank I kept four bitterling, *Rhodeus amarus*, and a largish goldfish. In with them I put a pair of Florida flag fish; and the male killifish has made the goldfish's life a misery even though the goldfish is more than twice its size. I have had to remove the goldfish because its fins were so badly nipped. One other thing: recently I bought two female swordtails to go with a recently bereaved male. I thought polygamy was common among livebearers. How wrong I was! One female took

an instant dislike to the other and quite obviously resented the male's attention to her. I found the weaker female in a state of shock one morning, with a large chunk out of her side. I put her in a breeding trap out of harm's way; but the other female kept attacking this. Having eliminated one rival, this female has turned her attention to the male, who has become henpecked indeed!"

Please write me a letter giving me your opinion on any aspect of our hobby. Send your letter to me at *The Aquarist & Pondkeeper*, The Burts, Half Acre, Brentford, Middlesex, TW8 8BN. Don't forget to put my name on the letter; and remember to include your name and address: print them so that I'll be able to read them easily. I should particularly like your opinions on: (a) cultivating giant *Vallisneria*, hairgrass, *Bacopa* or spatterdocks; (b) leaf loss in *Cryptocoryne* species; (c) experiences with piranhas, koi, marine invertebrates, reptiles or tetras; (d) peculiar behaviour of particular fishes; (e) dealing with diseases of fishes; or (f) Rift Valley cichlids.

BOOK REVIEW

Catfish Association of Great Britain. Information Book 6.

Available from Mr. J. Carpenter, 10 Thornbank Close, Stanwell Moor, Middlesex. 40p to members. 85p to non-members.

Not the least advantage of this important series of handbooks, which cannot fail to gladden the heart and the eye of every serious keeper and student of catfish, is the accuracy and excellency of the black and white drawings which head each page of authoritatively written text. This, the sixth book in the series, describes, in the strictest economy of words, twenty-one different species. Proper attention is given to distinctive features of anatomy, distribution in the natural state, size, coloration, preferred food—where known—and certain characteristics not found in the general run of aquarium literature as, for example, the presence in Trinidad of a blind *Rhamdia*—a cave-dwelling species, of course.

It is useful to be given the technical name of a handsomely appressed catfish known in the trade as the two spot catfish or the two spot pink pim (a shortened form of pimelodid, which, of course, the fish is not: it is a member of the family *Bagridae* and its correct name is *Mystus micracanthus*). Incidentally, your reviewer is particularly fond of this catfish from Thailand and limited areas of Malaysia and Indonesia, for, although it is given to hiding away for hours at a time (during the day), it lives for years and is quite at home in a community tank where it will not molest other fishes. It shows itself at night—not necessarily after dark—when food is introduced as part of the regular aquarium maintenance programme. At these times it suddenly appears, like the famed genie of Araby, among the other madly milling occupants, and grabs what it can as quickly as it can of the offered food: alive, dead or dried. Then, having appeased its appetite, it vanishes without trace to its hiding place among stones or plants.



THE POND SAGA

Part 7

by Roy Pinks

WHEN, FOR THE third time in almost as many weeks, I discovered that the Big Pond had sprung a leak, I reviewed the various ways I had considered for dealing with holes in plastic sheeting. There was no real reason for doubting the long term efficacy of most of them, provided that the adhesives had been properly applied and that adequate drying time had been allowed. Fortunately, the weather conditions that summer were near to perfection, and I had done my best to leave nothing to chance. Nevertheless, at least 3 of many patches had gone wrong, and I was very worried about the likely fate of all the others. Those which had always bothered me were the ones at or above the waterline where the fabric had been folded and often doubled: there were some severe faults here, and I was always pessimistic about the prospect of long term success by merely sticking on a patch, however secure it may have looked. Hence, I did a few experiments with fibreglass. On a number of trial pieces of Plastolene and similar material I found that fibreglass looked very promising to begin with, as it solidified quickly (sometimes embarrassingly so) and it looked to have considerable substance. The unfortunate feature of this was that it would not resist pulls and stresses, and patches could be peeled off fairly easily. I also tried using the standard reinforcing sheets, by placing pieces on one side of the holes and joining them to the Plastolene with fibreglass. This method was not particularly convincing, but I felt that it might work in places where there was minimal movement of the lining material. It did not look very promising for the area I was most concerned about, namely the waterline zone.

Large hole

However, I once again managed to trace the leak to a place much as described above. The hole below the patch was quite large, and I decided to try to insinuate some repair webbing into it, so that it lay between the lining and the side of the excavation, and to pile on a thick layer of fibreglass once this was in position. To put it mildly, it was a fiddling job because even after lowering the water well below the area in question, the surrounding soil was extremely wet. Crumbs of this kept getting on to the plastic webbing and transferred a dampness which I may yet have cause to regret. Having allowed for a dry area for an inch or so below the patch I managed to apply a liberal buttering of fibreglass, and the finished repair looked very sound. I covered this completely with a Plastolene patch secured by Evostik, with the usual Bostik 6 edging, and painted the whole affair over with bitumastic paint.

The reader, having suffered for all too long the agonies of repairing my pools, will note with some considerable relief, that after almost a year, and including a winter which constituted something of a trial, I have no further horrifying incidents to report, and although I am very sceptical about a statement I recently read, to the effect that repairs to plastic pools are permanent, I would certainly agree that they are well worth attempting. The work must never be hurried, however, and you must have dry conditions. Anybody trying to carry out a repair programme this summer will by now have gone raving mad, presumably, and there must be notions already of hiring marquees or the like for next year if the weather continues

like this. Perhaps we should go the whole hog and go for indoor ponds in the longer term. The prospect is appalling. To revert. It was nearing the time for me to remove all the fish from the Nursery Pool and to release them into the Big Pond—I was at last hopeful that leaks were all dealt with, and that the *daphnia* and fly larvae would have multiplied to the point at which their numbers would really set up the new fish for the forthcoming winter. The contents of the Nursery had to be sorted first, however. The comets and the orfe were to be transferred, but the goldfish and the shubunkins had to be returned to their owner after their six month stay. I might add that their failure to spawn during this period put them into the category of the sped guests, made all rather worse by the fact that they had virtually depleted the garden of earth-worms.

Night fishing

Never net your fish by day—at least if you want to see what you are about: I speak, of course, of fish in garden pools, and not the clear and mudless containers used by

dealers or breeders. So I equipped myself with buckets, net and powerful lantern and tackled the job well after dark. The dozen or so minute orfe (and few things move quicker!) were rounded up within a quarter of an hour, and the comets followed soon afterwards. I hesitate to guess how long this would have taken in daylight. These were transferred to the buckets, floated in the Big Pond for the remainder of the night. The balance of the fish were left until the following evening, to be trapped in like fashion with the exception of two or three brown throw-backs which defied all my efforts and were finally sorted from the nets when the pool was drained down before being rebuilt.

Things were now looking a lot straighter. All the fish I now had were my own. One pool was well set up. The Pit was full of water but unfinished, and the Nursery was ready for reconstruction. The time was early September with its days full of promise and its evenings putting things much more into perspective. For the rest of the season it would be planning and hard work and some sense of achievement. But the lilies and the little fish would not come this season—they were the things of the coming year.

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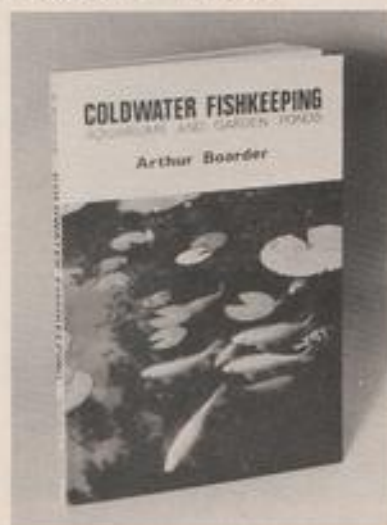
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TRADE ENQUIRIES INVITED





General view is of the Show area during the setting up period, with a portion of Harewood House in the background.

YORKSHIRE KOI SOCIETY

Y.K.S. HELD THEIR 4th Annual Koi Festival and Open Show at Harewood House, Leeds, on 25th August, 1980, by kind permission of the Earl and Countess of Harewood.

The Show was an outstanding success, and in addition to the magnificent setting of Harewood, Y.K.S. were favoured by a splendid sunny day.

5,291 people attended Harewood and crowded the marquee and Koi show area, fascinated by a superb display of high quality Koi.

This was a rather special occasion for Y.K.S., as this year Lady Harewood has graciously consented to take the office of President of the Society.

The entry of Koi, at 164, was a record and included 21 fish of over 18 ins. length.

Advance publicity on T.V. and Radio provoked much interest and the visitors were certainly most impressed.

The prizes were presented by Lady Harewood. Her Ladyship is a Koi enthusiast, having been fascinated by their beauty since the first Y.K.S. Show.

Grand Champion and Best Kohaku was a splendid fish of some 20 ins., in excellent health and with good, strong body shape. Good pattern, with strong and sharp edged colours, made the winner a very striking fish. The owner, Roger Cleaver of M.K.A., had a most worthy winner.

Second Overall was an excellent Platinum Ohgon of ca 24 ins., with clear unblemished scaling and superb body shape.

Third Overall was a highly coloured and well patterned Taisho Sanke in the 14-18 ins. class.

Judges were: Fred Ayres, Y.K.S. member and former

chairman; Ray Hunter, of M.K.A. and George Nessfield, Y.K.S.

Award winners were:

<i>Grand Champion</i>	
Harewood Plate	Roger Cleaver
<i>Aquarist Gold Pin</i>	
Framed picture presented by Dr. Paul Cook	
Jumbo Calendar presented by Dr. Paul Cook	
<i>2nd Overall</i>	
ZNA Towel, presented by Mr. Konishi	Ron Saunders Johnson
Calendar, presented by Dr. Paul Cook	
<i>3rd Overall</i>	
Gold Fish Tie-pin and Fan, presented by Mr. Kamihata	Ron Saunders Johnson
Calendar, presented by Dr. Paul Cook	

Best in Class Awards

Class	Award	Winner
Kohaku	Adachi Trophy	Roger Cleaver
Taisho Sanke	Atkins Cup	Ron Saunders-Johnson
Showa Sanke	Ayres Cup	Ron Saunders-Johnson
Utsuri Mono	Fishlake Water Garden Trophy	Ron Saunders-Johnson
Hikari Utsuri Mono	Adachi Trophy	Steve Wildsmith
Hikari Muji	Nakamori Trophy	Ron Saunders-Johnson
Koromo	Adachi Trophy	Richard Connew
Asagi Shusui	Wharfedale Trophy	Tony Causser
Bekko	Tamaki Trophy	Ron Saunders-Johnson
Hikari Moyo Mono	Adachi Trophy	Roger Cleaver
Kin Gin Rin	Kingston Koi Co. Trophy	Tony Causser
Tancho	Z.N.A. Trophy (Dr. T. Kuroki)	Brenda Hoyland
Kawari Mono	Nakamori Rosebowl	Syd Farrar
Homebred	Yorkshire Cup	Richard Connew



An underwater plant with Sagittate leaves.

A Newly Imported Aquatic Plant from Malaysia

by
Karel Rataj

Photos by
Rudolph Zukal

THE AVAILABILITY OF SUITABLE aquarium plants of the family Araceae is continually widening. It is highly likely that all plants which inhabit damp tropical rain forests and grow from the ground are able to survive without difficulty a long period of submersion in water. Many of them have the ability to adapt themselves to a permanently submerged existence.

This is true of a newly imported plant which has a very interesting inflorescence and leaf formation. This is *Typhonium flagelliforme* which belongs to the same sub-family as the well-known genera *Cryptocoryne*, *Lagenandra* and *Ambrosinia*. *Typhonium* differs from these genera most of all in that it has a bulbous root instead of a rootstock and the spadix forming the inflorescence is extremely long. Whereas in the genera *Cryptocoryne* and *Lagenandra* the sterile part of the spadix between the male and female flowers is bald, in the genus *Typhonium* this part of the spadix is covered with so-called staminodes. These are undeveloped, sterile stamens.

The leaves are the same in plants growing out of water as those which are submerged. Only the length of the leaves differs. Plants growing out of water reach a height of 30-40 cm, under water 20-25 cm at the most. They grow from white, round 1-3 cm large tubers. There are only 3-6

leaves. The leaf stems are green, clearly several times longer than the leaf-blades which are sagittate. They are three-cornered, pointed at the tip, lengthened at the base into sharp 1.5-3 cm lobes. The leaves including the lobes measure 5-10 cm and are 3-5 cm wide at the bottom. Like the leaf-stems they are a uniform green, sometimes yellowish-green, the veins can be clearly seen, and the edges of the leaves are undulate.

Typhonium flagelliforme belongs to the relatively small number of plants in the family Araceae which develop flowers readily when grown out of water. Under artificial circumstances the inflorescence appears from late spring almost into winter and during this period each plant develops 3-6 spathes. The whole spathe is 10-17 cm long. It grows on a short stem, 1-3 cm in length. As in the case of the *Cryptocorynes*, the lower part of the inflorescence widens into a kind of bowl where the lower part of the spadix contains the sexual organs. (picture 3) Right at the base are 5-6 style whorls and in the narrower part of the bowl are 5-7 stamen whorls. The stamens are separated from the styles by the sterile part of the spadix. This is 3-4 times longer than the male or female parts. The sterile part is, in contrast to the *Cryptocorynes*, covered with the so-called staminodes. These are sterile stamens which have



The inflorescence is given a striking appearance through the flagelliform lengthened part of the spathe and the tail-like spadix.

not undergone sexual development and take the form of cylindrical, white protuberances with dark almost black tips.

Just above the upper, sharply narrowed part of the bowl the spathe opens out. The open part is flagelliform and is 4-5 times longer than the bowl (picture 2). The spadix above the stamens, similarly, draws out into a very long and thin whip-like shape which is sterile at the end. This part is approximately the same length as the spathe. The whole inflorescence is yellowish-green. Its relatively unobtrusive coloration makes its unusual form all the more attractive.

It is likely that, like the *Cryptocorynes*, *Typhonium* reproduces to a great extent through cross-pollination and that the bionomic of the flowers is relatively complicated. So we can hardly expect to see fruit develop! Consequently, the reproduction of plants in artificial circumstances is achieved through vegetative reproduction. Around the main tuber 3-7 further tubers develop in the course of the summer, and quickly send out leaves. The new growth can easily be separated out and so the plants are reproduced fairly quickly. This is only the case, of course, with plants grown out of the water. *Typhonium* is a plant exceptionally well-suited to warm, damp terraria. Here, too, they can be reproduced. Only plants with well developed tubers should be planted under water. The plants should not be too large (20-25 cm maximum). Plants

which have at least 4-5 leaves take root the best. In its first stage of growth under water *Typhonium* grows quite slowly. Occasionally leaves which have first developed out of water turn yellow and wither when placed under water. At the same time newly-formed leaves develop. This process of adapting to a permanently submerged existence can last a relatively long time (3-4 months).

Sufficient experience has not yet been gained as far as reproducing the plant in the aquarium is concerned. We do already know, however, that *Typhonium* cannot be planted in a tank which has been newly set up, since they can not put up with new water. It grows well alongside *Cryptocorynes*, needs a pH reading of 6-7, carefully washed coarse-grained sand enriched with nutrients and a moderate degree of illumination. In the shady tank re-creating the Indo-Malaysian biotope the plants should be placed in not too densely-packed clumps, as their need for light is a little greater than is the case with many *Cryptocorynes*.

Typhonium flagelliforme stems from Malaysia from where it has been imported in recent years together with other species. In Western Europe it is already sold through specialised trade outlets. It is an interesting plant which flowers easily and, when grown out of water, needs surprisingly little attention. On the other hand, it appears that reproducing the plants in the aquarium is not for the beginner, nor is it likely to become so.



Longitudinal section through the bowl of the inflorescence with lower part of spadix visible.



Koi in August

Keeping KOI

by
*Hilda
Allen*

IT IS RELATIVELY EASY to buy Koi in any part of Great Britain nowadays, that is if Koi are your choice and if funds allow an indulgence in these magnificent fish. I admit to an ongoing love affair with Koi and time only strengthens my affection and respect.

For some, keeping them may be another and more painful experience altogether. Much will depend, as always, on both the time and money that can be spared for a favourite hobby. From the letters I receive, it is quite obvious to me that most people are impressed by Koi, yet there exists a certain amount of bewilderment still over the nature and habits of Koi.

Koi, being carp, belong to the large family Cyprinidae and are relatives of the more familiar goldfish, indeed many people keep both Koi and goldfish in the same pond, they are quite compatible. Even when quite small, Koi are easily distinguishable from goldfish by having whisker-like barbels on either side of the mouth and without these the fish cannot be sold as Koi.

The glorious colours, patterns and scale-types of Koi have to be seen to be believed. Some prefer the highly metallic Ohgon varieties which always show up well in a pond, while others prefer the patterned types such as Kohaku or the tri-coloured Showa and Taisho Sankes. Certainly these present a greater challenge in the purity

of colours and clearly defined, well-balanced patterns when viewed from above. I am certain there must be Koi to suit everyone's idea of piscine grace and beauty.

Many readers will be all too familiar with my constant pleas for healthy conditions for Koi. Most of us with average gardens must be prepared to make an effort at least to recognise the problems of keeping potentially large fish in relatively small volumes of water. No one ever wrote to me saying they wanted to buy some small Koi and how could they keep them small. Rather the opposite; it is more usual for ponds to be grossly overstocked in ignorance, without recognition of the problems associated with keeping any form of livestock healthy.

Filtration of water may be the only way of maintaining a limited amount of it in good condition for growing Koi. It is not such a revolutionary idea after all but just common sense and good husbandry.

Even a few Koi will rapidly upset the balance of previously well-established ponds as I know from experience. Well-planted ponds may take a knock as the Koi naturally "investigate" everything and their activities usually decimate most forms of plant-life.

Oxygenators can be a mixed blessing anyway and positively dangerous during darkness or enclosed under ice. A pump is a much better idea.

Continued on page 41

THE AQUARIST

They've eaten them again!!

by P. W. Thompson

WITH THE increasing amount of literature, and with aquarium-bred discus now readily available, more and more aquarists are experiencing spawnings of this fascinating and sometimes frustrating fish. It is with these spawnings that the discus-keeper often faces his most frustrating moments of all. I can think of no more disheartening sight than to watch one or both parents devouring their offspring.

With a pair of young fish they may well eat their first few spawnings, but once they get the hang of things they can turn out to be excellent parents. Unfortunately, this is not always the case and I have watched a female of mine eat literally dozens of spawnings.

A couple of articles have been published on how to raise the fry without the parents. The late Carroll Fritzold published a paper on this subject; Mr. Fritzold describes how he raises the fry in shallow pans, feeding the alevins on baker's egg yolk, rolled into pancakes and pressed around the sides of the pan. He goes on to say that he changes the water in these raising pans four or five times daily. One can imagine the work involved in such a project, let alone the time consumed! Not having the time or the inclination to attempt such a project, I decided to tackle the problem in another way and below follows a short account of what happened.

Aquarium-bred specimens

The fish involved were aquarium-bred in this country (for how many generations I don't know). At the time of the spawnings the fish were approximately two years old, and the spawning cycle lasted for about eighteen months. The fish involved were two males ("royal blue") haraldi and a female ("blue") haraldi.

When the female was in her spawning cycle she was tried in different set-ups and with both males at different times. The end result was always the same; she would keep the eggs for two days and then proceed to eat them; occasionally she would let them hatch before devouring her offspring.

Dr. Schmidt-Focke wrote an article in the *Aquarium Digest International* stating his experiences with some Watley Turquoise discus. In this article he states that the males of the strain were showing strong brooding tendencies. Instead of guarding the territory surrounding the spawning site they were trying to muscle in and take

over the brood care from the female. He found these spawnings always ended with the parents squabbling over the care of the brood, with the inevitable result of eggs or fry being eaten. This observation was very similar to my experiences with my particular fish. Dr. Schmidt-Focke surmounted this problem by mating his Watley females to wild stock males and the result was the start of his famous red x turquoise strain.

Reward of female

Not being in the position of acquiring any additional stock I decided to try and solve the problem by removing the female. This came about one evening whilst she was making a meal of her two day old eggs; there was only a dozen or so left when I netted her out but I was interested in how the male would react to the remaining zygotes. The male, although a shade nervous, immediately took over the brood care. Unfortunately the following evening I caused the male to panic by turning the adjoining tank lights out and he, in his panic, wafted most of the newly hatched fry from the spawning slate leaving only half a dozen still attached by their mucroid threads.

The following morning (a dim light was left burning through the night) the fry that had been wafted from the slate were dead, lying where they fell on the tank base. The remaining half dozen were still being cared for, although not very expertly. When these fry reached the free-swimming stage they just wandered aimlessly around the tank and eventually perished.

This experiment, although a failure, encouraged me inasmuch as it had shown me that the male did not have the same cannibalistic tendencies as its mate. I decided to reintroduce the female and try again. At the time of the next spawning I, and other aquarists I had spoken with, were experiencing problems with eggs fungus-ing (not only with the discus). Various methods had been tried, meth. blue, aquaflovin, etc. but not with much success. Water tests had been carried out with pH, D.H. and nitrite levels being within accepted limits, but still the problem was not solved.

Male in charge

The next spawning took place on 20th April 1978 and the female was removed ten hours after spawning. The

male now took over the brood, showing more enthusiasm than with the previous experiment. To try and combat the fungus problem, Myxazin was added at half the manufacturer's recommended dose. During the hatching period about one third of the eggs were lost through fungus, which was less than I expected, so the Myxazin seemed to have helped cut the losses. The next critical phase was expected to be reached sometime during the day of 25th April when the fry would start free swimming. I arrived home that day to find most of the fry scattered around the bottom of the tank, with only eight youngsters feeding on the male.

I decided to blank off all the outside of the tank by draping an old sheet over the top to exclude light from outside sources. I then switched on a single 25 w. lamp at one end of the tank with the hope of attracting the male and as many fry as possible to the light source. This was a partial success as forty-six youngsters were eventually removed from the male four weeks later.

Heavy mucus

It was noticeable that the male had an extra heavy mucus covering, in fact it was so heavy that after one week it was impossible to see the fish's coloration; its whole body was a dull grey. The lateral lines appeared as two knife-like cuts in its heavily slimed body. This experiment was carried out a third time using the same procedure, but in an effort to eliminate the fungus completely Myxazin was used at the full manufacturer's recommended dose. The spawning was a large one and the egg loss was practically nil, with a ninety five per cent hatch.

Prior to the free-swim stage the tank was again covered and a single low wattage lamp was placed over the spawning site. But within five hours of the fry leaving the slate, over ninety per cent of the fry were dead or dying on the bottom of the tank, only ten or twelve started feeding from the male and the following morning they too, had disappeared.

One of the questions I asked myself after this failure was—did the Myxazin used to kill the bacteria (fungus only being a secondary effect to a bacterial attack) affect the embryos in any way? I was already aware that prolonged or excessive doses with other medicinal products, eg. aquaflavin can produce embryonic abnormalities. This would seem to be one possibility using comparisons with dosage and mortalities. Unfortunately I was unable to experiment further because of a lack of time and a shortage of tank space.

Although the results of these examples are far from conclusive, I hope they are of some interest to aquarists who have experiences with continual egg-eating discus. The fry that were raised from the second experiment did not provide any problems whatsoever (from the moment they started feeding from the parent fish). A point of interest is the fact that the male fish produced a great deal more body slime when it raised the brood alone, than when it shared the fry-brooding with a female in a previous spawning. This heavy secretion did not

become apparent until the fry had been feeding from him for about one week. The reason for this could be because of the relatively small amount of fry and it could, perhaps, show earlier with a larger brood putting a greater demand for food on the fish.

Crossing for experiment only

The male fish used with these experiments is at the moment pairing up with a female *S. Heckel* and I am hoping this union will help answer some questions.

I must, however, point out that I am not in favour of indiscriminate cross breeding just for the sake of producing baby discus. One only has to look at some of the discus being imported from the far east to see the results of this.

It would be interesting to observe any differences between the two species' ability to care for their young as there have been some interesting points brought up by certain members of The British Discus Association regarding the Heckel's ability to feed its offspring. The Heckel is reputed to produce less body slime than the *Aequifasciata* and their fry are reported to grow at a slower rate. It will be interesting to see how any resulting fry from this union (how's that for optimism) react to their parents. Will they go to Dad (*Aequifasciata*) or Mum (Heckel) for this life giving secretion?

The thing one learns with keeping discus is how to be patient!

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TRADE ENQUIRIES INVITED

Beginning with Tropicals (6)

by Roy Pinks

THE ARRANGEMENT OF THE furnishings of a tank is an undertaking which often baffles the beginner, simply because he assumes that there are rights and wrongs which have to be observed if disaster is to be avoided. But this isn't really true, since this part of the proceedings is very much a matter of taste and judgment, and the worst that can happen, usually, is that the arranger takes a dislike to his work of art, scraps it and begins all over again. In the interests of the inmates of the tank, this sort of upheaval should not take place too often, but in the early days the beginner will find himself paying a lot of attention to the appearance of the furnishings, and will continue to alter them until he has got them right. It is remarkable how acceptable an aquarium looks when first set up; its owner stands back and admires it and then takes a further look on the morrow, only to realize that things were not all as they should be. A major shuffle then takes place that evening, and it all seems worth it, though this scenario itself scarcely sees the week out before yet another version assails the eye.

The moral, of course, is to defer the purchase of fish until you have made your decisions about furnishings. Because the plants have a major place in all this, time should be allowed for them to settle (for at least a fortnight), when they should show some signs of putting forth new growth. Unless the plants are in fact growing, leave alone purchases of other livestock.

Rockwork

The selection of rockwork is quite a worry for some, who fear that chemicals will leach into the water from unsuitable material. Provided that you can obtain really hard rocks which will not show scratch marks readily, you should have little trouble from this source, and if you buy them from an aquatic store, you may be sure that they will be safe. Coal which is hard and shiny is quite effective, and makes a vivid impression in association with the finer leaved plants. The gravel may either be the natural brown or one of the synthetic substitutes. The latter are fairly expensive by comparison with the normal material, but they are available in a wide range of colour, most of which are tasteful and tolerable. But do not try to mix them. Some folk put in a layer of white and then think that a trail of red right across it would look fine. Well, it does until the fish begin to move it all around, and then it looks just like the muddle which it is!

If you decide to use wood, do make sure that it is suitable for inclusion in aquaria. Treated petrified wood is quite suitable, but in general I prefer to soak all wood in water for several months before using it—weekly water changes are necessary. Be warned that unproven wood is extremely dangerous partly on account of natural content, and partly because odd specimens collected from field or shore may have weedkiller or oil well absorbed into the fibres, and this will soak out slowly, with fatal results. Cork bark is an old standby for tank decoration, but it used to be very difficult to anchor, in view of its buoyancy. Some genius thought of sticking a piece of glass to the bottom of each piece (using tank sealant), so that it protruded about 3 inches all round the base. This provided a sort of "foot", which can be tucked away under the tank gravel and weighted in place with a rock. Lengths suitable to cover the entire back of the tank can be arranged in sections by this method, or smaller pieces, about 4 inches high, can be placed in strategic places, the rear filled with gravel and used as planting areas for the more important specimen plants. The back of the tank is best covered either by cork bark (internally), as suggested above, or by a piece of coloured plastic sheeting (externally). I find that a piece of light blue sheet, cut to fit within the back outer frame, and fastened into place with a rubbing of wet soap, provides an interesting and varied pattern. The sheet adheres to the glass in places and misses it in others. The variation is unusual and unique to each fitting.

False backs

Some aquarists construct false backs and sides to their tanks and place plants and lights within them, but the beginner would be advised to consider such devices as something for the future, best avoided altogether if the main internal furnishings are proving satisfactory. Certainly, avoid the plastic playthings which whizz round and burp bubbles and the paper backgrounds depicting sunken galleons. These unoriginal and pathetic playthings soon pall and become irritating, and your money is best put to another purpose.

When all has been pieced nicely together, it is well to bear in mind that in time most furnishings will be discoloured by algal growths of some sort, so there is little point in fretting if that beautifully coloured piece of rock from Devon eventually turns colour. You might be able to scrape or scrub some of it off, but such weathering has to be accepted. A further point is that you must expect some of your plant life to fail and to need replacement or substitution, and this is especially so where there is little natural light. You will find that some species just won't grow in that particular situation, and you can write them off. Concentrate, therefore, on the types which do rather well, and buy them or their close relations to fill in the gaps left by those which are unequal to the struggle. This is rather like gardening, which is largely determined by the environment rather than by one's personal choice, so if your plants prove less reliable than your fish, you will know that you are in good company.

Behaviour and Reproduction of Amphiprion Ocellaris

Written and illustrated by
Alain Breitenstein

NORMALLY VERY HARDY, the Amphiprions are perfectly suited to cope with living conditions in the aquarium. In their natural biotope anemone-fishes live and reproduce in a relatively restricted space, in the immediate vicinity of a symbiotic anemone.

In my opinion breeding represents one of the goals to be reached in keeping a marine aquarium, for it affords interesting insights into the character and behaviour of the fish.

Stocking the aquarium

For more than five years I have had the pleasure of watching the progress of a number of Amphiprions in my tank (*clarkii*, *ocellaris* along with some *Dascyllus* and *Chromis* specimens). The fish find refuge amongst commensal anemones: *Stoichactis* and various species of *Radianthus*.

Stocking was undertaken on one occasion only. From the start the fish, all of them young fish and of approxi-



Results of spawning attached to the substrate.

mately the same size, appropriated a territory for themselves. The distribution of territory follows a well-defined physical hierarchy. In relation to their growth, the dominant individuals (*clarkii* and the *ocellaris* couple) progressively increased the limits of their domains.

Characteristics and habits

Their days are spent gliding amongst the tentacles of the anemones, nipping off here and there a tender frond of *Caulerpa*. . . . The *Chromis* specimens dig terraces in the bottom layer of sand, causing little land-slides. Occasionally a sharp and repeated click can be heard—it is the *clarkii* intimidating an intruder.

All aggression is abandoned, however, at a specific time—feeding time. At mid-day and seven in the evening they are all present in the same area of the tank. Once the food has been introduced (*tubifex*, raw or cooked mussels, adult *artemia*) it is rapidly disseminated by the moving water in the tank, to the great pleasure of the fish (in satisfying their natural hunting instinct).

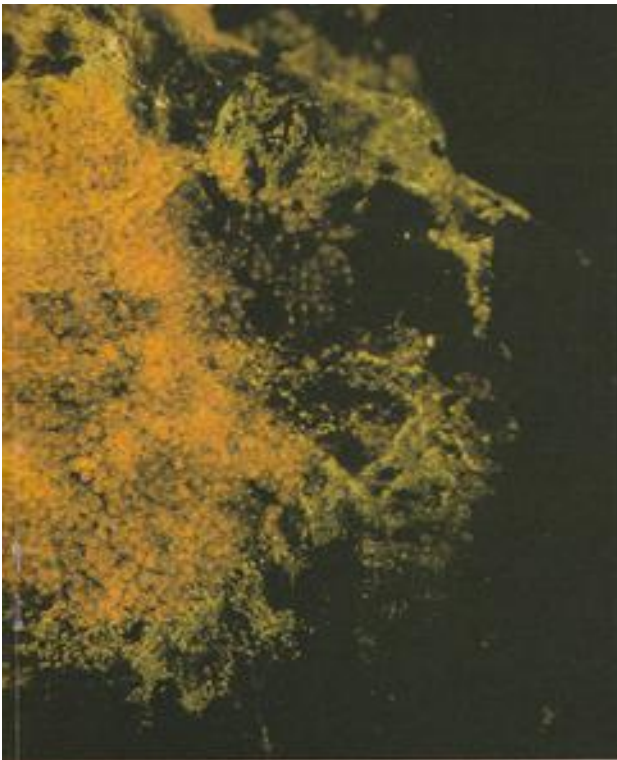
During one feeding time I notice the healthy appetite of a large female *ocellaris* and her plump lines. Sure signs of imminent breeding. . . .

Breeding preliminaries

The sudden nervousness of the pair is soon about to modify the life of the tank, which is ordinarily free of problems. For more than a year the pair had shared the same anemone with two ocellons, while other symbiotic invertebrates remained unoccupied.

THE AQUARIST

Fertilised egg.



The breeding pair, which are the dominant fish, spend their time on the exterior surface amongst the tentacles, whereas the two ocellaris shelter under the tentacles, in contact with the basal disc.

The change is effected rapidly and in 48 hours the pair become belliscose and firmly, but without viciousness, drive away the ocellaris, which take up residence in another anemone.

The other fish are drawn by curiosity. Only to be firmly repulsed. The ocellaris pair establish a "No man's land" around their anemone.

As the hours go by, the aggression between and within the species increases, except at feeding times. The pair begin courtship displays which are frequently interrupted by a chase or the search for a spawning site.

Several locations are inspected, always within close proximity to their anemone. The site chosen, brisk cleaning operations are begun, using the teeth or the fins. Then, taking turns, male and female nibble the basal disc of the anemone, as well as the outer edge supporting the tentacles. From time to time they nip the tips of the tentacles, and the anemone contracts, uncovering the place where spawning will take place.

Meanwhile cleaning operations are continued and will last for 24 hours. At feeding times the pair rejoins the other fish, taking a much greater amount of food. The abdomen and flanks of the female are fully rounded. The male, of course, has a much slimmer appearance.

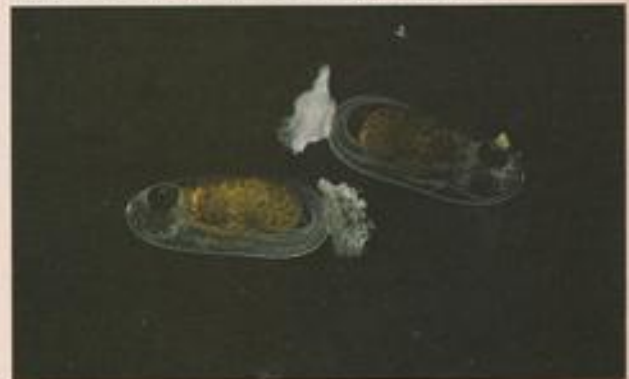
An hour before spawning, which often takes place at

December, 1980

A few minutes after hatching.



At 48 hours the eyes can be clearly distinguished.



4 days.



7 days.



the end of the afternoon (about 5 o'clock), the genital papillae or oviducts are clearly visible. As spawning draws nearer, the nervousness and aggression of the fish intensify.

Spawning

Preliminaries and cleaning operations are discontinued. The female, her nervousness apparent, carefully inspects the spawning site. In the last few minutes preceding the extrusion of the eggs, the agitated pair show some unusual behaviour. The female, anxious to relieve her egg-swollen ovaries, turns gracefully this way and that to encourage the male to breed.

In his published works, Doctor Gerard Allen, specialist on pomacentrid fishes, observes that Amphiprions raised in captivity behave differently from fish breeding in the natural state. Anemone-fishes in the aquarium are conditioned by feeding at regular times and the changing of water and their behaviour during spawning is greatly modified.

In the aquarium, spawning begins about five in the afternoon and always proceeds according to the same rituals. At the first contact the female brushes the substrate with her oviduct, the pelvic fins extended in order to keep her in position. Immediately after this first pass, the male simulates fertilisation. During this initial stage, however, no eggs are extruded. Several trial efforts will take place before spawning proper begins. The female, her body animated by regular trembling movements, glides over the substrate and extrudes the first strings of eggs, describing an arc in the water or concentric circles, the diameters of which are progressively increased. The eggs, cylindrical and rounded at each end, are firmly attached to the substrate by an adhesive appendage, the MANUBRIUM, a thread-like peduncle which is supple and brownish in colour.

Photographs allow one to assess the size of the clutch of eggs and to make an approximated count of the number of eggs deposited. On average, the surface area covered is 10 to 12 sq.cm and the number of eggs is between 350 and 400. That is a density of about 30 to 40 eggs per sq.cm. By comparison the eggs of *Amphiprion polymus* cover about 25 sq. cm. and number 1500!

Immediately after each pass of the female, and sometimes simultaneously, the male fertilises the eggs. As spawning proceeds the male and female often find themselves positioned head to tail or adopting particularly acrobatic or comical positions.

Spawning goes on for about an hour and once it is over the parents recover their aggression, chasing away intruders and carefully looking after the eggs. There is a brief truce—at meal times. After feeding, the female, having eaten a substantial amount, goes back to her guard duty. Parental care and an aggressive stance are prolonged for 8 to 9 days until their progeny are hatched.

Development of the Embryo

During the first few days after the breeding action one can easily observe the embryonic development of the fertilised eggs up to the time when they hatch. At the

time of spawning the eggs are light orange in colour and the cellular pigmentation increases until a dark brown hue is achieved.

As they develop the larvae adopt a rolled-up position in their transparent membranes and the already well-developed tail is curled back up to the head.

Observation of the eggs' embryonic development under the lens of the microscope is very interesting.

First, one notices the chromatophores, small black star-shaped markings with which the whole of the larva is speckled. Next one makes out the optic vesicles, which are very bright, and also the tiny, rapidly-beating heart. Occasionally the tail uncoils and the larva turns over, so that the spinal marrow and the outline of the dorsal fin can be seen.

The yolk sac, which provides endogenous feeding, takes up a lot of space inside the egg and one can clearly see the fine capillaries which distribute the embryo's food.

Hatching

The eggs begin to hatch during the night after 8 or 9 days. The larvae begin to move about vigorously and this movement must serve to enable the young to break through the membrane. Hatching continues through the night until dawn. Quite often a number of slower developing larvae hatch the following night.

At this final stage parental care is very important, as the eggs must be moved about quite a lot to ensure that they hatch. Throughout the night, the male and female busy themselves with the eggs and appear to suck the eggs one by one. This sucking action must have the effect of softening the egg membrane and so facilitate the hatching of the young. Parental activity ceases upon hatching and the newly born fry swim in a spiral to the surface in search of their first meal of plankton.

Feeding of Young Marine Fish

Certain species of marine fish breed regularly, but the rearing of the young fish is rarely successful. The problem is to provide the fry with a diet of plankton which is lively, attractive and abundant. The solution is provided by marine rotifers, more precisely by the species *Brachionus plicatilis*, which attains a size of 0.3mm.

The Brachions can be reared relatively easily, with the rhythm of their reproduction depending on their surroundings, variations in temperature (between 15 and 25°) and feeding, which is of vital importance. On average a female Brachion lives about twelve days and lays 3 or 4 eggs per day. The eggs hatch within 24 hours, at 25°, growth is extremely rapid and a young Brachion is capable of laying in its turn 1 or 2 days after it has hatched.

The Brachions are microscopic creatures, bearing distinctive organs at the rear extremity of their body. A circle of cilia constantly agitates the water, enabling the rotifers to feed and move about. They are microphagous organisms, the ciliary crown producing a flow of water which provides these creatures with small live particles of food such as algae or *infusoria*.

Rearing Conditions for Brachionus

In specialised laboratories large jars with conical necks are used, the mouth of which is plugged with a wad of moss or cotton. But the amateur can also use transparent plastic bottles, closed with a wad of cotton. The rearing medium consists of mature artificial sea-water (aerated for 30 days before use) distributed in small quantities in several containers. Following this simple preparation each bottle is given a supply of Brachionus.

Feeding the Brachionus

Rotifers feed on fine particles suspended in the water (algae or bacteria) and the growth of microscopic flagellate algae is provided for as follows. Receptacles identical to those used for rearing the Brachionus will serve in growing the algae. Transparent plastic bottles filled with 250 to 300 ml. of mature sea-water are used, to which one or two drops of liquid fertiliser are added. The well illuminated growing medium is now ready to receive a stock of *Dunaliella* (about 5 ml. per container). Lighting, which enables photosynthesis to take place, is essential and must be provided for 12 to 16 hours a day.

These algae are not visible to the naked eye, but they are so abundant in each bottle that the coloration of the medium indicates that the plants are multiplying rapidly. Frequent thinning out of the algae prevents them from choking through an excess of growth and this should take place every 5 or 6 days.

Using the bottles with the most growth, the algae are removed and filtered through a sieve in order to be fed to the Brachionus. The coloration transferred to the receptacles containing the Brachionus diminishes as the algae are consumed and serves as an indication of the time to introduce a further supply.

It is essential to maintain several cultures of *Dunaliella*, as success in rearing the rotifers depends in large measure on being able to feed them with sufficient quantities of algae. When the two sets of cultures are in equilibrium, the Brachionus can be fed to the newly-born fry, at the rate of 5 to 6 meals per day. Rearing the rotifers enables one to feed the young fish for about ten days, by which time they attain a size at which they can feed on *Artemia* nauplii.

Additional Information

Dunaliella algae can be distributed amongst young *Artemia salina* in order to obtain adult *Artemia* very quickly.

How can a stock of algae and rotifers be obtained? The enthusiast who lives by the sea can easily obtain some algae (*Dunaliella viridis*, green algae) and rotifers (*Brachionus plicatilis*), which can be collected in abundance in salt marshes, where plankton is present.

In order to study the different stages of development of the embryo and to provide macrophotographs and diagrams, a number of eggs are removed. Considerable difficulty is experienced in removing them from the substrate without damage.

CONCLUSION

Even if a careful vigil is carried out throughout the night, it is difficult to observe the fry hatch out. The provision of a mini-aquarium, with water circulating in it should enable one to observe this interesting spectacle more easily and perhaps to isolate a few of the fry with a view to rearing them.

Series No. 1: Embryonic Development

3 hours: Division of the cells of the BLASTODERM and development of the yolk sac. At this stage the eggs are composed of two parts: a central voluminous part corresponding to the yolk sac and an adjoining part where cell division leading to the formation of the embryo takes place.

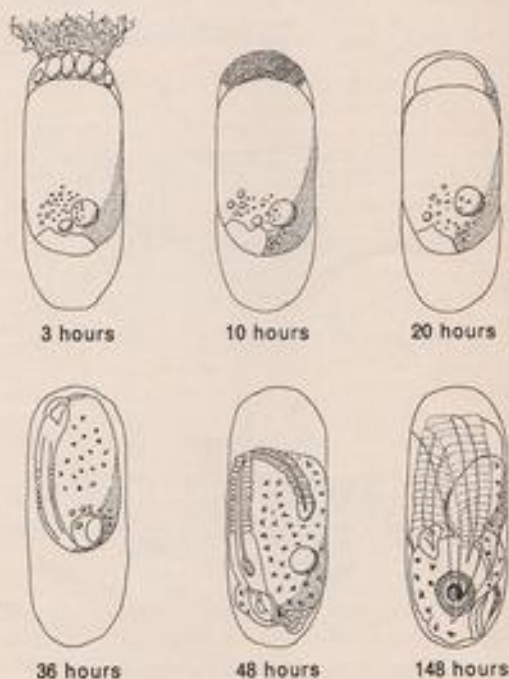
10 hours: The BLASTOMERES have divided extensively and are very small. This is the start of the DISCOBLASTULA stage.

20 hours: At the DISCOGASTRULA stage the yolk sac produces important reserves which provide ENDOGENOUS feeding of the embryo.

36 hours: Formation of the head with the outline of the eyes.

48 hours: The head is clearly visible and the eyes clearly distinguishable; pigmentation of the cells increases until a dark brown colour is reached.

148 hours: The larva fills the whole of the membrane and the curled-up tail reaches the head. Endogenous feeding visibly reduces the volume of the yolk sac. The eggs generally hatch during the night after 8 or 9 days.



Series No. 2. Fry's Development

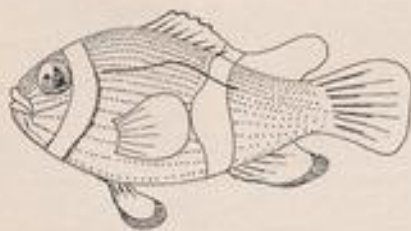
A



B



C



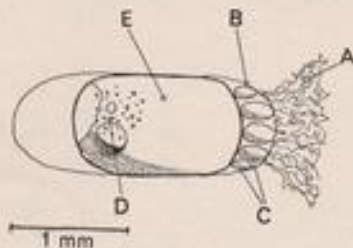
Series No. 2

A: **NEWLY HATCHED.** The length is about 4 mm. The yolk sac has been partially reabsorbed. The young seek out their first meal of plankton. This marks the beginning of **EXOGENOUS** feeding.

B: **FRY.** 6 to 7 days old—size 6 to 7 mm. The white bands, displayed by adult fish, are not yet visible.

C: **IMMATURE FISH.** 20 days after hatching, the size is 10 to 12 mm. The fry has changed into a stage which possesses almost all the characteristics of the adult fish. Its body will become slimmer, the orange colour will deepen and the third vertical band will appear at the base of the caudal fin.

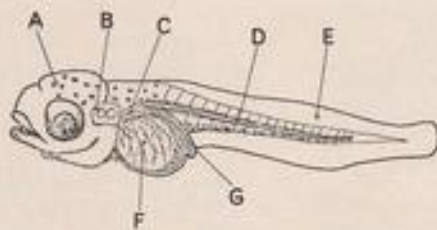
Series No. 3. Egg 3 hours after fertilisation



Series No. 3

EGG 3 HOURS AFTER FERTILISATION

A—**MANUBRIUM:** a thread-like and adhesive peduncle about 3 to 4 tenths of a millimetre.
 B—**SECONDARY CHAMBER IN THE EGG.**
 C—**BLASTOMERES:** these divide and form the larva.
 D—**PARTICLES OF PROTOPLASM:** protoplasm is a substance present in the cells of all living creatures.
 E—**YOLK SAC:** this provides endogenous feeding for the embryo.



Newly hatched Embryo 4mm long

NEWLY-HATCHED EMBRYO. SIZE 4 mm.

A—The head, with the optic vesicles.
 B—Optic capsules or **OTOLITHS**, which contain the organs of balance.
 C—Outline of the pectoral fin.
 D—Spinal marrow.
 E—Formation of the dorsal fin.
 F—Yolk sac fed by very fine capillaries.
 G—Intestine.



Female Ohgon with 'Bonio'

Continued from page 32

This year there have been several complaints of Koi-ponds infested with parasitic leeches which have wreaked havoc among Koi. No one should be tempted to gather plants from the wild, leech eggs are everywhere and once introduced into a pond are virtually impossible to eradicate without drying out the pond. A chore indeed for the sake of a few cheap plants. Koi should not be exposed to the hazards of anything from the wild, either live food or vegetation.

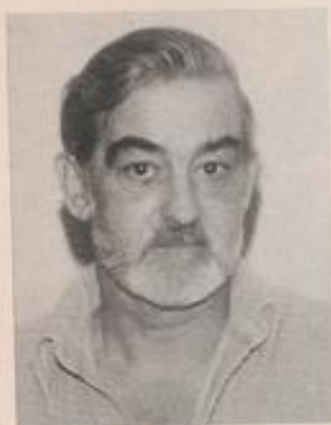
Koi are remarkably easy to feed and beginners may be amazed at the enormous variety of foods given to their Koi by experienced British Koi-keepers. The amounts offered are always determined by the number and size of the Koi and the temperature of the water. Koi have tremendous appetites in warm weather and should be fed especially well in later summer and autumn to prepare them for the uncertainties of the coming winter. Their activity and appetites are governed by their surrounding environment and both will be reduced as the temperature drops. Deep ponds protect Koi from sudden changes in temperature, always to be avoided, and another harsh winter will demonstrate the sense of providing a deep refuge for safety. Koi that have been previously overwintered outside in Britain will be noticeably more active at lower temperatures than newly-imported stock. Established healthy Koi should be fed on foods that sink rather than float, down to temperatures of around 40°F. The feed should include more carbohydrate and vegetable and less animal protein during the colder months.

Keeping Koi is a continuing interest; do not switch off the pumps and retire indoors with the first frosts but watch over your Koi. Observation is all-important in winter as well as summer and Koi are well worth the effort.

It is impossible for me to write about keeping Koi without mentioning the very real problems of imported disease. Before our Koi arrive it must not be forgotten that they have undergone a great deal of stress, maybe overcrowding in transit, various changes in water temperatures and quality and a certain amount of rough handling. Weakened Koi are prone to disease and difficult to cure. A lengthy quarantine period for observation is a must, disregarding whether the fish were described as "fully quarantined" when purchased. There are widely differing opinions on quarantine and it is up to the individual to protect healthy stock from vicious diseases to which they have no immunity. No one should be dazzled by the beauty of Koi but insist that health is the deciding factor when buying Koi. It is not true that Koi lying on their sides are asleep!

To counteract any feelings of depression, it has been most encouraging to hear of more successful Koi-spawnings in Britain this year than ever before.

Many amateur Koi-keepers are to be congratulated upon raising healthy, home-bred stock. I hope this pleasurable aspect of keeping Koi will grow and other people will realise there is more to keeping Koi than being mere collectors.



Coldwater Jottings

by Frank W. Orme

ALL TOO SOON, it seems, we have come to the end of another year—and from a weather point of view not one of the most outstanding. Unfortunately, due to various circumstances, I have only managed to visit one major open show of fancy goldfish during the past months. The show staged by the Northern Goldfish and Pondkeepers Society which is held in Bolton, Lancashire, occupies a venue that must be the envy of many other societies, in the Sports Centre, Silverwell Street.

The Sports Centre is a complex of halls devoted to a number of varying sports, plus a restaurant and licensed bar. It lies within only a short walking distance of the main shopping centre, and within very easy access of the motorway system.

On this particular occasion my wife and son accompanied me to Bolton, on Saturday the 16th of August, where, after an uneventful drive along the motorways, we arrived at around 11.00 a.m. The show was being held, as in previous years, in one of the large halls which allowed ample space for the ranks of tanks and an abundance of room for the unjostled viewing of the exhibits. In fact there is so much room available that, although there was a large entry, twice as many exhibits could very easily be accommodated without crowding the public.

This is one show which deserves support both by way of entries and spectators, therefore it was pleasing to find that some exhibitors had travelled from the Bristol and Midland areas—but it would be nice to see even greater entries from other parts of the country, the venue and organisation certainly warrant it. Of course, one of the problems, perhaps the biggest problem, is the cost of travelling any great distance, and it may well be that Bristol A.S., have the right idea for they arrange to trans-

port interested members to the show by mini-bus—thus keeping individual expenses within reasonable bounds.

In common with the other premier coldwater shows, the organisers supply water-filled tanks, ready marked, for the use of exhibitors. These contained most of the fancy goldfish varieties, many being of very good standard. The Best in Show was a very good bubble-eye entered by Messrs David Lord and Walter Gregory, who are both members of the N.G.P.S.

Judges came from as far away as Bristol and Bath, and one travelled from Devon—this was Mr. Ron King. Mr. King is probably the busiest of coldwater judges, I have met him at many different open shows including Bristol, Salisbury, the Alexander Palace and others—which proves just how much he is in demand, and the esteem in which his judging ability is held. The fact that these judges consider the Bolton Show worthy of their attendance is surely sufficient recommendation to encourage readers to try to visit this event next year.

Societies and their show benches

How can societies attract more entries to their show benches? This is a question that has been put to me, at times, by some show secretaries—and is a question that has been asked many times in the past. I do not know the answer, I wish I did. It may well be that as travelling costs continue to escalate, and unemployment continues to haunt the people, both the number of entries and those of the visiting public will continue to diminish and I can think of no way to overcome the problem at society level. Another factor may well be that many of the newer members of the goldfish keeping hobby have no inclination to exhibit their fishes in open competitions. In my own



View of spacious hall in which the Bolton Show is staged.

society it is noticeable that only a few are willing to place their fish on show in the 'table shows' and still fewer are interested in 'open shows' but this does not mean that they are any-the-less good fish keepers, in fact many of them have some very nice fishes—they just do not have any interest in displaying their stock publicly.

It has been suggested that if cash prizes were offered it would encourage a greater number of entries, however, I feel that such an inducement will spoil the present day atmosphere of our shows. Under the existing system we are happy to receive an award card, and, generally, accept the judges decision without quibble, the atmosphere is friendly as old acquaintances meet and new friends are made—the main topic of conversation, of course, is fish.

Introduce monetary prizes and things could change. There will be those who will not so readily accept the judges decision, petty jealousies will start to creep in and some of the friendly atmosphere may depart, to be replaced by suspicions and accusations. No, I feel that the introduction of cash prizes, as a general rule, would not be good for our amateur shows. It may, perhaps, encourage more entries but it would also add to the already high cost of staging even the smaller open shows, and might well cancel out any of the hoped for benefits.

Between now and the start of next year's breeding season coldwater fish keepers have little to do. Until warmer temperatures return our fishes will remain in a lethargic state, however, we should continue to make a daily inspection to ensure that all is well. Other than that we must patiently await the coming of spring. We can, of course, reflect upon any highlights of the last season, and make plans for our future breeding programme—deciding which fish should be paired with which, and so on. We can also put the time to good use by overhauling any equipment which will be required during next season. Heaters and thermostats can be checked to ensure that they are in good

working order by placing the submersible types in a bowl of coldwater and switching on. It takes only a short time to ascertain whether they are functioning coorrectly or not.

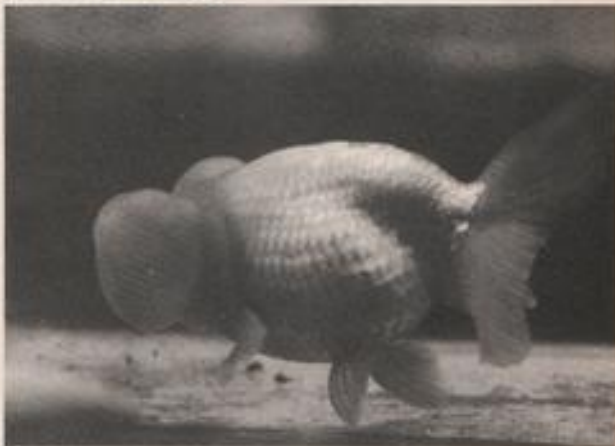
Air-pumps can also be looked at and, if found faulty, diaphragms or other parts can be replaced. Water-pumps will benefit from being serviced; such types as the Otter can be stripped down quite easily and thoroughly washed until clean. When dry, all moving parts can be given a light coating of petroleum jelly and then be reassembled. Make a careful inspection of all electrical connections and wiring; if there is the slightest doubt about the safety of either—replace it. The time spent, whilst there is little else to do, will be time well spent for it should help to avoid the frustration of requiring a piece of equipment in a hurry only to discover that it is faulty or broken.

Should you have the misfortune to find one, or more, pieces of equipment do need replacement then it is obvious that something must be done—this is, perhaps, the best month to coax someone into obtaining the required item and presenting it to you. A glum expression and deep sighs may prompt someone to enquire into your apparent misery. If a suitably despondent reply is given—who knows but what a replacement may appear in your Christmas stocking. The magical replacement will, of course, be greeted by great surprise—it was so unexpected!

The Old and the New

And so, like the year, this month's Jottings draw to a close. Next month the new decade begins—we can only hope that it proves better than this present, fast fading decade. But whatever the future holds in store, I am sure that nothing short of a catastrophe is likely to stop us keeping, and enjoying, our fishes. So let me end by wishing all readers a happy Christmas and increasing pleasure and success in the year ahead—as members of a fascinating and friendly hobby.

Bubble-eye goldfish awarded Best in Show owned by messrs David Lord and Walter Gregory both members of the NGPS.





Meet the Aquarist - No. 4 A. E. Roberts

by Frank Orme

596 QUESLETT ROAD, GREAT BARR, BIRMINGHAM is the home of one of the goldfish hobby's best known personalities—Tony Roberts. He is a man who is devoted to furtherance of the hobby, and will spend hours talking about his favourite subject—the goldfish—whether it be to the veriest novice or an experienced fish keeper. Ever ready to pass on the benefit of his knowledge, visitors find a warm welcome awaits them, whilst his wife, Pat, keeps a constant supply of cups of tea flowing from her kitchen to the fish-house. Time spent with this enthusiast passes all too quickly.

Tony first became interested in goldfish at about the age of ten years. At that time he had a collection of frogs, toads and newts and his father decided to build him a pool in which to keep these amphibians. He is still very

interested in the British amphibians and raises the tadpoles of both frogs and newts, which he releases into various natural waters around North Birmingham in an effort to maintain the numbers of these diminishing creatures. Shortly after the pool was completed his uncle presented him with five small common goldfish, and this sowed the seed of his interest. During the next few years he built up a motley collection of goldfish, which thrived and spawned. He learnt how to maintain the fish in good health and how to get the best rate of growth on the young fish, and this helped to give a firm foundation to his future fishkeeping activities.

Approximately three years after the pool was constructed he visited his first fish show, at Bingley Hall, Birmingham, and was fascinated to discover the "beauty and form" of the

different goldfish varieties. He was especially intrigued by the Bristol shubunkins and veiltails and decided that he had to replace his existing fish with a more exotic variety.

He netted the fish from his pool and sold them to a local pet shop. With the proceeds of the sale, and a little financial help from his father, he visited a goldfish breeder and purchased a breeding team of four metallic orandas. This purchase was made during the early 1950's and amounted to £10. A little later he was able to obtain a pair of Bristol shubunkins, from a well-known breeder of that time, at a cost of £6. He still has the descendants of that original pair.

Over the following years Tony has raised many high quality fish of various varieties. He started to breed fancy goldfish seriously at the age of seventeen and is, perhaps, best known for his strain of metallic orandas. These have consistently gained awards in the major open shows in both the breeders and adult classes for many years. The size to which he grows his young fishes amazes many people, but he achieves this by allowing his fishes plenty of growing space in large tanks and ample feeds of home-made and live foods. In fact he spends a lot of time collecting *daphnia* which he feeds in generous amounts to his many fishes. At the present time he keeps, breeds and raises Bristol shubunkins, nacreous veiltails, and metallic orandas.

For many years he has successfully exhibited his fishes at all of the major coldwater open shows and is particularly proud of the fact that he won the Midland Championship Cup, at the once great but now, sadly, defunct Bingley Hall Open Show, a record number of times against many of the country's best known exhibitors. He became a recognised judge of fancy goldfish nearly 20 years ago, and has judged at all of the U.K., goldfish shows at various times; he has also devoted many hours to lecturing different societies about goldfish. Over the years he has also served upon a number of different committees which have been organised nationally to further the goldfish-keeping hobby.

To the person who is entering the hobby he offers the following advice: First decide upon the variety of goldfish that is to be kept, then patiently seek out the best sources of supply for that particular variety. Do not rush around haphazardly buying fish from all over the place. Be selective in choosing the stock, for any reputable breeder of goldfish will allow visitors to view the fishes without pushing them into buying a fish that they do not want. The only variety which Tony would discourage the novice from buying is the Moor which, he says, although quite hardy is nevertheless susceptible to water changes and weather conditions. He feels that this type of goldfish should only be kept by the more experienced aquarist.

Having decided which variety of goldfish to keep, his advice is to purchase young fish that are about four months old, and certainly not older than twelve months. No attempt should be made to breed the fish until they are two to three years old. Whilst waiting for the fishes to reach this age the aquarist can learn how to keep them healthy and growing—to make really strong well-grown fishes. He suggests that the newcomer should also spend the time enjoying the hobby by visiting different shows and goldfish

breeders, at which times the opportunity should be taken to study the fishes and ask questions.

After two or three years the beginner should have acquired enough theoretical knowledge to attempt the practicalities of breeding the fishes. However, he says that no more than 500 eggs should be kept which, in his opinion, is adequate for any fishkeeper to handle. To successfully raise this number requires a minimum total of 12 feet of tank. Providing plenty of space from the very beginning is the secret of raising well-grown fish, he says. He strongly advises that there should be a definite breeding programme, and careful selection of the young should be paramount. He also feels that the goldfish breeder should enter fish in the various shows. He considers that, where possible, goldfish keepers should join one of the specialist societies and that they should try to put more enthusiasm and effort into the society than they take out of it.

Tony considers that many of the modern nacreous veiltails are too brassy and muddy in colour. He has an ambition to create a strain of nacreous veiltails with improved coloration. He hopes to produce fishes that exhibit clearer colours, with a clear colour separation—rather than the merged colours of present day fish—rather like the sharply defined colours that are seen on the better quality specimens of koi. If he succeeds in this ambition, he states that he will then keep just a few fish for his own amusement. The rest of his time would be devoted to his "first love—the British amphibians" but this could be some distance into the future.

A descriptive and well illustrated booklet ideal for the novice fishkeeper

A BEGINNERS GUIDE TO FISHKEEPING

A beginner's guide to fishkeeping



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Brentford, Middlesex TW8 8BN**

TRADE ENQUIRIES INVITED

How to induce pets to feed after the shock and fear in transport or changed environment has left a new purchase without appetite or interest in food, is a common problem. A Millport (Isle of Cumbrae) reader had this problem with a young green iguana still refusing food 10 days after purchase, despite tempting offers of chopped lettuce, grapes, plums, peaches and garden earthworms. Its compartment is heated with a 40 watt bulb, though this could be warmer for these tropical reptiles, say a 100W bulb for a small 'cage.'

The common iguana is fairly omnivorous, ranging in diet from leaves, flowers and berries to insects and small worms. In circumstances like these, reptiles can sometimes be tempted with a "starter" of bright red colour, like a bit of tomato or strawberry skin, or something lively to arouse its hunting instinct, like craneflies minus one wing so they cannot escape. Many reptiles don't feed if their body temperature falls below 75 degrees F, thus requiring a 250W chicken-incubator bulb suspended about 20 ins in a large cage for 4 to 8 hours a day. Even non-basking tropicals want an air temperature of 80-85 deg F.

Norfolk

In Norfolk in mid September, I found the bright yellow flowers of greater bladderwort, a part-floating aquatic plant, still perfect in Catfield Fenside dyke, below the public staithe, on the east side of shallow Barton Broad, while the leafy-rosette of water-solider had already sunk below the surface towards its winter rest. Lots of marsh-fern and some royal are on this bog. It was interesting also to find natterjack toads still occupy a pool at Burnham Overy near Wells, though they have other haunts so far up the east coast as King's Lynn levels and the north end of Saltfleet Haven slacks in Lincolnshire.

I was interested also in the commercial importance of common reeds, so numerous around the broads. A member of the local naturalists' trust told me they cut and sold the reeds around their various reserves for some £12,000 a year, £3 or £4,000 from Cley alone. East Anglia and Cambridge fens were the last British haunt of the European Terrapin or pond-tortoise, colonising after the Pleistocene, until climatic changes.

The Anglian Water Authority here permits anglers to remove up to 2 zander a day where these alien fish are unwanted. Where prey are scarce and zander are eating their own fry, they are given permission to destroy more, over 1,000 last year from Middle Level Drain, 20 Ft River and Burwell Lode. This eventually leads to greater numbers of zander which the water authority doesn't seem to disfavour so much as would be expected. The Ely Ouse from little Thetford to Denver and the Relief Channel are waters where the limit is only 2 a day until the roach-bream spawning cycles are restored. The area is recovering from the roach decline setback of recent years. But an exceptionally severe depletion of fish-stocks occurred in the first two open waters colonised by zander—the Ely to Denver Sluice and the Great Ouse Relief Channel. A similar effect from this fish is occurring in the Middle



From a Naturalist's Notebook

by Eric Hardy

Level system of drains. A restocking target of 60,000 roach, bream, rudd, etc over 15cm long from Grafham Water, Ardeleigh Reservoir and Costessey Fish-farm, etc, was introduced to the Ely Ouse for a viable breeding population too great for predatory zander to affect seriously again. Pike and zander are thought to migrate out of areas short of prey species. However, coarse fish were taken from rainbow and brown trout waters in the upper Rivers Lark, Nar, Wissey and Grafham Water to reduce competition, and 4,000 bream, carp, roach, rudd and tench were taken from Rougham Lake near Bury St Edmunds to form a few fishery at West Stoe, in Suffolk. Thus the student of native fish-distribution is fraught with a mixed-up lot.

Eel Fishing

Economic times probably explain the increase in eel-fishing in fenland, the number of traps, hives, sets or fyke-nets nearly trebling in the Ouse reaches. Bleak were among coarse fish added to the Ouse at Haversham. Parbel to 4.9kg are in the River Wensum. Grass-carp are being reared on the Costessey fish-farm for experimental weed-control, as well as common, mirror and crucian carp, tench, roach and bream. Roach and other

coarse fish populations are developing in the new Rutland water reservoir as well as many rainbow and brown trout, while brook-trout have also been introduced. But zander are a problem in Twenty Foot Drain and King's Dyke which link the Ouse with the Nene.

A fish population survey of Lincolnshire's River Witham and the Fosdyke found half to over three quarters are roach. Dace and some large chub predominated in shallower, fast-flowing upstream parts of the Lower Till. But so many fish mean slower growth rates, roach only half an inch at nearly 7 years old, with an average annual survival of 37%. 1979's cold weather resulted in Toft Newton Reservoir's young rainbow trout being smaller than usual; then an outbreak of cyelluke caused some blinding, even mortality. Brown trout are more resistant to this pest. An experimental introduction of brook-trout has been made there, too.

Alton Water, the new Essex reservoir near Holbrook, has been stocked with mostly roach. Trout are in Han-ningfield and Ardleigh reservoirs, and the new irrigation reservoirs will also be stocked. Zander have spread to the Essex Stour.

Many efforts to establish migratory Atlantic salmon in Tasmania, New Zealand and the Falklands failed, it is now believed due to the influence of oceanic currents circulation on the sea-going phase of feeding and growth.

Rivers

There is no "typical" river and no rooted plant shows any special adaptation to running water, states Dr Colin R. Townsend in his new paperback *The Ecology of Streams & Rivers* (£2.50, in Arnold's Studies in Biology series). Most anglers know that upstream fish require more oxygen to survive than downstream deep water fish; but here we find that weirs and reservoirs delaying water-flow increase its plankton, and the part played by animals like caddis-fly nymphs in shredding dead leaves fallen into the river and reducing their presence. The minute effects of shade, temperature and chemistry influence the presence and life of fishes, insects, plants and other water-life. But this succinct summary of the latest knowledge is tersely written, hard going for the reader, full of somewhat needless technical terms and, like other titles in this series of paperbacks, lacking an index for quick reference. I would have thought water-crowfoot and arrowhead leaves examples of rooted plants adapted to running water.

Ash and alder leaves disappear faster than sycamore, maple and willow, while beech and oak are slowest. But all stay too long for the garden pond-keeper. The differences in crayfish distribution are mainly that species have different preferences for substratum or river-bed. In those caddis which spin fine nets to catch their tiny prey there's a marked regularity in downstream distribution of species according to temperature, water-speed and oxygen preference. Goldfish can survive water up to about 41 deg C. North American creek-chub reduce buoyancy by decreasing swim-bladder volume when exposed to faster rivers, compensating for lift from water deflected over their backs.

These are the finer points of distribution which make ecology interesting to the amateur who is not engaged in well-funded research, but finds it interesting that Thames water averages about a week to run its course and that most invertebrates associated with pondweeds don't feed on them but may be there to feed on the algae, or use it as a place from which to filter passing food, or predate on others.

When is a goldfish not a goldfish? When it's a marine goldfish, the name given for the garibaldi, a bright orange-scarlet coral fish, *Hypsypops rubicunda* which loses some blue spots of youth as it matures up to about 2 ft length. What is saurochory? Seed-dispersal by reptiles, older than that by birds which is often the only one taught at schools. Such saurochorous fruits grow low down on trunk or stem and have attractive odours and bright colours to tempt them. This may explain why the pet tortoise's fondness for carotenoids or yellow pigment often denudes a garden of yellow flowers. In the Cretaceous Age when reptiles were dominant their interest, may have evolved the bright warning colours of flowers. These are just a few of the interesting topics in a 263 page, £6 2nd edition from University of Texas Press of *Coevolution of Animals and Plants*—papers from a congress producing the only book on how plants and animals have affected each other's course of evolution.

READERS' LETTERS

European Union of Aquarium Curators

May I use your Readers write columns to send information to the keepers of public aquaria throughout the United Kingdom?

On a recent visit to European Aquaria, I found that not one representative of the British Isles attended the meeting of the EUAC—nor is anyone from this country even a member.

The EUAC is the European Union of Aquarium Curators. They meet every few months at various European capitals and exchange useful information on the art and science of public aquarium keeping.

With the members speaking every European language from French to Flemish, the only common language is (I'm glad to say) English, so any British Curators will have no difficulties in communication.

Their Secretary is:—

Mr. Frank De Graaf
Amsterdam Zoo
Plantage Kerklaan 40
Amsterdam
NETHERLANDS.

to whom requests for more information should be sent.

Yours sincerely
DR. DAVID FORD
Consultant to Aquarian



COLDWATER Queries

by Arthur Boarder

I have five Golden Medakas in an aquarium and one of the females has a strand of some substance coming from the anal fin. It is about a third of an inch long and has a ball of the same substance on the end. What is it and what shall I do?

The Medakas, *Oryzias latipes*, are breeding and you should remove any plants with eggs for hatching and rearing away from the parent fish. Spawning takes place among water plants and the female carries the eggs around in a transparent envelope from which they are stripped off on the plants. A good temperature for spawning is about 28°C. The tiny fry hatch in about 12 days at this temperature and should be fed on *infusoria* at first and then as they grow, on slightly larger foods.

Last year I dismantled a four foot tank and stored the gravel in an outside water butt. When I came to use it this year it had turned black. Is there any safe way of cleaning it please?

I suggest that you throw it away and use fresh. If you are unable to get more, then you can sterilise it by boiling it. However, some of the black may remain but this will do no harm in the tank.

I have noticed some white spots on three of my eight inch Orfe. They are on their fins and are about half a centimetre across and are quite hard. What are they and what shall I do about them?

From the size of the growths I do not think that they are white spot disease, being much too large. They appear to be a form of cyst and so there is nothing you can do about a cure. Sometimes parasites are embedded in small growths but I do not know of any which cause such a large growth. I suggest that you keep a watch on the fish and should the growths become inflamed you will know that they are not cysts and they may burst. If so, any pus can be squeezed out and the wound dabbed with neat T.C.P.

I have bred tropical fishes many times and found it quite easy. I now wish to breed common goldfish but have been told that it is very hard. Is this true and how should I proceed?

To say that it is easy to breed tropical fishes is rather a doubtful statement, as although many species are easy to breed, others are very difficult. However, goldfish are easy to breed as long as certain factors are considered.

READERS SERVICE

Our experts are always pleased to receive your letters which should be addressed to:
Readers Service, The Aquarist & Pond-keeper, The Butts, Brentford, Middlesex, TW8 8BN.

All queries requiring a personal response must be accompanied by a stamped addressed envelope.

Healthy goldfish in a pond should breed every year as long as there are the two sexes present. It is not as easy to breed them in a tank as they need plenty of space in which to chase. Make sure that you have both sexes and then see that they are not overcrowded if in a tank. Then feed well on live foods, such as garden worms and maggots. One male to a female is all right in a tank but an extra male is useful in a pond as a more vigorous chasing is then to be expected. Wherever the fish are spawned it is imperative that the parent fish are separated from the eggs as otherwise few would remain uneaten. Have plenty of fine leaved plants in a tank and bunches of plants tied at the edge of a pond.

Can you give me any information on breeding *Daphnia*. I have a one gallon plastic tank. Would this be large enough?

The tank would not be of much use for your purpose; it is too small. *Daphnia* need plenty of oxygen in the water as well as necessary food. If you can get an old bath, this will be suitable for breeding quite a few fleas. Green water from a pond is very useful to get the culture started as long as no pests such as larva of dragon flies or water beetles, etc., are included. *Daphnia* feed on minute forms of life such as *infusoria* and this can be cultured by adding crushed lettuce leaves, etc., to the water. Try to get a good supply of *infusoria* in the tank before adding any *Daphnia* and do not take any for feeding until a good supply is available. Then see that some of the water is changed for fresh occasionally to ensure that plenty of oxygen is available. Some aquarists find that it is harder to breed a continuous supply of *Daphnia* than it is to breed goldfish.

I am considering making an aquarium, but have been unable to find any information on the subject. Can you help please?

The making of a framed tank is described in my book, "Coldwater Fishkeeping". Now-a-days metal frames are no longer popular as there is the risk of rusting. Plastic frames are more often used as they require no painting and never rust. A type which is becoming very favoured is the all-glass type. No frame is used and the sheets of glass are just held in position whilst a sealant is run along the edges. Very little sealant is needed and when

Continued on page 52



TROPICAL Queries

by Dr. C. Andrews

I have set-up an aquarium measuring 6 inches long by 12 inches wide, by 13 inches deep, and I have been (unsuccessfully) trying to keep and breed dwarf gouramis (*Colisa lalia*). Whenever I put a female gourami into the tank the male chases her unmercifully. Can you offer any advice?

In addition to being rather an unusual shape, your aquarium is too small to keep and breed the dwarf gourami. You should set-up an aquarium of at least 10-15 gallon (50-75 litre) capacity, and ensure that it is well planted, and maintained at about 25°C. Feed a good varied diet, including a vegetable based flaked food, and perhaps a little live food. As you have noticed, in small aquaria the male dwarf gourami will harass the female to the point of exhaustion—even death!

By the way you should also change 25-30% of the aquarium water every couple of weeks.

I have a large comet goldfish in a 36 inch aquarium, and I wondered if it were possible to feed it exclusively on earthworms?

Many pond or coldwater aquarium fish enjoy an occasional feed of earthworms, and earthworms are not only a very "safe" live food, but they are also extremely useful at bringing some coldwater fish into spawning condition. However, feeding your fish exclusively on earthworms may result in nutritional or intestinal problems. I recommend that you offer your comet earthworms about once or twice a week, and use a good quality flaked or pellet food as a staple diet.

My tropical aquarium is infested with small pink leeches. The tank is literally "crawling" with them, and they swarm all over the glass, rocks and gravel. How can I get rid of them, and are they harmful to my fish?

An article of mine entitled "Some Other Aquarium Pests" appeared in the February 1980 issue of the *Aquarist and Pondkeeper*, and it dealt with this problem. I would imagine that the "leeches" you refer to are, in fact, planarians (tiny flatworms). They are often introduced into aquaria with live food and (dare I say it?) thrive in unhygienic tanks. They probably do not actually harm the fish (although they may attack eggs and fry), but they do make the tank look very unsightly. Partial water

changes (of 25-30% of the aquarium water every 2-3 weeks), along with the removal of accumulated debris and mulm will help in the control of these pests, and fish such as the Siamese fighting fish (*Betta splendens*) and Kribensis (*Pelvicachromis pulcher*) will actually feed on them. However, their elimination from a tank where they are a severe problem may require more drastic measures. For example, removing all the fish to another aquarium, and raising the temperature in the infested tank to about 90-100°F (i.e. around 30°C) for several hours. This should kill the planarians; before any fish are re-introduced you should carry out a partial water change, and reduce the water temperature to a more acceptable level. Please let me know if you have any further problems of this nature.

I am hoping to build a 6 x 2 x 2 foot aquarium out of 3/4 inch chipboard, using 10mm. glass for the front. Can you offer me any advice, so that I can avoid any obvious pitfalls?

The chipboard and glass you are intending to use are substantial enough for the job; obviously the chipboard will have to be varnished with several coats of a good polyurethane varnish, and then screwed together and finally sealed with aquarium sealer along each joint. The aquarium will require a couple of cross bars across the top to prevent it bowing when full, and a very substantial support. Before going any further, you should have a look at "Making Your Own Aquarium" by J. Hansen (Bell and Hyman, about £5.00). I think you will find it contains some useful hints and ideas.

I have a 36 inch long by 12 inch wide by 15 inch deep tropical freshwater aquarium; it has under-gravel filtration and is illuminated by a 20 watt Grohox tube (left on for about 12 hours per day). My plant growth is extremely poor. Do you think it is the undergravel filtration?

I think that there are two main reasons for your poor plant growth. To begin with you should substantially increase the lighting in your tank; each foot length of aquarium requires about 15 watts of fluorescent strip lighting, or 20-30 watts of Grohox lighting. This should be left on for 8-10 hours per day; if an algal problem develops you can either cut down on the duration (or intensity) of the lighting, or perhaps simply introduce more plants. Obviously you should avoid overfeeding.

Furthermore, undergravel filtration does tend to have an adverse affect on aquarium plant growth. If you wish to stick with U/G filtration you could plant your plants in small pots or trays filled with aquarium peat, garden loam and gravel. Alternatively you might like to strip the tank down, remove and wash the gravel well, and then refurbish the tank with a 1-1 inch layer of a mixture of aquarium peat and garden loam beneath the gravel. For filtration I would then use an internal/external box filter, or a couple of polyfoam cartridge filters (one at each end of the tank).



MARINE Queries

by Graham Cox

I have been keeping fish, both freshwater and marine, for several years. Up to now, the largest marine tank I have had is 48 in. x 12 in. x 12 in. I now intend to sell all my other tanks and concentrate on setting up a tank 72 in. x 24 in. x 18 in. for marines. I intend to make this a complete marine tank (i.e. invertebrates plus fish). Please could you answer the following queries:

- (1) How many heaters (or total wattage) required to keep constant satisfactory temperature. (The tank would be in a moderately heated room of about 70°F).
- (2) The correct amount and composition of light required.
- (3) The best type of filtration for a set-up of this size.

(1) *Tank Heating.* If you have adhered to the usual British convention of stating tank dimensions, viz. that the final dimension is always the vertical height of the tank, then your tank, measuring 6 feet in length, 2 feet front to back and 18 in. vertically deep has a gross gallonage of approximately 112 Imperial gallons or 510 litres. In a heated room such as you describe you would need two 200 watt heaters or combined heater/thermostats to safely guarantee a 78-82°F temperature range all the year round.

(2) *Lighting.* At 18 in. vertical water depth, you need 2½ feet of fluorescent lighting per each square foot of tank surface area if you are to succeed with algae and invertebrates. Thus, with a surface area of 12 square feet you will need 30 feet of fluorescent tubing. This would best be achieved by using 2 x 5 foot "Gro-Lux" and 4 x 5 foot "Northlights." The above lights should be switched on for at least 12 hours per day.

"I receive fifty complaints each year from marine aquarists who just cannot keep algae and invertebrates alive."

On this topic of the high lighting intensity needed for the successful culture of invertebrates and algae, I receive at least fifty complaints per annum from marine aquarists at home and abroad bemoaning the fact that, try as they might, they just cannot keep algae and invertebrates alive. A small percentage of these queries every year is finally resolved as being due to the use of inadequate sea salt

formulations or metal poisoning or excessive usage of sodium bicarbonate as a pH buffer over a prolonged period, resulting in the eventual total loss of all calcium ions from solution, etc. However, on investigating the other forty or so invertebrate/algae failures, one always finds a pathetically low lighting level. Only last week I spoke to a man with an aquarium of exactly the same external dimensions as your own but with the 24 in. dimension in the vertical plane.

The gentleman's complaint was that he had bought a large invertebrate/algae/living rock collection from a well-known provincial trader only to see everything die off very gradually over the next six months. He returned to the trader and complained about this. His trouble was diagnosed as tired seawater which he thought a little surprising since he had been conscientiously changing 25% of the water every 3-4 weeks.

"Dismayed but not defeated, he discarded all his 'lunar landscape' rocks and spent over £100 on new algae, invertebrates and living rocks."

Dismayed but not defeated he discarded all his by now "lunar-landscape"—type "living" rock and spent over £100 on a new collection of living rock, algae and invertebrates having first done three 33⅓% partial water changes in a seven day period. Exactly the same thing happened again. None of the creatures, algae or encrusting lifeforms on the living rock died with a dramatic suddenness—they just slowly dwindled in size and vitality over the ensuing few months.

"... the most blindingly, brilliantly illuminated aquatic environment on Earth, i.e. the shallow, crystal-clear waters of a coral reef..."

At this stage we discussed his problem together and to my utter astonishment I found that his aquarium was lit by one five foot "Gro-Lux" tube. He had been taking animals and plants from the most blindingly, brilliantly illuminated aquatic environment on Earth—the shallow, crystal-clear waters of a coral reef and for half the day (when his "Gro-Lux" was lit) exposing them to a lighting intensity comparable to that at a depth of 100 to 150 feet of seawater—where none of them would naturally grow! For the remaining twelve hours of each day they were in total darkness.

(3) *Filtration.* You use the phrase "best type of filtration." If I may take this to mean—that money is of secondary importance, then without a doubt this should consist of two external powerfilters of capacity at least 70 to 80 gallons per hour each and filled only with an ultra-high activity marine charcoal pumping the powerfiltered seawater down two airlifts and up through a bacterially-matured cockle-shell/coral sand deep (minimum 3 in. average depth) filter-bed.

This is known as *reverse-flow undergravel filtration* and prevents the accumulation of the almost non-biodegradable



PLANT Queries

by

Vivian De Thabrew

I don't seem to have much success in growing *Cryptocorynes*. I have several of the more common types in a 3 ft. x 15 in. x 12 in. tank which has been set up for 7 months. New shoots that do appear are a very pale green that soon die off. The tank is illuminated with a 2 ft. 20 watt north light tube and 2, 25 watt ordinary bulbs which are on for 5 hours a day for 5 days and all day Saturday and Sunday. Every 2 weeks I add a liquid fertilizer. The only filter I use is a box corner type.

As you do not give any information about your tank condition, I am unable to determine the reason for your difficulty in growing *Cryptocorynes*. However, the fact that you say that pale green new shoots appear and soon die off, is a good indication that the water condition is not quite right. If the temperature is low, the growth is very slow, but the new shoots will not die off. On the other hand, if the temperature is high, the leaves and the stems will rot away. This all indicates a very acid or alkaline condition. A lighting period of 8 hours per day by a 2 foot 20 watt tube and 2, 25 watt bulbs would be ideal.

No amount of liquid fertilizer can promote plant growth if the water condition is unfavourable. Anyway, the best form of plant nutrients can be provided through a good planting medium, especially in a very limited area.

Therefore please check the pH and DH of your water. The pH should be maintained between 6.5 to 7.0. If it is below or above this range, immediate steps should be taken to correct it. Rainwater filtered should provide you with the good water condition so conducive to plant growth.

I assume you have a satisfactory planting medium. This should ideally contain peat or clay as a layer, sandwiched between coarse sand or gravel layers. For the popular and commonly available *Cryptocorynes*, a temperature range of 74°-78°F is satisfactory.

I have a 24 in. x 12 in. x 15 in. aquarium lit by a 20 watt power twist tube for twelve hours per day. Undergravel filtration with a slow turnover of water of a pH of 6.5 and DH 5 to 6. My problem is the occurrence of brownish-red algae on the leaves. Originally a view was held that to eradicate brown algae, one should increase the period and intensity of lighting. However I think this theory is not accurate now. Do you think, that due to

the availability of very much improved lighting aids it would be best to decrease light to stop this reddish-brown algae growth? Please tell me how long I should keep the tube lit for, or should I paint part of the cover-glass to cut down the intensity?

I am also puzzled by the deformed growth of at least two species of plants. The leaves of *V. spiralis* and *H. salicifolia* develop a 'kink'.

As the improved type of tube lights appear to be capable of producing light rays beneficial to plant growth, the light intensity of these over twelve hours per day is more than substantial. If anything, you could decrease the period by at least three hours per day.

The development of brown or brown-red algae is of common occurrence in tanks which receive a concentration of filtered rays. Your observations, according to my opinion, are correct. I do not think you need to paint or shade part of your cover-glass, as this would give uneven light-spread into the tank. The 'kinks' on leaves are normally caused by uneven light concentration, and this is seen especially when the light rays are bounced back from rocks under water. I have observed this sort of kinking occurring on species of *Cryptocoryne*, *Vallisneria asiatica*, *V. spiralis*, *Blyxa seylanica* and *Hygrophila angustifolia (salicifolia)* in streams in Sri Lanka. *H. salicifolia*, however, is prone to this curling of the leaves, and this, apart from the action of light refraction could be due to the effect of water turbulence. This is only my opinion based on observation of the growth of these plants in their native Indian sub-continent.

'Kinking' or 'puckering' of leaves of some species can also be due to genetic mutation. Temporary deformation of leaves with the subsequent decay is caused by certain virus diseases. However this is of rare occurrence in common aquarium plants.

Recently I bought a *Cryptocoryne ciliata* from a plant supplier, and he suggested that it would grow well in very acid water. Is this correct? In my tank the water is about pH 6.0, but the plant died without even rooting. Could you give me more information about this plant, and how to grow it successfully.

Cryptocoryne ciliata does not like very acid conditions. It will tolerate mild acidity, but will thrive in neutral to slightly alkaline water with some salinity. The species is found in south-east Asia, especially Indonesia, Malaya, India, Pakistan and Sri Lanka, where it grows in mangroves, near estuaries and shallow, brackish water pools. However, another form is found in slow-flowing water-courses, coming over calcareous rocks. *C. ciliata* is an ideal bog plant, and grows well in an emersed condition. Since it grows very tall, bushy and erect, ample room should be provided. The tank bottom should contain some loam, clay or mud. It requires a water temperature of 72°-76°F, and bright, strong light. Specimens of true *C. ciliata* are rarely available, as those usually exported from the tropics are hybrids.

THE AQUARIST

sea-humus in the coral sand. This accumulation is highly undesirable since we now know that certain parasites are able to subsist on this material at certain stages in their life cycle. The powerfilters, whilst they won't prevent the sea-humus from occurring, will at least concentrate it into the external powerfilters' boxes from where it may easily be washed out of the charcoal periodically.

Should you decide that this rather expensive filtration method is not suitable, then the normal airlift-operated undergravel filter is perfectly suitable—indeed over 90% of the nation's aquarists use this method—provided that:

- (a) you add a 75 pence internal box-filter full of marine charcoal, and
- (b) you always take each month's 25% to 33% partial water change as an opportunity to flush as much sea-humus from the coral sand as possible.

I have now been keeping a marine aquarium for over three years. I thoroughly enjoy the hobby but my main difficulties are financial since I am still a schoolboy.

From my tank I recently lost a 6 in. adult Blue-ring angel fish (*Pom. annularis*), and a 4 in. Queen angelfish (*Hol. isabelita*) and a 1 in. long baby Clowntrigger fish (*B. conspicillum*). This only leaves four fish left alive in my tank as follows:

- (1) 3 in. Clowntrigger fish.
- (2) 2 in. Regal Tang (*Paracanthurus hepatus*.)
- (3) 1 in. Humbug damsel (*Dascyllus aruanus*.)
- (4) 2 in. *Chaetodon melanotus* butterflyfish.

My question is where can I acquire a healthy 1 in. Clowntriggerfish or a 4 in-5 in. Emperor angelfish (*Pom. imperator*) to complete my community? Also which of these two fishes would be best for my tank which measures 39 in. x 12 in. x 15 in.

My first reaction to your letter was one of amazement that anyone should attempt to cram some 20 inches of coralfish into a 25 gallons (gross capacity) aquarium. Allowing for seawater displaced by rocks and corals and coralsand you probably have only a little over 20 gallons of seawater in the aquarium. Thus, even if you have a powerfilter and an undergravel filter your maximum stocking density should not have exceeded 1 in. of fish per each 2 gallons of seawater, i.e. 10 in. of fish maximum. At 20 in. of fish you were exactly doubly overstocked and I am not surprised that disaster overcame your aquarium costing the lives of three beautiful, relatively rare and certainly very expensive fishes.

"My first reaction to your letter was one of amazement that anyone should attempt to cram some 20 in. of coralfish into a 25 gallons (gross capacity) aquarium."

You now have at least 8 in. of fish left in your aquarium. This is about maximum if your tank is filtered by both a U/G filter and a power filter. If you only have one or other type of filter you already have more than enough

livestock in this tank. To buy more would only be to consign all your fishes to a life of overcrowded misery until you again repeated the previous disaster.

If you cannot establish another aquarium but still feel compelled to keep on buying more creatures, why don't you try keeping a few filter-feeding invertebrates? These lowly but colourful and interesting animals impose on the system only a fraction of the biological loading which fishes impose, and are non-territorial by nature unlike most coralfishes.

Coldwater Queries — Continued from page 48

set can be practically everlasting. The method of joining is to lay the base first and then the ends have to fit inside the front and back sheets.

I have a garden pond, with 45 square feet of surface area. In it I have one Tench, 7 in.; four Golden Orfe, 8 in.; one goldfish, 5 in.; two Comets, 3 in.; two Shubunkins, 5 in.; and I have now added three more Orfe, 3 in. Since adding these small fish I have not seen a sign of them after three days. Can you explain?

Your pond appears to have been fully stocked before you added the new fish. It should only hold 45 inches of length of fish, excluding the tail. The larger Orfe in the pond must have looked like sharks to the smaller ones. It is a mistake to add small fishes to a pond where there are large ones. The new fish may hide away for some days. There is nothing clever in trying to keep too many fishes in a small pond. A few will keep much healthier.

I have a number of fresh water mussels in a pond with various coldwater fishes. I wish to breed the mussels and shall be glad of any information?

The breeding habits of most of the fresh water mussels, especially the larger ones, is rather complicated. The female produces many eggs which are held in a type of pouch. They are fertilised by the male sperms which are drawn in through the inhalant syphon. There the eggs remain for some time. The eggs are produced in the summer but are not released until the following spring. They are called *glochidium* and have a small bivalve shell and a tiny sticky thread protruding from them. They may fall to the bottom or become entangled in water plants by the thread. If they are fortunate enough to come in contact with a fish swimming through the plants, they become attached and live on the fish as a parasite. The fish may form a kind of cyst over the young mussel which feeds on the fish until mature when it drops to the bottom and lives the life of an ordinary mussel. It can be seen from this that there may be danger to pond fishes if fresh water mussels are allowed to breed in their pond.



News from Aquarists' Societies

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

SOUTH EAST



GOLDFISH SOCIETY OF GREAT BRITAIN OPEN SHOW RESULTS—British type shubunkins: 1, W. Leach; 2, H. Whiting; 3, A. Law; 4, D. Morris, and J. Amos. Veiltail: 1, J. Kingsland; 2, B. Cook; 3, H. Berger; 4, J. Day. Bramblehead (London): 1, B. Lumley; 2, L. Clemens; 3, Mr. and Mrs. Hixon; 4, J. Pollard. Common Goldfish: 1, M. Dudley. Pearlscale: 1, A. Dibley; 2, 3, and 4, A. Lestur. Celestial: 1, H. Berger; 2, M. Dudley; 3, J. Handell. Puss-Pon: 1, and 2, J. Amos; 3, W. Leach; 4, J. Pollard. Bubble-eye: 1, 2, and 3, P. Speaks; 4, J. Pollard. Common Goldfish: 1, B. McHugh; 2, J. Ross; 3, J. Handell; 4, D. MacKay. London Shubunkin: 1, and 2, W. Leach; 3, and 4, P. Whittington. Comet: 1, D. MacKay; 2, and 3, P. Norman; 4, H. Berger. Fantail: 1, 3, and 4, R. Dodkins; 2, W. Cook. Oranda: 1, 2, and joint 4, A. Lawman; 3, G. Lewis; 4, J. Day. Bristled Type Shubunkin (Breeder): 1, B. Cook; 2, D. Nutt; 3, V. Cole; 4, A. Roberts. Veiltail (Breeder): 1, D. Mills; 2, B. Cook; 3, A. Roberts; 4, J. Laidie. Globe-eye (Breeder): 1, and 2, M. Dudley. Bramblehead (London) (Breeder): 1, R. Elliott; 2, and 3, A. Tapp; 4, B. Lumley and D. Gay. Pearlscale (Breeder): 1, 2, 3, and 4, A. Lestur. London Shubunkin (Breeder): 1, and 3, P. Whittington; 2, and 4, W. Leach. Comet (Breeder): 1, 2, and 3, P. Norman. Fantail (Breeder): 1, and 2, A. Barnes; 3, W. Cook. Oranda (Breeder): 1, 2, and 3, A. Lawman; 4, G. Lewis. Bristled Type Shubunkin Matched Pair: 1, B. Jordan; 2, H. Whittington; 3, T. Ball; 4, V. Cole. Novice Class: 1, and 4, Jan Amos; 2, R. Graham; 3, D. Gay. Best Fish in Show—Aquarist Gold Fish: B. Lumley. Best Owner-Bred Fish in Show: W. Leach. Highest Pointed Basic Variety Team: B. Cook. Highest Pointed Basic Variety: W. Leach. Highest Pointed Metallic Veiltail: J. Kingsland. Highest Pointed Popular Variety: B. McHugh. Highest Pointed Single Tailed Popular Variety: B. McHugh. Highest Pointed Twin-Tailed Popular Variety: A. Lawman. Highest Pointed Owner-Bred Double Variety: K. Speaks. Highest Pointed Intermediate Breeder: P. Norman.

Croydon A.S. open show results: Class Ag: 1, Mrs. E. Smallwood (Reading); B: 1, A. Chaplin (Basingstoke); Runners-up: Mr. and Mrs. C. Brook (SELAS); P. Levine (Mid-Sussex); A. Chaplin (Basingstoke); B: 1, W. Hastings (SELAS); Runners-up: D. Lambert (Kingston); 1, Edwards (Thames); E. Tester (Mid-Sussex); C: 1, E. Tester (Mid-Sussex); Runners-up: W. Hastings (SELAS); J. Doughty (SELAS); J. Edwards; C: 1, J. Doughty; Runners-up: M. Powell (East Dulwich); A. Feast (Tonbridge); Ch: 1, M. Rowena (SELAS); Runners-up: A. Chaplin; Mrs. D. Winder (East Dulwich); Mrs. V. Feast (Tonbridge); D: 1, W. Hastings; Runners-up: W. Hastings; F. May (Reading); Dc: 1, A. Fuller (Kingston); Runners-up: C. Osborne (SELAS); C. Finnis (Strood); C. Brook (SELAS); Dc: 1, J. Payne (SELAS); Runners-up: W. Hastings; R. H. Mitchell (Bexley Heath);

E: 1, D. Wood (East London); Runners-up: C. Finnis; A. Chaplin; M. Bourne; B: 1, D. Winder (East Dulwich); Runners-up: Mrs. D. Winder (East Dulwich); M. Newman (East Dulwich); F: 1, A. Feast; Runners-up: J. Jackson (Basingstoke); P. Mack (Croydon); C. Cherwright (Southend); G: 1, J. London (Southend); Runners-up: Mrs. M. Lambert (Romford and Becontree); J. Payne; A. Chaplin; H: 1, C. Finnis; Runners-up: J. Part (Romford and Becontree); W. Hastings; J: 1, Mrs. D. Winder; Runners-up: M. Faith (Hastings); Mrs. M. Edwards (Thames); K: H. Mitchell; K: 1, J. Jackson; Runners-up: C. Stallwood (Reading); J. Payne, Jr. (SELAS); D. Wood (East London); L: 1, A. Feast; Runners-up: P. Mack; C. Osborne; D. Winder; M: 1, A. Feast; Runners-up: A. Chaplin; D. Lambert; C. Brook; N: 1, C. Cherwright (Southend); Runners-up: R. H. Mitchell; D. Lambert; J. Jackson (Basingstoke); N: 1, C. Finnis; Runners-up: D. Cherwright; P. Scott (Thames); J. Jackson; O: 1, F. May (Reading); Runners-up: D. Sindle (Reading); W. Hastings; 1, Part; P: 1, W. Hastings; Runners-up: C. Finnis; W. Hastings; Q: 1, A. Chaplin; Runners-up: W. Hastings; E. J. Jackson (Hastings); Miss Sharon Smith (Mid-Sussex); R: 1, C. Finnis; Runners-up: J. Edwards; C. Finnis; S: 1, D. Wood (East London); Runners-up: D. Wood; T: 1, J. Edwards; Runners-up: A. Chaplin; D. Cherwright; F. Scott; U: 1, D. Cherwright; Runners-up: G. Stallwood (Reading); S. Smith (Mid-Sussex); C. Brook; V: 1, J. London (Southend); Runners-up: J. London; A. Chaplin; X: 1, J. Jackson; Runners-up: C. Cherwright; M. Faith (Hastings); F. Scott; X: 1, D. Cherwright; Runners-up: D. Lambert; J. Edwards; C. Finnis; Novice Class: 1, M. Bourne; Runners-up: M. Bourne; D. Lambert; Reptiles and Amphibians: Miss C. Derrick (Croydon). Best in Show: A. Feast, Class L. F.B.A.S. Class: D. Wood, Class E. Highest Pointed (Lady): Mrs. D. Winder.

At their meeting on 4th September the Kingston and District A.S. were treated to an interesting and enjoyable talk on setting up a furnished aquaria by Terry Waller. On 18th September they had the club table show for livebearer classes. At the election of officers on 2nd October, the following officers were re-elected for the forthcoming year: Mr. A. J. Fuller (Chairman), Mrs. J. Ellis (Treasurer), Mr. D. Mackay (Show Secretary), Mr. B. West (Assistant Show Secretary), Mrs. P. Lambert (Secretary) and Mr. D. Lambert (Trophy Secretary).

Prospective new members or visitors to the Club are always welcome. Meetings are held on the first and third Thursday every month at the Raynes Park Methodist Church Hall, Wootpe Road, Raynes Park, S.W.20. Please contact the Secretary on 01-542 9556 for further details.

A GROUP of enthusiastic fish keepers have formed an Aquarist Club known as Leigh Community A.S., with meetings held the second and fourth Monday of each month at the Phoenix Hall, Rowbury Road, Leigh Park, Havant. All aquarists are welcome, regardless of age. At the first Club meeting there were 28 members, out of which the following committee was elected: Chairman, Mr. P. Hinson; Secretary, Miss A. Jennings; Treasurer, Mr. R. Pinn; Mr. D. Jennings was invited along to explain to the members the benefits of the society being affiliated to the F.B.A.S. and A.S.A.S. For more information, please contact the Secretary, Miss A. Jennings, c/o 11 Bliss Close, Portsmouth, Hampshire, PO1 5XD.

THE Wycombe Marsh A.S. meet at 8 p.m. at the Social Club, Raiko Ltd., Loudwater, High Wycombe, Bucks. The secretary is Jeff Woodbridge, 14 Mount Pleasant, Lane End, High Wycombe, Bucks. The programme for 1981 includes: 5th January, A.G.M. and Quiz; 19th January, Tape Slide—"Sea Must Live"; 2nd March—Bring and Buy.

At the October meeting of the Mid-Sussex A.S., members welcomed their President, David Super, who judged the table show. Cards awarded: Cichlids: 1, B. and T. Tester; 2, R. Perrin; Livebearers: 1, E. and T. Tester; 2, P. Levine; 3, Sharon Smith; 4, S. Warner. Breeders (Egg-layers): 1 and 3, T. Fildley; 2, B. Hardy; Breeders (Livebearers): 1, 3 and 4, P. Levine; 2, E. and T. Tester. The table show for the evening was "AOS Livebearers," by A. Blake. The 50 club winners for the month of October were: 1, T. Tester; 2 and 3, N. Short. Meetings are held on the second Thursday of each month at Oakley Lodge, Oakley Lane, Keymer, from 8 p.m. Anyone interested is welcome. Further information from the Secretary, Mr. John Birch, 11a Sandricks Way, Hayward's Heath. (Phone: H. Heath 30585).

NEW members will be most welcome at the Aylesbury A.S. meetings at the "Hop Pole," every other Tuesday, 8 p.m. Full programme now arranged. Phone: Staks Mandeville 2409 for fuller details.

OFFICERS elected at the a.g.m. of Romford and Becontree A.S. were as follows: Chairman, J. Part; secretary, J. Risk; treasurer, E. Ward; show secretary, G. Magrath; ant. show secretary, P. Lambert; programme officer, Mrs. M. Lambert; junior member, S. Elliot; Lay Members, M. Smith, Mrs. M. Part, P. Prior.

RESULTS of the National Fishkeeping Show held on 2nd, 4th and 5th October. Total entries, 315. Best Fish, Class B: *Rasbora radiata* owned by P. Moya. Society Furnished Tropical: 1, Hendon; 2, Portsmouth; 3, Walthamstow. Society Furnished Goldwater: 1, Portsmouth; 2, Walthamstow. Individual Furnished Tropical: 1, J. Salt. Individual Furnished Goldwater: 1, T. Woolley. Mini-Furnished Aquaria: 1, Waller; 2, G. Smith; 3, D. Winder. Society Furnished Aquascape: 1 and 2, Runnymede. Individual Aquascape: 1, Mrs. Butler; 2, P. Mills.

Class B: 1, P. Moya (Horseshoe Regis); 2 and 3, B. Witteridge (Southbury); B: 1 and 3, P. Moya; 2, M. How; C: 1 and 3, David Winder; 2, J. English (Throckley); G: 1 and 2, David Winder; 3, C. Hoggan (East Dulwich); Ch: 1, W. Laws (South Sholdy); 2, Mrs. Davis (Corby); 3, S. Penchard (GAGB); D: 1, Bill Hastings (S.E. London); 2, W. A. Miles (Harrington); 3, T. Woolley (Harrington); Da: 1, T. Woolley; 2, R. Elliot (Corby); 3, T. J. Hawkins (MASG); Dc: 1, David Winder; 2, P. Moya; 3, Doris Winder; Dc: 1, T. Woolley; 2, G. Smith (Polhill); C: 3, Osborne (S.E. London); E: 1, Mr. and Mrs. Carney (S.E. London); 2, P. Moya; 3, C. Finnis (Strood); Ea: 1 and 3, David Winder; 2, Mrs. Lambert (Romford & Becontree); Eb: 1, A. Waller (East London); 2, C. Osborne; 3, C. Finnis; F: 1, P. Mills (Walthamstow); 2 and 3, J. Jackson (Basingstoke); G: 1, J. Fuller (MASG); 2, M. Field (Amersham); 3, P. Moya; G: 1, Mrs. Lambert (Romford & Becontree); 2, C. Osborne; 3, T. Woolley; H: 1, C. Osborne; 2, M. Field (Amersham); 3, C. Finnis; Ha: 1, C. Finnis; 2, David Winder; 3, T. Woolley; J: 1, Mrs. Davis (Corby); 2 and 3, B. Witteridge (Southbury); K: 1, J. Jackson; 2, C. Finnis; 3, J. Edwards (Thames); L: 1 and 3, David Winder; 2, C. Hoggan (East Dulwich); La: 1, Mrs. Chapman (East London); 2, G. Davis (Corby); 3, P. Wilson (Southbury); M: 1, A. Stevens (Middlebrough); 2, J. English (Throckley); 3, M. Kirkham (MASG); Ma: 1, David Winder; 2, W. Laws (South Sholdy); 3, W. Gibson (Throckley); Nb: 1, Mrs. Davis; 2, J. Jackson; 3, S. Penchard (LAGB); Nc: 1, Doris Winder; 2, A. Stevens (Middlebrough); 3, P. Kelly (Throckley); O: 1, M. Kirkham (MASG); 2, J. Edwards; 3, T. J. Hawkins (MASG); P: 1 and 2, F. Chapman (East London); 3, Mrs. Chapman; Q: 1, C. Finnis; 2, A. Stevens (Middlebrough); 3, R. S. Farmer (Roehampton); R: 1, Sylvia King (S.E. London); 2, P. Mills (Walthamstow); 3, C. Finnis; S: 1 and 2, T. Woolley; 3, A. Stevens; T: 1, A. Waller; 2, David Winder; 3, J. Jackson; U: 1, Master R. Fox (Wycombe Marsh); 2, Mrs. S. Brown (East London); 3, P. Pinder (GAGB); U: 1, 2 and 3, A. Coomber (GAGB); U: 1, 1 and 2, S. Furnessdown (Walthamstow); 3, A. Coomber; U: 1, A. Coomber; 2 and 3, S. Furnessdown; W: 1, J. Brown (Bethnal Green); 2, J. English (Throckley); 3, C. Hoggan (East Dulwich); Wa: 1, 2 and 3, J. Brown; X: 1, J. Fuller (MASG); 2, P. Moya; 3, C. D. Roberts (Horseshoe); X: 1, T. Waller (East London); 2, C. Finnis; 3, J. Edwards; X: 1, J. Edwards; 2, David Winder; 3, D. Cherwright

(SLAG). Za: 1 and 3, P. Mills (Walthamstow); 2, J. Jackson. Zb: 1, 2 and 3, P. Mills (Walthamstow). Zc: 1 and 2, P. Mills; 3, D. Pearce (Purtonmouth). Spz (Reptiles): 1 and 3, A. Cox; 2, Mrs. Butler (Kingsmead). Society Tableaux results: 1, Portsmouth; 2, East Kent; 3, South Shields; 4, Croydon; 5, Throckley and Sunnymede. Highest Pointed Society: East Dulwich.

SOUTH WEST



AS a result of the a.g.m. of Plymouth and District Aquarist and Pondkeepers Society, Mr. A. J. R. Taylor, 40 Radford Park Road, Plymouth, Plymouth PL8 9DM, will serve as the Honorary Secretary for 1980-81. The Society Show Secretary is Mr. J. Randall, 50 Dourham Avenue, Liplon, Plymouth.

North Avon A.S. meet on the third Monday in the month at "The Hub" on the A38 (near "New Inn") at Patchway, Bristol, at 7.30 p.m. Visitors and potential new members can be assured of a warm welcome.

GRAMHAM BELL, speaking to members of Bristol A.S. on "Lionheads" confirmed the hardness of this variety and that maximum growth required maximum room. During the meeting reports were read that underlined the success of the recent show.

THE new Secretary of Yeovil and District A.S. is Mr. Roger Bond, 28 Hillcrest Road, Yeovil, Somerset BA22 4RA. (Tel: Yeovil 28921).

MIDLANDS AND WALES



Bridgewater A.S. Open show results: Guppies: 1, Mr. and Mrs. Baldwin (S/G); 2, A. and E. Berry (B); 3, M. Burgeyne (B); Platies: 1, E. and B. Calow (B); 2, H. Wood (St. Hel); 3, K. Corbett (M/Side). Swordtails: 1, H. Wood; 2, K. Corbett; 3, A. and E. Berry. Mollies: 1 and 3, Mr. and Mrs. Iddon (S/G); 2, K. Johnson (Long). A.O.V. Livebearers: 1, Mr. and Mrs. Iddon; 2, D. Wilson (L/Pool); 3, J. Corbett (M/Side). Small Anabantids: 1, Mr. and Mrs. Underwood (Ind); 2, A. and E. Berry; 3, K. Buckley (B). Large Anabantids: 1 and 2, Mr. and Mrs. Underwood; 3, J. Crane (M/Side). Fishers: 1, K. Corbett; 2, P. Darcy (Old); 3, L. Fountain (Run). Small Cichlids: 1 and 2, Mr. and Mrs. Underwood; 3, J. Corbett. Large Cichlids: 1, Mr. and Mrs. Iddon; 2, Mr. and Mrs. Briers (R/Pool); 3, Mr. and Mrs. Underwood. Anglis: 1, A. Bobby (S/G); 2, K. Buckley; 3, P. Darcy. Rift Valley Cichlids: 1, 2 and 3, Mr. and Mrs. Iddon. Small Barbs: 1, L. Fountain (Run); 2, P. Kenyon (S/G); 3, Mr. and Mrs. Baldwin. Large Barbs: 1, Mr. and Mrs. Baldwin; 2, P. Kenyon; 3, L. Bloom (Pomeries and Dist.). Small Characins: 1 and 3, Mr. and Mrs. Muckle (Run); 2, Mr. and Mrs. Mills (M/Side). Large Characins: 1, Mr. and Mrs. Underwood; 2, K. Buckley; 3, Mr. E. Calow (B). Toothcarps: 1, K. Buckley; 2 and 3, S. Ainsworth (B). Rabaras: 1, K. Holman (B); 2, T. Garney (B); 3, J. Corbett. Danios:

1 and 2, Mr. and Mrs. Baldwin; 3, I. Whittaker (S/G). Minnows: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin; 3, Mr. and Mrs. Goddard (Macc). Corydoras and Brochis: 1 and 3, Mr. and Mrs. Baldwin, Best in Show; 2, D. Parkinson (Strom). Loaches: 1 and 2, Mr. and Mrs. Underwood; 3, Mr. and Mrs. Hulse (Old). A.O.V. Catfish: 1, Mr. and Mrs. Baldwin; 2, B. Steadman (Run); 3, Mr. and Mrs. Tooth. Sharks: 1, B. Steadman (Run); 2, J. Corbett; 3, Mr. and Mrs. Stevenson (Old). Foxes: 1, M. Burgeyne; 2, Mr. and Mrs. Stevenson; 3, P. Kenyon. Breeders (Egglayers) (B): 1, Mr. and Mrs. Hulse; 2, H. Woods; 3, A. Chadwick (Old). Breeders (Egglayers) (Ind): 1, K. Buckley. Breeders (Livebearers): 1, J. Corbett; 2, Mr. and Mrs. Hulse; 3, K. Buckley. Pairs (Egg layers): 1, B. and B. Calow (B); 2, Mr. and Mrs. Underwood; 3, M. Burgeyne. Pairs (Livebearers): 1, K. Corbett; 2, J. Corbett; 3, M. Burgeyne. A.O.V. Tropical: 1 and 2, Mr. and Mrs. Baldwin; 3, L. Fountain (Run). Juniors (Livebearers): 1, K. Corbett; 2, S. O'Rourke (Old); 3, M. Rimmer (S/G). Junior (Egglayers): 1, Mrs. Baldwin (S/G); 2, Master P. Underwood (Ind); 3, D. Gostaine (Long). Common Goldfish: 1, S. Walsh (Acc); 2, Mr. and Mrs. Colley (Old); 3, Mr. and Mrs. Williamson (Leigh). Shobunkins: 1, Mrs. P. Garney (B); 2, A. Chadwick (Old). Fantasy: 1 and 2, C. Wainbank (Acc); 3, Mr. and Mrs. Colley (Old). Moors, Orandas and Lionheads: 1, S. Walsh (Acc); 2, Mr. and Mrs. Williamson (Leigh). A.O.V. Coldwater: 1, S. Walsh; 2, Mr. and Mrs. Underwood; 3, L. Fountain. Mollies: 1, A. S. Toombs (Wych); 2 and 3, S. Ainsworth. Minnows: 1 and 2, P. S. and A. Hopwood (Dar). Best in Show, Mr. and Mrs. Baldwin, of S/Grounders with a Corydoras Catfish.

Acc—Acrydion (34 points); B/Pool—Blackpool (2); B/S—Bridgewater (44); Dar—Darwin (6); Ind—Independent (31); Leigh—Leigh (3); L/Pool—Liverpool (2); Long—Longridge (3); Macc—Macclesfield (1); M/Side—Moseley (25); Old—Oldham (21); Poteries—Poteries and Dist (1); Ran—Runcorn (14); St. Hel—St. Helens (7); S/G—Sandgrounders (35); Strem—Strettonside (2); Wych—Wythenshawe (4).

ON 13th October, Port Talbot A.S. Members' Meet-Show was held at the British Steel Corporation Sports Club. Three judges: C. Harding, Cardiff; C. Turner, Cardiff and C. Davies, Aberdare, judged a total of 93 benchted exhibits. Members were limited to entering a maximum of two fish per class. While judging was in progress, Mr. H. Wing of Llanwr, Mair, gave an interesting talk on "Breeding and Raising Guppies".

Results: Class B: 1 and 2, T. Rees; 3 and 4, J. Egan. C: 1, E. Perkins; 2, M. Rees; 3, T. Rees; 4, B. Pousacre. D: 1, T. Rees; 2 and 3, J. Egan; 4, C. J. Davies. E: 1, J. Francis; 2, B. Pousacre; 3, T. Francis; 4, J. Francis. J: 1, J. Egan; 2, F. and G. Angle; 3, J. Egan. O: 1, J. Williams; 2 and 3, T. Williams. Q: 1 and 2, J. Egan; 3, M. Egan; 4, T. Williams. R: 1, E. Perkins; 2, M. Egan; 3 and 4, J. Egan. S: 1 and 2, E. Perkins; W: 1 and 2, E. Pousacre. A.O.V. Tropical: 1, B. Pousacre; 2, T. Rees; 3, J. Egan; 4, T. Rees.

New members welcome to meetings held fortnightly on Tuesday evenings at 7.30 p.m. at Great Talbot Youth Centre, Port Talbot. Secretary: D. Nicholls, 8 Dolphin Place, Sandfields, Port Talbot.

Cader A.S. on 5th October held their first table show and it was well supported. The guest speaker and judge was Mr. Cyril Pritchard, from Wrexham T.P.S. After judging the fish Mr. Pritchard gave a very interesting talk on various aspects of the hobby and this was illustrated with slides. He also answered many questions and to complete his very busy evening he donated a generous amount of aquarium plants. These were very much appreciated.

Coming events include a Western dress Cowboy dance at the Springfield Hotel, Fairbourne, a visit to Chester Zoo Aquarium, and an F.R.A.S. slide show "CICHLIDS".

Results of table show: Class A egglayers: 1, 2 and 3, Dave Garney. Livebearers: 1, Ray Stubbs; 2 and 3, Merian Rees. Catfish: 1 and 2, Dave Lacy; 3, Stephen Lacy. Coldwater: 1, Ray Stubbs.

The club venue is the Springfield Hotel Fairbourne and meetings are held every two weeks on Tuesdays. The next meetings are 4th November, 18th November, 2nd December, 16th December. New members and visitors welcome. Please phone Fairbourne 250774, 250857, 250253, or write to Secretary Mr. G. D. Lacy B.K.A. 644, 2 Godre's Gar, Llaypenwll Gwynedd LL37 2JZ.

THE first open show of Poteries and District A.S. was held on 14th September, at the Stoke-on-Trent Technical College, Moorland Road, Burnley, Stoke-on-Trent. The show attracted 720 entries from as far afield as South Wales, London, Northampton and Yorkshire. The total prize money being £547 cash, plus trophies, prizes

cards, etc. and the judging duties were carried out by M.A.A.S. officials. It is estimated that between 1,200 and 1,500 people passed through the Hall during the afternoon, showing just how popular the hobby is. Best fish in show award (Royal Doulton Rose Bowl) to Mr. and Mrs. Iddon (Sandgrounders) with an *Aequidens* species. Society gaining most points was Sandgrounders, who were presented with the P. Taylor shield.

Results: Guppies: 1, Mrs. E. Baldwin (Sandgrounders); 2, Mrs. B. May (Reading); 3, M. and N. Finner (Sandgrounders); 4, M. Kirkham (I.B.C.). Swordtails: 1, Sutton and Harris (Barnley); 2, P. A. Hughes (Loughborough); 3, Mr. and Mrs. A. Onslow (Loughborough); 4, C. Tonna (Reading). Mollies: 1, P. A. Hughes (Loughborough); 2 and 3, Mr. and Mrs. Iddon (Sandgrounders); 4, Sutton and Harris (Barnley). Platies: 1, S. Mansel (Selective); 2, P. Moya (Houghton Regis); 3, C. J. Nightingal (M.T.A.); 4, E. and N. Hallam (Loughborough). A.O.V. Livebearers: 1, K. Griffiths (Northampton); 2, Mr. and Mrs. M. Griffiths (Ind.); 3, Sutton and Harris; 4, A. and E. Berry (Bridgewater). Small Barbs: 1, Mr. and Mrs. M. Griffiths; 2, Sutton and Harris; 3, T. P. Jones (Wolverhampton); 4, K. Clifton (Torbay). A.O.V. Barbs: 1, Mr. and Mrs. Kemp (Sheaf Valley); 2 and 4, P. Moya; 3, Mr. and Mrs. Underwood (Sandgrounders). Small Characins: 1, A. Potts (Cannock); 2, A. Howard (Kiddersminster); 3 and 4, Mr. and Mrs. Underwood. A.O.V. Characins: 1, R. and A. Johnson (Peters); 2 and 3, Mr. and Mrs. Underwood; 4, P. A. Hughes. Anabantids: 1, Mr. and Mrs. Underwood Section winner; 2, P. May (Reading); 3, P. Moya; 4, G. Edwards (North Staffs). Fishers: 1, Derek Lovison (Potters and District); 2, M. Kirkham (I.B.C.); 3, Ian Davies (Poteries and District); 4, A. and E. Berry. Toothcarps: 1, Cliff Walker (Poteries and District) Section winner; 2, D. Wilson (Liverpool); 3, K. Buckley (Bridgewater); 4, Roy Chapman (B.K.A.). Dwarf Cichlids: 1, P. P. Jones (Wolverhampton) Section winner; 2, Mrs. B. May; 3, P. A. Hughes; 4, R. Blackburn (Liverpool). A.V. Rift Valley: 1, N. F. Campbell (Corby); 2, 3 and 4, Mr. and Mrs. Iddon (Sandgrounders). Anglis: 1, S. Hutchinson (Ind.); 2, 3, Hawkins (Cannock); 3, C. Tonna (Reading); 4, Mr. and Mrs. Weaver (Warrington). A.O.V. Cichlids: 1, Mr. and Mrs. Iddon; 2, Mr. and Mrs. Golland (Sheaf Valley); 3 and 4, P. May. Corydoras: 1, P. Moya, Section winner; 2, Mr. B. Baldwin; 3, E. and B. Calow (Bridgewater); 4, M. Kirkham (I.B.C.). A.O.V. Catfish: 1, Mr. and Mrs. Golland; 2, Section winner; 2, A. Rothwell (Five Towns); 3, Mrs. E. Baldwin; 4, K. Thompson (Liverpool B.S.). Lionfish: 1 and 3, Mr. and Mrs. Underwood; 2, E. and N. Hallam (Loughborough); 4, R. Houghton (Ind.). Rabaras: 1, Mr. and Mrs. Underwood; 2, D. Wilson; 3, G. Bould (Selective); 4, A. Evans (Cannock). Danios and Minnows: 1, Mrs. E. Baldwin; 2, Mr. and Mrs. B. Goddard (Macclesfield); 3 and 4, A. Evans. Sharks and Foxes: 1, L. Lainton (Stafford); 2, P. A. Hughes; 3, D. J. Kidd (Wolverhampton); 4, R. Underhill (Tamworth). A.O.V. Tropical: 1 and 3, Mr. E. Baldwin; 2, Mr. and Mrs. Underwood; 4, N. Williams. Poteries and District. Breeders (Livebearers): 1 and 2, M. Kirkham (I.B.C.); 3, K. Buckley (Bridgewater); 4, D. Wilson. Breeders (Egglayers): 1, A. P. Vassiere (Liverpool); 2, D. Hulse (Ind.); 3, P. Moya; 4, K. Buckley. Pairs (Egglayers): 1, Mrs. E. Baldwin; 2, Mr. and Mrs. Underwood; 3, Mr. and Mrs. Lake (Grimsby); 4, M. Davies (Selective). Pairs (Livebearers): 1, Mr. and Mrs. Iddon; 2, M. Kirkham; 3, Sutton and Harris; 4, R. and J. Jackson (Doncaster). Single Tail Goldfish: 1, Carol Payne (Sheaf Valley); 2, Sutton and Harris; 3, A. Evans (Cannock); 4, T. A. O'Brien (Hyde). Twin Tail Goldfish: 1 and 3, A. Evans; 2, S. Miers (Ind.). Food and River: 1 and 3, Sutton and Harris; 2, Mr. and Mrs. Underwood; 4, A. Potts (Cannock). Junior Livebearers: 1, M. and N. Rimmer (Sandgrounders); 2, Miss J. Baldwin (Sandgrounders); 3, J. Norton (Tamworth); 4, S. Tomlinson (Macclesfield). Juniors (Egglayers): 1, C. Javoroski (Poteries and District); 2, P. and I. Iddon (Sandgrounders); 3, Jane Pair (North Staffs.); 4, Miss J. Baldwin. A.V. Ladies: 1, M. Davies (Selective); 2, Carol Payne (Sheaf Valley); 3, Miss S. Underwood (Sandgrounders); 4, Mrs. E. Baldwin. Plants (Kotted): 1 and 3, K. Buckley; 2, Cliff Walker (Poteries and District); 4, Mr. and Mrs. Golland. Plants (Cuttings): 1 and 3, A. Wilson (Stafford); 2, Mrs. J. Tonna (Reading). Floating: 1, A. Wilson; 2 and 3, Robert Potts (Cannock); 4, M. Kirkham.

Evesham Fish Keepers' Society held their first open show in October, and the following officers were elected: Chairman, B. R. Gold; Vice-chairman and Secretary, Mrs. E. M. Thomson, 41 Crooks Lane, Studley, Warks. (Tel: Studley 7125); Show Secretary, Miss J. R. Baker; Asst. Show Secretary and P.R.O., K. R. Baker; Treasurer, Mrs. J. E. Hessel; Minutes Secretary, Mrs. E. M.

Thornon; Lay Member, F. G. Thornon.
 Quiz of the Year award winner: R. Jenkins;
 2. Mrs. J. Hesse; 3. P. G. Thornon; 4. Mrs. L. Wright. The Fish of the Year award: R. Jenkins;
 2. T. Rizzo; 3. B. R. Goll. The Aquarist of the
 Year award: 1. Mrs. J. Hesse; 2. Mrs. L. Wright;
 3. P. G. Thornon; 4. R. Jenkins.

Chesterfield and District A.S. held their
 Open Show in September, with 415 entries. The
 Best Fish in Show award was won by Mr. and
 Mrs. Kemp, of the Sheaf Valley Society with a
Barbus schwanefeldi (Tindoff Barb). The highest
 pointed Society was B.B.C., Thorne.

Results: Guppies: 1. Mrs. B. Edwards (North
 Staffs.); 2. M. Coon (Grimsby and Cleethorpe);
 3. Mr. and Mrs. Smith (B.B.C., Thorne). Plaques:
 1. D. Strub (Barnsley); 2. Mr. and Mrs. Sida
 (Barnsley); 3. Sutton and Harris (Barnsley).
 Swordtails: 1. G. Clark (B.B.C., Thorne); 2.
 D. Barrett (B.B.C., Thorne); 3. Mr. J. Churn
 (Chesterfield). Molies: 1. A. Marples (Ashfield);
 2. M. Coon (Grimsby and Cleethorpe); 3. A.
 Palmer (Hullford). A.O.V. Live: 1. R. Banks
 (B.B.C., Thorne); 2. D. Barrett; 3. Mr. and Mrs.
 Smith. Small Characins: 1. Mr. and Mrs. Holland
 (Redford); 2. E. Mottershead (Bosworth); 3. Mr.
 and Mrs. Davis (Grimsby and Cleethorpe).
 Large Characins: 1. Mr. and Mrs. Smith; 2.
 C. Quasock Wyke (Hull); 3. D. Moody (Grimsby
 and Cleethorpe). Large Barbs: 1. and 2. Mr.
 and Mrs. Kemp (Sheaf Valley) (Sheffield); 3.
 Mr. and Mrs. Smith. Small Barbs: 1. Mr. and
 Mrs. Kemp; 2. A. Marples (Ashfield); 3. D.
 Barrett. Rift Lake Cichlids: 1. and M. Price
 (Bosworth); 2. P. Gregory (Sherwood); 3. M. A.
 Hollingsworth (Sherwood). Angels: 1. G. N. Marples;
 2. B. Mottel (Independent); 3. G. Evans (Chester-
 field). Small Cichlids: 1. and 2. L. and M. Price;
 3. S. Hill (Alfreton). Large Cichlids: 1. B. Mottel;
 2. A. Bryan (Ashfield); 3. P. Gregory (Sherwood).
 Fishers: 1. and 2. Mr. and Mrs. Frithby Wyke
 (Hull); 3. Mr. and Mrs. Brown (Wyke). Small
 Anabantids: 1. Mr. and Mrs. P. Howell (Ashfield);
 2. Mr. and Mrs. Johnson (Sherwood); 3. T. Sands
 (Boston). Large Anabantids: 1. Mrs. E. Edwards
 (North Staffs.); 2. P. Gregory (Sherwood); 3.
 A. Palmer (Hullford). A.O.V. Killers: 1. and 2.
 Mr. and Mrs. Smith; 3. M. Shaw
 (Ind.). A. Marples (A.O.V. Care: 1. and 2.
 Mr. and Mrs. Gollard (Sheaf Valley); 3. Mr. and
 Mrs. P. Howell. Loaches and Botias: 1. S. Oxborrow
 (Grimsby and Cleethorpe); 2. B. Banks; 3. I.
 Prendergast (Boston). Sharks and Foams: 1. B.
 and I. Jackson (Doncaster); 2. Mr. and Mrs.
 Kemp; 3. M. Rice (Ind.). A.V. Antisepsion: 1.
 B. Banks; 2. Mr. and Mrs. M. Holland (Redford);
 3. A. Palmer (Hullford). A.O.V. Killers: 1. and 2.
 Mr. and Mrs. Johnson (I. and E.); 3. S. Oxborrow
 (Grimsby and Cleethorpe). Raboras: 1. Mr.
 and Mrs. Lake (Grimsby and Cleethorpe); 1. and 2.
 L. and M. Price (Bosworth); 3. R. Gee Wyke
 (Hull). Danios and Minnows: 1. Mr. and Mrs.
 Lake; 2. S. Hill (Alfreton); 3. Mr. and Mrs. Smith.
 Pairs (Livebearers): 1. D. Barrett; 2. B. Banks;
 3. B. and I. Jackson (Doncaster). Pairs (Egglayers):
 1. Mr. and Mrs. Waller (Chesterfield); 2. L. and
 M. Price; 3. E. Mottershead. Breeders (Egg
 A and B): 1. Mr. and Mrs. Pickford (Guisborough);
 2. Mrs. S. Dawn (Sherwood); 3. B. Banks. Breeders
 (Egg C and D): 1. Mr. and Mrs. D. Harrop
 (Huddersfield); 2. L. and M. Price; 3. B. Banks.
 Breeders (Live A and B): 1. B. Banks; 2. Mr. B.
 Shaw (Ind.); 3. B. and I. Jackson (Doncaster).
 Breeders (Live C and D): 1. D. Moody (Grimsby
 and Cleethorpe); 2. and 3. B. Banks. A.O.V.
 Tropical: 1. Mrs. D. Penny (Doncaster); 2.
 Mrs. Smith (B.B.C., Thorne); 3. D. Strub
 (Barnsley). Goldfish and Comets: 1. K. Chapman
 (Metheringham); 2. Mrs. C. Torpe (Sheaf Valley);
 3. A. Marples. Shubunkins and Fancy Goldfish:
 1. Mr. and Mrs. Waller; 2. M. Rice (Ind.). A.O.V.
 Goldwater Fish: 1. B. Banks; 2. Mrs. B. Ashon
 Wyke (Hull); 3. Mrs. G. Cook (Hullford). Juniors:
 1. Miss A. F. Hollingsworth (Sherwood); 2. Miss
 L. Wilson (Grimsby and Cleethorpe); 3. Miss
 S. Lambie (Louth). Grand Challenge Trophy:
 1. Miss J. E. Hollingsworth (Sherwood); 2. Mr.
 and Mrs. Waller; 3. K. Chapman (Metheringham).
 Selling Class: 1. Mr. M. A. Hollingsworth (Sher-
 wood); 2. Mr. and Mrs. P. Howell; 3. Miss A. L.
 Hollingsworth (Sherwood). The winner of the
 Selling Class was sold for £20.

THE Association of Midland Goldfish Keepers
 is an expanding group of enthusiasts whose membership
 spreads well beyond the Midlands to areas
 such as Leicestershire, Lincolnshire, Avon,
 Buckinghamshire, Northamptonshire and Wiltshire.
 It meets once every two months, during a Sunday
 afternoon, at the Foleshill Community Centre,
 Coventry—which is quite close to the M6 Motorway.

Committee for the next eleven months: President,
 Frank W. Oms; vice-president, Jim Amor;
 chairman, Ray Field; vice-chairman, John
 Capwell; treasurer, John Moore; show secretary,
 Ivie Parry; newsletter editor, Janette Amor;
 lay member, David Southwood. The Secretary,

Miss Gill Kedg, 8 Dean Gate Drive, Houghton-on-
 the-Hill, Leicestershire LE17 9HA. (Tel. 0533
 415861) will answer all enquiries relating to the
 A.M.G.K., if accompanied by a stamped, self-
 addressed envelope.

Subscriptions are very modest at £1-75 for
 single membership, £7-00 for a family, juniors
 under the age of sixteen years are admitted to the
 membership free at any subscription fee.

EAST



L & E A.S. held their first mini show at Cordoux
 High School. 178 fish were entered from as far
 as Otley, Airedale, Sherwood and B.B.C.
 Thorne, also members from around took part.

Judging was done by five members of the V.A.A.S.
 Section results: Guppies: 1. Mrs. Coon (Grimsby
 & Cleethorpe); 2. Mr. and Mrs. J. B. Haddock (Aire-
 borough); 3. Mr. and Mrs. Johnson (Sherwood).
 Plaques: 1. B. McCoskey (Grimsby and Cleethorpe);
 2. Mr. and Mrs. Pickford (Guisborough); 3. Mrs. Coon.
 Swordtails: 1. Mr. and Mrs. Hare (Grimsby & Cleethorpe);
 2. D. Barrett (B.B.C.) 3. K. Prendergast. (Boston).
 Molies: 1. D. Moody (Grimsby & Cleethorpe); 2. Mr. and
 Mrs. Kenworthy (Otley A.S.); 3. Mrs. Coon.
 Killers: 1. D. Moody (Grimsby & Cleethorpe); 2. Mr. and
 Mrs. Kenworthy (Otley A.S.); 3. Mrs. Coon.
 A.O.V. Livebearers: 1. Oxborrow (Grimsby & Cleethorpe);
 2. D. Moody; 3. G. Clark (B.B.C.). Small Barbs:
 1. D. Moody; 2. and 3. Mr. and Mrs. Lake (Grimsby
 & Cleethorpe). Large Barbs: 1. Mr. and Mrs. Pickford;
 2. and 3. Mr. and Mrs. Dawn (Sherwood). Sharks:
 R. Clayton (Independent); 2. T. Sands (Boston);
 3. D. Penny (Doncaster). Foams: 1. Mr. and Mrs.
 Kenworthy; 2. and 3. Mr. and Mrs. Pickford.
 Dwarf Cichlids: 1. Miss A. L. Hollingsworth
 (Sherwood); 2. M. A. Hollingsworth; 3. Mr. and
 Mrs. Lake. Large Cichlids: 1. Miss J. E. Hollingsworth
 (Sherwood); 2. Mrs. N. M. Hollingsworth
 (Sherwood); 3. M. A. Hollingsworth. Angels:
 1. Mr. and Mrs. Kenworthy; 2. Mr. and Mrs. Hare
 (Guisborough); 1. 2. and 3. Mr. and Mrs. Haddock.
 Small Anabantids: 1. Mr. and Mrs. Johnson
 (Sherwood); 2. B. Riley (Grimsby & Cleethorpe); 3. Mr.
 and Mrs. Haddock. A.O.V. Anabantids: 1. Mr.
 Shaw (Independent); 2. Mrs. B. Matthews (Grimsby
 & Cleethorpe); 3. B. Piley (Grimsby & Cleethorpe).
 Minnow and Danio: 1. Mr. and Mrs. Lake; 2. Mr. and Mrs.
 Clark (B.B.C.); 3. D. Moody. Raboras: 1. and 2.
 Mr. and Mrs. Hare; 3. Mr. and Mrs. Lake. Cor-
 dyfers: 1. M. Shaw; 2. Mr. and Mrs. Lake; 3. Miss
 Wilson (Grimsby & Cleethorpe). A.O.V. Catfish: 1. D.
 Penny; 2. R. A. Bloomfield (Louth & Don.);
 3. Mr. and Mrs. King (Independent). Botia and
 Loaches: 1. B. Banks (B.B.C.); 2. Mr. Oxborrow;
 3. Mr. K. Prendergast. A.O.V. Tropical: 1. D.
 Penny; 2. Mr. Oxborrow; 3. Mr. D. Moody.
 Breeders Egglayer A & B: 1. and 2. Master Dawn
 (Sherwood); 3. Mr. and Mrs. Pickford. Breeders
 Livebearers A & B: 1. B. Banks; 2. Mr. Shaw;
 3. Mr. and Mrs. Pickford. Breeder Livebearer
 C & D: 1. and 2. Mr. Barrett (B.B.C.); 3. B. Banks
 Characins: 1. Mr. and Mrs. Lake; 2. Mr. and Mrs.
 Pickford; 3. Mr. and Mrs. Hare. Characins (over
 9 cm): 1. D. Moody; 2. Mr. Lake (Grimsby & Cleethorpe).
 A.V. Killfish: 1. B. Banks; 2. Mr. Oxborrow;
 3. Mr. and Mrs. Johnson (L. & E. A.S.). A.V.
 Pairs: 1. Mr. Barrett; 2. Mr. and Mrs. Lake;
 3. Mr. Prendergast. Cold Water: 1. Miss Mathew
 (Grimsby & Cleethorpe); 2. Mr. Oxborrow; 3. Miss
 Wilson (Grimsby & Cleethorpe). The prize for the best
 fish in the show went to Miss J. E. Hollingsworth of
 Sherwood, with the highest points of 78.

They are a small society, looking for new members,
 young and old. Contact the Secretary Mr. I.
 Johnson, 17 Florence Wright Avenue, Louth, Lincs.,
 LN1 1BE.

THE latest East Anglian Federated Aquarists'
 show was held at the Community Centre, Diss, on
 28th September. This show was hosted by the
 Thetford society and the following member clubs
 took part: Bury (B), Diss (D), Great Yarmouth
 (GY), Ipswich (I), Kings Lynn (KL), Thetford
 (T) and Thorpe and District (TD). The Best
 Tropical Fish in Show award was presented to
 D. Beethoven, of Ipswich, for his Rabora ballena,

and the equivalent coldwater award was won by
 V. R. Good, of Thetford, for a Pinkstreak Sun
 Bass.

Awards for the classes were: Barbs: 1. T. J. Wil-
 liams (D); 2. M. Hodgson (TD); 3. D. Newman
 (D); 4. L. Bird (GY). Characins: 1. N. Cobb (D);
 2. T. J. Williams (B); 3. N. Cobb (B); 4. D. Beethoven
 (D). Cichlids: 1. D. Newman (D); 2. A.
 Beespe (T). Angles: 1. T. Cook (TD); 2. A.
 Wood (T); 3. A. Beespe (T); 4. A. Farrow (D).
 Dwarf Cichlids: 1. N. Cobb (D); 2. G. Drewry
 (GY); 3. N. Cobb (D); 4. T. Cook (TD). Rift
 Valley Cichlids: 1. S. Rix (KL). Labryonchs: 1.
 N. Cobb (D); 2. J. Good (T); 3. S. Rix (KL).
 Fishers: 1. K. Appleton (TD); 2. K. Appleton
 (TD); 3. T. Cook (TD); 4. D. Newman (D). Kill-
 ers: 1. G. A. Home (D); 2. D. Newman (D); 3. N.
 A. Home (D). Catfish: 1. N. A. Home (D); 2. D.
 Beethoven (D); 3. T. Cook (TD); 4. D. Beethoven
 (D). Cordyfers: 1. T. Cook (TD); 2. N. Cobb
 (D); 3. F. Auffer (D); 4. L. Bird (GY). Raboras:
 1. D. Beethoven (D); 2. D. Beethoven (D); 3. D.
 Beethoven (D); 4. M. Hodgson (TD). Danios:
 1. M. Hodgson (T); 2. D. Newman (D); 3. M.
 Hodgson (T); 4. L. Bird (GY). Loaches: 1. T.
 Cook (TD); 2. D. Newman (D). A.O.V. Egglayers:
 1. D. Newman (D); 2. K. Appleton (TD); 3. M.
 Hodgson (T); 4. T. Cook (TD). Sharks: 1. M.
 Hodgson (TD); 2. M. Hodgson (TD); 3. M.
 Hodgson (TD). Fairy Egglayers: 1. L. Bird (GY);
 2. F. Auffer (D); 3. N. Cobb (D); 4. L. Bird (GY).
 Fairy Livebearers: 1. T. Cook (TD); 2. N. A. Home
 (D); 3. A. Beespe (T); 4. K. Appleton (TD).
 Guppies: 1. K. Appleton (TD); 2. A. Beespe (T).
 Swordtails: 1. N. Cobb (D); 2. G. Drewry (GY);
 3. E. Knight (TD). Plaques: 1. T. Cook (TD); 2.
 M. Hodgson (TD); 3. & 4. K. Appleton (TD).
 Molies: 1. & 2. K. Appleton (TD). A.O.V. Live-
 bearers: 1. N. A. Home (D); 2. & 3. T. Cook (TD);
 4. F. Auffer (D). Goldwater Singletail: 1. 2. & 3.
 J. Good (T); 4. V. Wood (T). Coldwater Twin-
 tail: 1. V. R. Good (T); 2. J. Good (T); 3. and 4. A.
 Wood (T). A.O.V. Coldwater: 1. V. R. Good (T);
 2. G. A. Home (D); 3. K. Appleton (TD); 4. S.
 Rix (KL). Breeders Egglayers: 1. T. Cook (TD);
 2. F. Auffer (D); 3. and 4. T. Cook (TD). Junior
 Tropical: 1. T. Nash (D); 2. N. Home (D); 3. and
 4. J. Nash (D). Junior Coldwater: 1. and 2. V.
 Wood (T); 3. A. Cobb (D); 4. V. Wood (T).

NORTH



Otley A.S. open mini-show results: Highest
 pointed Society: 1. Barnsley (46 points); 2. Sutton
 (28); 3. Otley (25). Judge Mr. Bob Singleton.
 Key to Societies: B—Barnsley; S—Sutton;
 O—Otley; A—Ashby; H—Huddersfield; BR—
 Bradford; K—Keighley.

Guppy: 1. and 2. Mr. and Mrs. Haddock (S);
 3. Mr. and Mrs. Kenworthy (O). Fairy Sword,
 Molier: 1. D. Strub (B); 2. Mr. and Mrs. Haddock
 (S); 3. Mr. Lark (A). A.O.V. Livebearers:
 1. 2. and 3. Mr. and Mrs. Wood (D). Fishers:
 1. and 2. Mr. and Mrs. Haddock (S); 3. Mr. Horner
 (S). Small Anabantids: 1. Mr. and Mrs. Sida
 (B); 2. D. Forward (S); 3. Miss J. Lee (S). Large
 Anabantids: 1. R. J. Lark (A); 2. Mr. and Mrs.
 Shaw (O); 3. Miss M. Shaw (O). Angles: 1.
 Mr. and Mrs. Chadwick (O); 2. Mr. and Mrs.
 Kenworthy (O); 3. Mr. B. Brook (B). Small
 Cichlids: 1. B. Brook (B); 2. Mr. and Mrs. Sida
 (B); 3. Derek Sugden (BR). Large Cichlids:
 1. Miss J. Lee (S); 2. B. Brook (B); 3. Mr. and
 Mrs. Campbell (O). Small Barbs: 1. 2. and 3.
 D. Sugden (BR). Large Barbs: 1. Mr. and Mrs.
 Kenworthy (O); 2. and 3. Mr. and Mrs. Drury
 (O). Small Characins: 1. and 3. Mr. and Mrs.
 Brackenbury (A); 2. J. Duffett (B). Large
 Characins: 1. Mrs. Stanfield (BR); 2. R. Gately
 (BR); 3. S. Stevenson (K). A.V. Killers: 1. D.
 Gibson (B); 2. D. Sugden (BR); 3. Mr. Horner
 (S). Raboras, Danio, Minnows: 1. and 2. D.
 Sugden (BR); 3. Mr. and Mrs. Drury (O).
 Cordyfers, Brochis: 1. D. Stubbs (B); 2. Miss
 J. Lee (S); 3. Mr. and Mrs. Haddock (S). A.O.V.
 Catfish: 1. and 3. Mr. and Mrs. Sida (B); 2. Miss

J. Lee (S). Sharks, Fosses: 1, Mr. and Mrs. Kenworthy (O); 2, Mr. and Mrs. Shaw (O); 3, Derek Suggles (SR). Loaches, Bots: 1 and 3, T. Smith (BH); 2, D. Gibson (H). A.V. Egg-larver: 1, D. Stubbs (B); 2, Mr. and Mrs. Shaw (O); 3, Mr. and Mrs. Haddock (S). Breeder (Egg): 1, Mr. and Mrs. D. Harrop (H); 2, B. Brook (H); 3, Mr. and Mrs. Haddock (S). Breeders (Live-borers): 1, Mr. and Mrs. Wood (B); 2, S. Sutton and Harris (B); 3, D. Stubbs (B). A.V. Pairs: 1, S. Sutton and Harris (B); 2, Mr. and Mrs. Wood (B); 3, J. Ducken (O). A.V. Goldwater: 1, S. Sutton and Harris (B); 2, Mr. and Mrs. Chadwick (O); 3, Miss Judy Cook (O).
The society wishes to thank all who attended and helped to make the show the great success it was.

SCOTLAND



Dumfries and District A.S. have just elected a show secretary. Any correspondence to John

Carnochan, 11 Bakerland Avenue, Larchfield, Dumfries. Tel: Dumfries 2413.

Dumfries and District A.S. Show results:
Class G: 1, P. Morrison (Portar); 2, T. Crawford (Livingston); 3, J. Lees (Greenock). PL: 1, P. Henry (Dumfries); 2, B. Fleming (Livingston); 3, B. Milne (Forfar). MO: 1 and 2, P. Connor (Dumfries); 3, B. Milne (SW). 1 and 3, I. Henry; 2, J. Walker (New Battle). A.O.S. (Live): 1, G. Kane (Kirkcaldy); 2, B. Fleming; 3, D. Roberts (Livingston). C (A): 1, J. Makin (Glasgow); 2, D. Roberts; 3, A. Little (Kirkcaldy). C (B): 1, R. and S. McIntosh (Livingston); 2, B. Cunningham (Perth); 3, A. B. Scott (New Battle). C (C): 1, I. Henry; 2, H. Bowie (Edinburgh); 3, T. Smith (Dumfries). Tiger Barbs: 1, I. Henry; 2 and 3, E. Mann (Forfar). A.O.B.A.: 1, E. Mann; 2, J. Milligan (Edinburgh); 3, A. Rennie (Edinburgh). Barbs (B): 1, E. Mann; 2, R. Purdie (Greenock); 3, W. Brown (Dumfries). R.V.C.: 1, A. B. Scott (New Battle); 2, G. Talbot (Forfar); 3, A. Rennie (Dumfries). Dwarf Cichlids: 1, T. Ramsay (Livingston); 2, F. Paxton (New Battle); 3, G. Hepburn (Loch Gelly). Large Cichlids: 1, G. Marshall (Portar); 2, D. Marne (P.S.A.S.); 3, S. Madras (Forfar). Tropical Minnows: 1, B. Fleming (Livingston); 2, P. Henry (Dumfries); 3, M. Walker (Edinburgh). Danios: 1, E. Booth (Gorebridge); 2, P. Henry; 3, E. McLagan (Gorebridge). Guppies (A): 1 and 2, J. Makin; 3, A. B. Scott. Catfish (B): 1, T. Crawford (Livingston); 2, A. B. Scott; 3, D. Dobbie (Dumfries). Loaches: 1 and 3, A. B. Scott; 2, J. Walker. Toothcarps: 1, 2 and 3, T. Ramsay. Colias: 1, D. Dobbie; 2, J. Davidson (New Battle); 3, M. Gilchrist (Forfar). Trichogaster: 1, G. Marshall; 2, A. McCrobie (Stirling); 3, R. Bell (Muir House). S.F.: 1, W. Brown (Dumfries); 2, J. Davidson; 3, T. Ramsay. A.O.V. Anabantid: 1, R. Bell; 2 and 3, T. and J. Davidson (New Battle). Silverfish: 1, E. Mann; 2, C. Henry (Dum-

fries); 3, P. Henry. S.H.: 1, J. Walker; 2, E. Booth (Gorebridge); 3, M. Shields (Edinburgh). Ras: 1, W. McDowell (New Battle); 2, P. Fleming (Livingston); 3, P. Henry. A.O.S. (Egg): 1 and 2, D. Long (Dumfries); 3, J. Walker. Pairs (GU): 1, W. Kennedy (Dumfries); 2, J. Milligan (Edinburgh); 3, H. Hoey (Dumfries). Pairs (PL): 1, H. Bowie (Edinburgh); 2, P. Henry. Pairs (MO): 1, F. Connor (Dumfries); 2, C. Henry. Pairs (SW): 1, J. Lees (Greenock). Pairs (A.O.S. Live): 1, A. White (Kirkcaldy); 2 and 3, D. Roberts (Livingston). Pairs (Egg): 1, D. Dobbie; 2, S. and J. Walker (Independent); 3, P. West (Dumfries). Brds. (GU): 1, T. Crawford; 2, B. Fleming; 3, J. McKee (Inverness). Brds. (PL): 1 and 3, D. Bowie; 2, G. Hepburn (Loch Gelly). Brds. (SW): 1, G. Hepburn; 2, R. Bell (Muir House); 3, A. Outhrie (Kirkcaldy). Brds. (A.O.S. Live): 1, P. Fleming; 2 and 3, D. Roberts. Brds. (Egg D): 1, J. Phillips (Glasgow); 2, P. Henry; 3, J. Lees (Greenock). Brds. (Egg C): 1, R. Bell (Muir House); 2, A. B. Scott; 3, D. Long (Dumfries). Brds. (Egg B): 1, A. B. Scott; 2, J. Makin (Glasgow). Brds. (Egg A): 1, J. Makin; 2, Common Goldfish and Comet: 1 and 3, S. Wood (New Battle); 2, J. Yorkie (Dumfries). A.V. Double Tailed Goldfish: 1, A. P. Corwell (Gorebridge); 2, E. Davidson (Independent). A.O.V. (Goldwater): 1 and 3, H. Bowie; 2, D. French (Scottish A.S. Plants). 1, T. Ramsay (Livingston). Mini Tank: 1, H. Hoey (Dumfries); 2, T. Ramsay (Livingston). Dumfries Member with Highest points: P. Henry. Individual with Highest points: T. Ramsay. Aquaria Gold Pin for Best Fish in Show: J. Walker (Epilizaetochus kribiaensis) (SH). Liveborers: G. Kane. Characins: R. and S. McIntosh. Barbs: E. Mann. Goldfish: T. Ramsay. Tr. Min. and Danios: B. Fleming. Catfish: T. Crawford. Gourami: G. Marshall. Rasbora: W. McDowell. Pairs: D. Dobbie. Breeders (Live): B. Fleming. Breeders (Egg): R. Bell. Goldwater: H. Bowie.

1981

Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

DECEMBER

12th December: The U.K. Chapter of the Japanese Koi Society, Zen Nippon Aikins, Annual Christmas Dinner with supporting film shows and lectures at the "Bull Head," Gerrards Cross. For membership details write to: U.K. Chapter, P.O. Box 36, Windsor Street, Uxbridge, Middlesex.

13th December: Bedford and Beacontree Aquarists' Society annual Christmas Dance. For more information please telephone either: 01-595 1110 or Hornsburch 57589 (J. P. Risk, Secretary).

13th December: Chesterfield and District A.S. Buffet Dinner and Christmas Draw at Westfield School, Momborough. First Class Dance Band and Licensed Bar. Telephone: Eckington 432531 or Chesterfield 74967.

13th January: Port Talbot & District A.S. s.g.m. Meetings to be held fortnightly after that date.

1st March: Kighley A.S. open show at Victoria Hall, Kighley, Yorks.

12th April: Taunton & District A.S. open show at Corfield Hall, Taunton.

26th April: Yeovil & District A.S. open show at Parish Hall, Marwick. Details and show schedules (S.A.E. please) from: T. C. Perry, 316 St. Michael's Avenue, Yeovil, Somerset BA21 4NF.

31st May: North Avon A.S. open show.

31st May: Mid-Sussex A.S. First Open Show, at the Sidney West Sports Centre, Leylands Road, Burgess Hill, W. Sussex. Information from Mr. T. Tester, 19 Cyprus Road, Burgess Hill, W. Sussex RH15 6DX (phone: B. Hill 43262) or Mr. L. Pinney, 23 Burdocks Drive, Burgess Hill, W. Sussex (phone: B. Hill 47129).

18th July: Mid-Sussex A.S. exhibition, at the Sidney West Sports Centre, Leylands Road, Burgess Hill, W. Sussex.

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