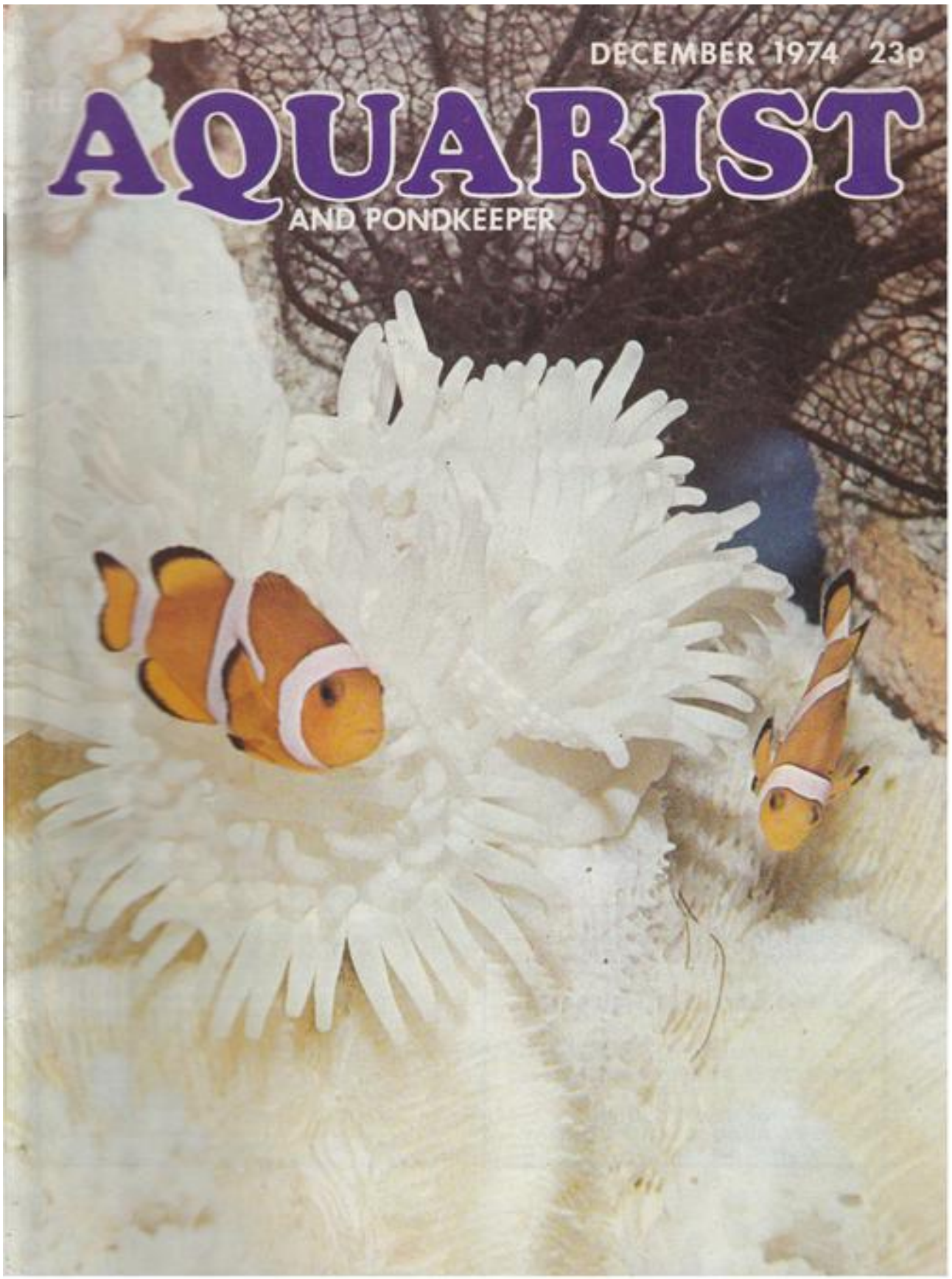
DECEMBER 1974 23p

AQUARIST

AND PONDKEEPER



THE AQUARIST AND PONDKEEPER

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Our Cover:
Clownfish (*Amphiprion percula*) among the anemone tentacles.

THE
BLUE-EYED CICHLID
(Cichlasoma spilurum)

SOME NOTES ON SPAWNING BEHAVIOUR

by Jorgen & Pamela Hansen

WE FIRST NOTICED *Cichlasoma spilurum* in our local aquarist shop, where a large pair had been placed in with a large flock of *T. mossambica* (which we had just sold him). As the female's ovipositor protruded, and the male had established himself in one corner of the tank and was busy digging a hole, we bought the pair.

We introduced them into our tank for American cichlids, which already contained *C. meeki* (firemouths) *C. nigrofasciatum* (convicts), and *Geophagus surinamensis*. But although the male fought now and then with the firemouths and convicts, and sometimes appeared to be trying to establish a territory beside a bit of slate, no spawning occurred. Most of the time the pair merely swam around and looked stately, their majestic movements reminding one a bit of discus.

The male was considerably larger than the female (14 cm and 9 cm respectively), and had a bulge on the head. The colour of both was greyish with a bluish tinge with, across the body, 7-9 transverse bands, and a large spot at the base of the tail.

The female had, in addition, an elongated spot on the dorsal fin. The eyes were bright blue in both male and female, which gives the fish the popular name "the blue-eyed cichlid."

According to the looseleaf system published by the Copenhagen magazine *Akvariebladet* in co-operation with *T.F.H.*, the fish has the following distinguishing characteristics:

(1) The part of the head that lies behind the eye is the same size or longer than the snout;
(2) The dorsal fin has 18-19 spiny rays and 8-10 soft rays;
(3) The anal fin has 8-10 spiny rays and 7-8 soft rays;
(4) The scales along the lateral line are of the same size as those under the lateral line;
(5) The bottom part of the dorsal fin is soft, with scales at the base;
(6) The pectoral fins reach to about the beginning of the anal fin or further.

The fish was classified as *C. spilurum* in 1862 by Günther; the type he collected measured up to 9·2 cm. (nearly 4 in.), while the tankbred fish available can reach a considerably larger length. Our male measures at the moment 15 cm. (6 in.) and the female 10 cm. (4 in.). The classified type came from Lake Yzabel and Rio Matagua in Guatemala, but the fish is also found in Costa Rica. These areas are actively volcanic, which factor contributes to making the local water alkaline and fairly hard. The fish resembles *C. nigrofasciatum*, *C. Cutteri*, *C. facetum*, *C. spinosissimum*, and *C. immaculatum* which, together with *C. spilurum*, belong

to a group of closely related striped species. Regan (1905) regards *C. nigrofasciatum* as the most closely related to *spilurum*.

When we had waited for a couple of months without anything happening, we decided to move the *spilurum* to a special breeding-tank of 100 litres (25 gallons). The water was fresh from the tap and of a pH 7 and DH 14, and with a temperature of 26°C (79°F). A large piece of coal, two stones and a sheet of slate was placed in the tank, the latter being placed in such a way that a cave was formed between the slate and the side glass. In this way we tried to give the fish several possible spawning sites, as well as a place to hide. There was then nothing to do but feed them well with *Daphnia*, *Cyclops*, and mosquito *larvae*, and wait patiently.

We didn't have to wait long. Two days later both male and female displayed breeding-tubes. The female's breeding-tube measured 3 mm. in length, was

cone-formed and dark grey in colour. The male's breeding-tube measured 1 mm. in length and 1 mm. in breadth, and was white.

On the following morning (6-6-73), at 7.30 a.m., spawning was well under way in the most concealed spot in the tank, that is, on the inside of the piece of slate. The female swam with head downwards, and with ovipositor very close to the slate while she spawned. The eggs, which were yellow and about 2 mm. in diameter, stuck to the slate.

Sometimes, but not always, immediately after the female had laid a new row, the male swam closely over the eggs and fertilised them. Roughly 100 eggs were laid.

Later in the day the male dug a hollow immediately below the slate with the eggs. He didn't help take care of the eggs. The female, however, continually fanned water over them with her pectoral fins, and ate those which fungussed.

On 9-6-73, at 2.30 p.m. (78 hours after the spawning) the first small tails burst out from the eggs. As this occurred, the female took the fry one by one and spat them down into the hollow. The male again declined to help with this, but instead dug a new hollow beneath a stone on another area of the tank.

On 10-6-73 the eggs were moved by the female to another hollow dug by the male, who had by this time dug so many holes than the tank resembled a miniature mountain landscape; he had never dug holes in the previous tank.

On the following day, 11-6-73, the fry were no longer to be seen. They had apparently been hidden in the farthest corner of the tank under a large piece of coal; here they stayed for, we thought, an uncomfortably long time.

By 16-6-73 our patience was almost exhausted. We decided to drop a few freshly hatched brine shrimp (*Artemia*) into the tank at the spot where the female stood on guard and where we therefore assumed the fry were hidden. Nothing happened other than that the parents seemed satisfied at being fed.

On 17-6-73, however, a large swarm of young could be seen swimming immediately under the female; when we approached the tank in order to see better, the male sprang forward and placed himself threateningly in front to screen the fry from our view.

We fed again with brine shrimp; if they didn't fall at the exact spot where the fry were, the mother fetched a mouthful and spat it out in the midst of the fry. The male didn't show much interest any more, but neither did he do them any harm. The fry followed the parents around the tank, generally keeping immediately below the female. If she wanted to eat something at the other end of the tank, she swam so quickly away that the fry could not follow, but instead waited for her return. If any of the fry showed too much interest in its surroundings and set off on a voyage of discovery the mother immediately grabbed it and seemed to chew it once or twice before spitting it out in the midst of the flock. Only once did we notice the male bother to fetch a strayed fish, and then he apparently forgot to spit it out.

We allowed the parents to remain with their young for a week more, and fed the adults occasionally with mosquito *larvae*, while the fry were fed twice daily with either brine shrimp or micro-worms.

The young grew quickly: at three weeks of age they measured 1 cm., and had a very spotted appearance; now at two months of age they have the same colouring as their parents.

WHAT IS YOUR OPINION?

by B. Whiteside, B.A.

Photographs by the Author

MY BEST wishes to all readers for a happy Christmas and a peaceful and prosperous New Year. I hope your fishes and plants thrive and that you continue to send me details of your experiences for this feature.

My recent request for more letters from lady readers has resulted in some interesting replies. Mrs. Barbara Creed lives at 41 Eaton Road, Margate, Kent, and she has eight tanks housed in her 33 ft. lounge. She keeps a variety of fishes. Mrs. Creed writes: " . . . (One of my tanks) contains 5 large festivum cichlids, and an excellent pair of blue acaras from which I have raised approximately 500 young in six months; with another 24 in. tank housing approximately 250 fry. By the way, don't let anyone tell me that festivum cichlids do not eat plants. Mine have stripped 3 well-planted tanks in as many days, and although I hate artificial plants I have now little choice. I provide the fish with a little *Riccia* each day to eat. I prefer the use of Gro-lux and tungsten lighting mixed for plant growing, but Gro-lux alone is used in one tank. *Algae* is a problem with discus in the tanks—I have just acquired 4 young ones—but have not found anything to get rid of it. I prefer not to use chemicals. Perhaps I have been lucky because apart from the odd outbreak of white spot, cured purely by raising the temperature, I have yet to have my fishes suffer from anything else—despite the fact that they all consume vast quantities of the dreaded tubifex, along with daphnia, assorted flakes and the odd feeding of washed, tinned cat food. I have also kept marines with a large degree of success; but that's another story. Now the question is: "Who moves out? Us or the fishes? By the way, can anyone recommend a fish that will eat *algae* but be safe with discus?" (I have also found *Cichlasoma festivum* (photograph 1) to be very rough on plants. I recently bought several rather expensive spatterdocks and these fishes have consumed one and are in the process of finishing off a second. *Gyrinocheilus aymonieri* are useful *algae* eaters and would probably be safe for your discus tank).

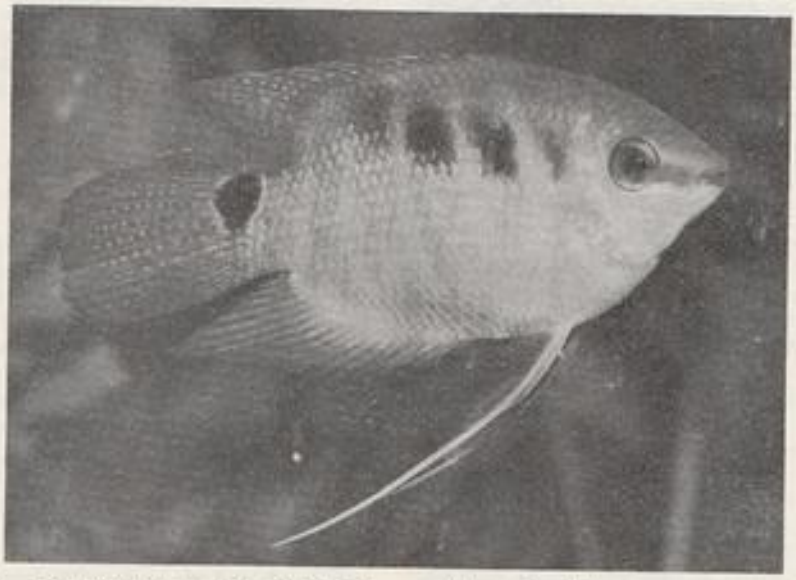
No. 33 Pound Lane, Marlow, Bucks., is the address from which Mrs. B. Harris writes. "Perhaps, like me, a lot of ladies find that voicing an opinion to men is a waste of time as the assumption is that we don't know! Have you found any connection, from your readers' letters, between conditioning feeding of cichlids and their failure to rear their young? Six types of cichlids have bred and reared their young in my tanks over the last four years. The only part I played was to provide the occasional feeding—mostly Pond Pride and Phillips Flakes, with Biol for the fry. I love watching fish and find them much more fun when a bit hungry. Please tell Mr. Hems that Lake Tanganyika can get fairly cool because of mountain ice and its high elevation. My *Lamprologus savoryi elongatus* are happier at 70°F, the temperature they live and breed at. 74°F kills the young and the parents breathe heavily. I have one tank where parents and fry are living happily at room temperature —62°F at the moment (September). The sexes are both alike until about 1 year old; then the male's fins are longer and the trailing edges whiter. He is also longer and slimmer. I do not find them suitable as community fish as they seem to enjoy chasing other fish, and when mating and breeding are vicious."

Mrs. J. Good resides at 'Bell Green,' 13 Heather Way, Brunden, Suffolk. She states: "I have been keeping coldwater fish for 25 years. I bought a 36 in. plastic bow-fronted aquarium about 3 months ago thinking it was a good idea. I sold my other two 30 in. angle iron tanks, because of the rust which appears after a few years, but to my dismay I have lost several of my fancy goldfish which developed split fins and dropsy. I never had this trouble before so I can only assume that it must be the plastic tank. I have now removed the lid so that the fish can get more air and they seem to be a lot better for it. I think these plastic tanks are not really suitable for coldwater fish as there is not enough air getting into the tank, so causing the fish to get ill and die off. I would like to know of anybody else having had this trouble and would be pleased to hear from them through your feature." (It's certainly important to ensure that the water surface of a tank has some direct contact with the outside air. Any tank, whether glass or plastic, which does not have an adequate air supply, can cause death or disease in fishes; hence I don't think plastic tanks alone can be blamed. What is your opinion?).

"After reading the letter of Mr. H. Moran, of New Zealand, about his problem with foam filter pads, I

would like to state that I have used such a foam pad filter system in one of my 24 in. tanks for over a year now and have had no problems at all. The water is clear with no odours. I change a third of the water every three weeks and at the same time I clean the filter foam pads by soaking in luke-warm water for about an hour; they are then replaced. In my opinion there's something wrong with Mr. Moran's washing method; perhaps he adds some kind of soap to the washing water. Also, the number of fish in his tank is rather high." This letter reached me from Mr. B. Ward, of 30 Havre Towers, Weston Estate, Southampton, Hants.

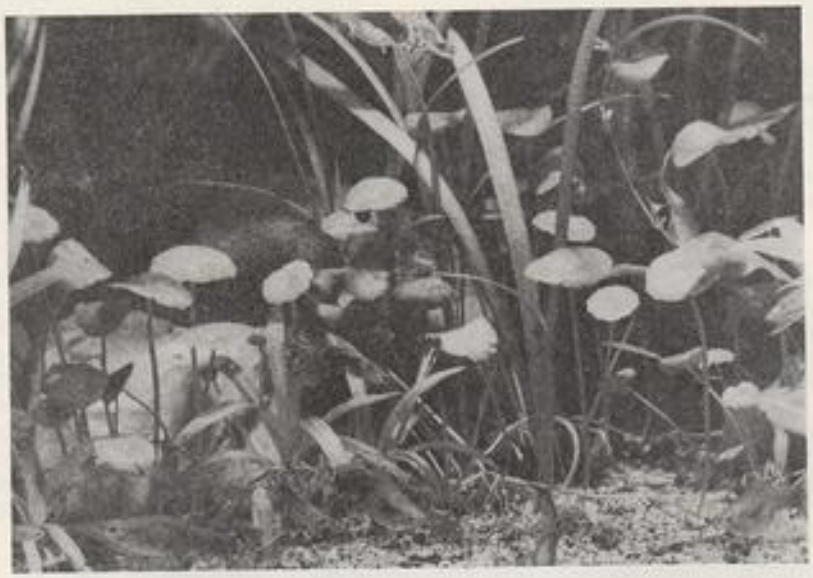
From 48 Tatton Road, Liverpool, comes a letter written by Mr. L. Jones. He writes: "I am writing about one species in particular that performs an unusual trick, in my opinion. The fish was sold to me as a flying fox. It is silver underneath, with black sides and a yellow stripe down each side. Its fins are white and black with yellow tips. It is an *algae* eater. I have this fish in a 3 ft. tank along with a mixture of other fishes. Because of lack of space I have an outside filter inside at one end of the tank. Every now and again a too inquisitive fish gets sucked up the inlet tube and ends up in the filter; and I have to get it out and return it to the tank. A few weeks ago I came in from work and, as is my practice, had a look at my tanks. I spotted the flying fox in the filter. I was just about to get it out when the phone rang and I had to go out. When I returned I went again to the tank to get the fish out—and there it was gaily swimming around the tank. At first I thought it had jumped back into the tank, but I decided to keep an eye on it. Two hours later I noticed again the fish in the filter, so I waited to see what would happen. After about 10 minutes browsing around the filter it made its way back into the tank by swimming back along the inlet pipe. I noticed that it now does this about three or four times each evening. The fish is obviously using its intelligence and I would be interested to know if this is as unusual as I think it is. One more point before I close: I have had a pair of bumble bee fish now for two years, and apart from a weekly feed of *daphnia* they have not received any special attention and they are fit and healthy. According to most of the books I have read these fish are listed as being difficult to keep; but I have not found this to be so." (Please let me know if you have had any experiences of particular fishes showing unusual 'intelligence' of behaviour.)



"You asked for designs for planting sticks which really work. What I use is an artist's oil painting sable, round and rather well worn, but clean and resilient. I usually fasten a narrow strip of lead to each plant so that it will lie at an intersection where two leaves have been stripped off. Now the plant will naturally assume a planting position when introduced into the tank. One need only guide the plant to a pleasing and suitably lighted position, where one can press the roots or stem terminal into the sand or gravel with a coaxing, or perhaps oscillating, motion. One may use a second brush to cover large roots. After this one may remove the planting brush and make the final touches to the planting medium before removing the brush. The brush I use is almost 12 in. long; the hairs are just over ½ in. long; and the ferrule narrows down to 5/32 in. I have tried other 'planting sticks' but I would recommend only a brush. They

are rather expensive and only a proper artist's colourman will stock them. The cost may be 75p to £1·00, but the brush should last for many years with a little care and make to job much easier. Water colour brushes have shorter handles, and bigger, softer bellies to act as reservoirs. They are not so good for pressing plants into the planting medium." This letter reached me from Mr. R. Turnbull, of 20 South George Street, Dundee.

The following is part of a letter received from Mr. W. Clark, whose home is at 56 Braeside Road, Greenock, Renfrewshire. " . . . While visiting our local pet shop, P.T.A. member, etc., a few weeks ago, I mentioned that I preferred ordinary angels to marbled angels. At that time the price for all sizes was 25p each. This week ordinary angels are named zebra



angels and cost 64p each. Blushing angels are 33p and marbled angels a little cheaper. Using an overdose of Wardley's Algicide 'Allclear', which cost me 35p for 0·07 oz., I found that *Ceratopteris thalictroides* (Indian Fern) quickly rotted; after a few months thread *algae* rotted; *Vallisneria* were not affected." (I must admit that I find the ordinary angel more attractive than its many varieties and sports. Most algicides will kill off higher forms of plant life if manufacturers' instructions are not followed carefully.)

I would like to take this opportunity to remind readers that they should PRINT their name and address on letters to this feature. I would also like to point out that I do not necessarily agree with the views expressed by contributors and that I accept no responsibility for the views expressed by them.

Mr. S. Fox has been a regular contributor to this feature over the years. The following is taken from his latest letter sent to me from 126 West Farm Avenue, Longbenton, Newcastle upon Tyne. "Recent opinions, concerning vitamin preparations to feed to fishes, I have found most interesting. Perhaps readers would care to consider the following. Many years ago I used this method of supplementary feeding when I was breeding budgerigars; I later used the method with tropical fishes. Obtain a small glass jar with a wide neck and a screw lid. Place some of the fishes' favourite dried food in the jar. Make a small depression with a fingertip; add a few drops of halibut oil to fill the slight depression. *Do not use excessive amounts of oil.* When this is done replace the lid and place the jar in a warm location for a few days. When the oil is seen to be completely diffused throughout the food, the food can be fed to the fishes: twice per month and no more. The small amount of oil that is released into the aquarium will do no harm provided that excessive feeding is avoided. Any oil film on the water surface after feeding can be removed by placing an absorbent paper on to the water. When the paper is damp, skim the paper from one side of the tank to the other; this will remove the oil. Some practice, plus observation, will enable the aquarist to properly calculate the quantity of oil to add to the food so that it floats for a longer period than untreated dried food, or to allow it to sink at a slow rate thus allowing fishes more time to consume it. This will cut down the amount of food that would normally settle on the gravel to decompose. Cod liver oil can be used as an alternative . . ."

Mr. T. Rainey, of 29 Lyppincourt Road, Henbury, Bristol, sends his suggestions for fishes and plants with which to stock a 24 in. community aquarium. He

writes: "For the front of the tank I would suggest *Cryptocoryne beckettii* or *C. petchii*. If one has stone or bark decor in the tank, why not try a little Java moss draped over it. For the back I suggest a small variety of Amazon sword; or if one likes to see a lot of foliage at the back, *Cabomba* does a good job. There are of course many more species, but these few, with the possible exception of Java Moss, are easily obtainable and are not too fussy over water conditions for different parts of the country. For fishes I suggest the smaller species for the 24 in. community aquarium. Avoid fin nippers, bullies and plant nibblers, if possible. Any *Danio* species would do, with the exception of the giant danio; also rosy barbs, harlequins, white cloud mountain minnows, smaller tetras, guppies, scissors tails and, perhaps, one of the *Corydoras* species for the bottom."

Photograph 2 shows some plants of *Hydrocotyle verticillata* (pennywort). I find this a very attractive plant for the front or middle of the community aquarium. Under which conditions do you find it grows best?

Mr. G. Hann, of Corner Bungalow, Havelock Road, Southampton, SO3 6FS, has the following to say: " . . . I was interested in your question about the 'sievelike things,' provided with filter siphons, that get clogged up with debris, etc. It seems to me that one has to understand the basic principles of filtration. If you have big holes you only stop the bigger bits, and if you have small holes you have to have more small holes to stop the big and small bits. So you have got to have a larger area of small holes or else the small area gets choked up and needs cleaning. The underwater 'Otter' pump is supplied with something like a watering can 'rose', inside which is packed an ordinary nylon pot scourer; this is fitted to the inlet of the pump—which can be readily dismantled and cleaned. Some such gadget might suit your purpose as it would take some time to clog up. The large filtration area is, after all, the secret of much of the success of the U/G filters which can remain in use for months without cleaning.

"In fact I use a U/G filter in my little, indoor pond, instead of the rose, by connecting a hose from the air lift of the Algarde to the inlet of the 'Otter' underwater pump. The outlet can then serve as a fountain or it can be fed over charcoal or other filter bed material and back to the pond. Pond maintenance then consists of scraping *algae* off the walls and allowing the normal water flow to clear the pond. I have clear water, healthy fish, frequent spawnings and above average population. A clean, sweet pond is, as you will realise, a requirement in one's living quarters. I enclose a snapshot of my indoor pond which, whilst lacking in detail, gives an idea of what my little indoor water garden is like." (Mr. Hann's photograph shows a delightful little pond. It would grace the inside of any home large enough to accommodate it.)

The next letter is headed 79 Hampden Close, R.A.F. Hemswell, Gainsborough, Lincs. It comes from Mr. A. Mitchell and he writes: "I am sending you this letter in reply to your question about cleaning aquarium glass. In the past I have used a car windscreen scraper—supplied free with a tin of de-icer. It looks cheap and nasty but does a very effective job—if you don't mind getting your hands wet. Perhaps you could answer a few questions for me. After having scraped my glass what will happen to all the *algae* after they fall to the bottom? I have a 24 in. × 10 in. × 10 in. tank and use an Algarde U/G filter most of the time. I also employ the services of a peppered *Corydoras*. Will it eat the *algae*? Can you provide me with a bit of information about Gro-Lux lighting? I recently bought a new unit but was given no technical or other information." (I would like to remind readers that if they want a personal reply from any of the regular contributors to the magazine they must enclose a s.a.e. with their queries. This request seems very reasonable when one considers that certain specialist magazines request a s.a.e. *plus a fee of* £2·00 before they will provide a personal answer to a reader's query. On two occasions I tried such services and, after long waits, received brief replies. Neither reply properly answered my query—and neither could have taken more than a couple of minutes to answer. So, please don't forget the s.a.e. if you require a personal reply from contributors to this magazine. I should point out that these remarks are not directed at Mr. Mitchell as he did not request a personal reply.) The *algae* scraped from the glass of the aquarium will probably fall to the gravel where they may decay. Some of it might be eaten by *Corydoras* species; some may be broken down by bacteria in the gravel. Some might continue to grow on the base of the tank, or land on plant leaves and thrive there. I shouldn't worry about such *algae* unless they start to thrive somewhere else. If they should do so then on future occasions it might be useful to run a siphon over the base of the tank an hour or so after the glass has been scraped clean. This should remove most of the filaments. However, all healthy aquaria contain a variety of algae. Such *algae* should not present any problems unless one species of algae starts to proliferate to such an extent that it becomes unsightly or smothers the higher plant life. If the latter happens steps can be taken to control the problem—e.g., cut down on light; keep the base of the tank free from waste materials by using a siphon; add more higher plant forms to the tank, etc. For more information about Gro-Lux you might care to read the article "Gro-Lux Fluorescent Lighting," by B. Whiteside, *The Aquarist*, page 229, October, 1970 issue. This should contain most of the answers to your probable questions.

"I have been receiving *The Aquarist* for nearly a year and have been keeping fish for six months. I enjoy reading the magazine but I would like to see a couple of pages each month devoted to information for inexperienced aquarists like myself as I have neither the money nor the knowledge to keep many of the fish discussed between the covers of your magazine; and I suspect that many budding aquarists would agree with me; but I hasten to add that I consider *The Aquarist* an excellent magazine and, as I am still at school, I would not spend some of my scarce money on it if I didn't. My favourite features are W.Y.O.?, the queries section, and the product reviews." This is the opening of a letter from 15-year-old Chris Owen, of 12 The Crescent, Walton-on-the-Hill, Stafford, ST17 0JZ. Chris continues: "Another reason why I think it would be a good idea is because when I bought my first issue I had not set up either of my tanks, and also I knew precious little about them—which is why I bought the magazine in the first place. Looking through it I was a little overpowered, and came to the conclusion that keeping fish was beyond me. Fortunately I was set to rights by a friend who has been keeping fish for some time. Now many of the things I thought were almost impossible for me seem very ordinary, straightforward and common sense. I might not have been so lucky! I was thinking along the lines of an article each month for people who have just set up their first tank with fish like guppies and *Corydoras*, telling them what fish not to start with, etc. None of the books that I have read give any guide lines or suggestions to people who want to go on to something more advanced; they seem to leave it to the aquarist to struggle on as best he can. This is certainly true of the cheaper books; and the more expensive and glossy books, which probably contain this information, are beyond the means of many aquarists; or they are reluctant to 'lash out' on a book that might turn out to be useless anyway. This is where a magazine like yours has the advantage: it can offer such information cheaply, and this is one of the reasons why I am in favour of its being published fortnightly. It would also help solve your problem of the many letters that you cannot print for lack of space, and it would also enable many new features to be published, thus broadening the scope and interest of the magazine . . ." (I think Chris has made a valid point in that we sometimes ignore the beginner and cater more regularly for the somewhat more experienced or advanced aquarist. However, if a large proportion of the magazine were devoted to the beginner I'm sure we would have complaints from older readers who know all about the basics of fish keeping. What is your opinion? An excellent and inexpensive book for beginners such as Chris, and indeed for more experienced aquarists as well, is *Indoor Aquaria*, written and illustrated by Derrick Latimer-Sayer, and revised last year by Mr. Jack Hems. This book, in the series 'Teach Yourself Books', is published by the English Universities Press Ltd., price 50p. Its 215 pages are packed with useful information, advice and illustrations.)

Having recently taken up a new teaching post, as head of the department of English in a large school, I find that I have now much less time to devote to my fishes. Thus you can imagine my disappointment when, on returning home rather late from school last week, I found that the thermostat in my largest aquarium had stuck in the 'on' position and that the water temperature was well above 105°F. Although I use Dumpy thermometers in all my tanks, I have developed the habit of very briefly running my hand across the front glass of each aquarium when I am feeding the fishes. This is a useful habit to develop as it is much quicker than checking the temperature visually. If the aquarium glass feels too hot or too cold one can quickly check the temperature on the thermometer for confirmation. On the occasion mentioned I quickly removed the cover glass from the tank and was greeted by clouds of water vapour rising from the water surface. Two of my *Corydoras* were already dead, and all the other fishes were gasping at the water surface. I immediately switched off the combined heating unit and lights, left the motor filter running, and replaced a couple of gallons of the very warm water with cold water straight from the tap. This lowered the temperature in the 20-gallon tank by about 9°F, and I decided to then let the tank cool down to its normal temperature at its own rate. The defective heating unit was then removed, and the filter ensured that the drop in temperature was not too sudden. I'm pleased to report that none of the various other fishes in the tank seemed to have suffered any permanent damage, and they have all survived the ordeal. Hence, my tip for the month would be to develop the habit of doing a quick touch test on each tank whenever feeding the fishes. It could save a lot of money, a lot of lives, and a lot of heartbreak.

Those are all the opinions for which I have space this month. For a future issue please send me your opinions on the questions and problems posed above, and on the following: (1) If you are a member of a club or a specialist association what is your opinion of the manner in which it is run and the way in which controlling members are elected? (This question was sent by a reader.) (2) What have been your experiences with the keeping of oscars? (3) What was your opinion of the Jubilee Issue? (4) Please send me details of your breeding experiences with various species of gouramies. (5) In a recent radio news programme it was announced that tropical fishes are now the most popular pets in the U.K.

Although most aquarists already knew this fact, I would like to receive your opinions on why you find tropicals so attractive and popular. Have any of your friends taken up the hobby after having seen your tanks? (The hobby is spreading like wildfire in my own home town—and I suppose I'm partly to blame!). I look forward to hearing from all my old friends, and to making many new ones through this feature, in 1975. Go easy on the turkey!

Corydoras punctatus

by Jack Hems

THE SCORES OF CATFISHES of the genus *Corydoras* belong to the family *Callichthyidae*. I say scores without any exaggeration because there are, at the time of writing, some 80 different species and sub-species known to science and, according to all reports, there are many more to come. All of them are found in the New World, from Argentina in the south to Venezuela in the north and thence eastwards to the island of Trinidad and, I strongly suspect, a few other islands thereabouts.

Externally, the most characteristic feature of members of this family of catfishes are the horny shields or thin plates that cover the sides in place of scales. These shields are arranged in two horizontal rows. Each shield slightly overlaps the next in line like a series of plates on a kitchen shelf. More shields cover most, or all, of the head and dorsal ridge. There was no lack of imagination on the part of the person who bestowed upon these fishes the popular name of mailed or armoured catfishes.

Again, there is their habit of making hurried visits to the surface for a mouthful of air. That they should do this in well-aerated water is not possible to explain. In overcrowded conditions, however, or in waters depleted in oxygen, the explanation is simple. For the *Callichthyidae* have a hindgut that can absorb atmospheric air taken in at the surface and then extract the oxygen dissolved in it and pass it into the respiratory system. Therefore, in water that is not all that it should be in the matter of purity or oxygen content (which amounts to the same thing), visits to the surface are frequent.

In the main species of *Corydoras* do not attain much size. The smallest species average about 1½ in. in length, the largest, *C. barbatus*, reaches more than three times this size. The rest keep within the 3 in. mark. Among the pygmies is the well-known *C. hastatus* which, exceptionally, spends more time hovering or darting to and fro in the middle of the water than grubbing about on the floor.

Even so, the bottom frequenters make excursions into the middle and upper levels of the water when the mood moves them. They are more likely to do this in a community tank every time the increased rocketing and downward swooping of the other fishes indicates a sudden rain of food.

Although dried food is taken greedily, species of *Corydoras* keep better nourished and therefore live longer when they can stuff themselves with small worms, red or white, tiny pieces of raw red meat, or floor-hopping *Daphnia*. Hence, it is all-important to see that the bottom-livers get their full share of food. For clearly, if most of the introduced food is snapped up by other fishes before it reaches the depths, then it stands to reason that the bottom-livers will have a lean time and will not enjoy a long life-span.

The species of *Corydoras* with the widest temperature tolerance appears to be *C. paleatus*, the first member of the genus to be introduced to aquarists. This as long ago as 1893. As a rule, this fish will flourish well at comfortable (warmish) living-room temperature. Still another point in its favour is its longevity: upwards of ten years. It is interesting to note, too, that there is an albino form of *C. paleatus* which is easier to find illustrated in books than to come across in dealers' tanks. The albino *Corydoras* that is seldom absent from aquarium shops today is the albino form of *C. aeneus*.

Among the species of *Corydoras* adorned with spots rather than irregular blotches or splashes of colour on a plain green, bronze or creamy ground is *C. punctatus*. It is said on good authority that this fish is probably a sub-species or geographical race of *C. melanistius*. Be this as it may, the spots which adorn the sides of *C. melanistius* are spattered all over the body and are smaller than those which are arranged in neat rows on *C. punctatus*.

C. punctatus was first made available to tropical aquarists in Europe (Germany) in 1935, and is native to north-eastern South America southwards to Brazil. It reaches a length of about 2¼ in. and, like so many of its congeners, it will live for several years in captivity if the water is not too soft or acid and it is not placed in the company of fishes which, though not overtly worrying or aggressive, will not permit it to live in peace. In short, *C. punctatus* will not last long if it is pushed around.

The ground colour of *C. punctatus* is a variable pale to bluey grey shading to a sort of dirty white on the underparts. The gill-cover may or may not have a faint bronzy sheen. A band of closely clustered black spots extends from the gill-plates to the tail. Above and below this dark horizontal band there are two or three rows of black spots or perhaps more truthfully miniscule smudges set rather widely apart. These dark markings are less numerous and less well-defined in the upper and lower parts of the body in some specimens than in others. This in itself seems to indicate that the fish vary slightly in pattern markings in the different places where they are collected in the wild. The anteriorly spined dorsal fin has a blotch which masks most of the front portion of this fin and spreads onto the back and down the forward slope of the head. A few black streaks or irregular black markings are present on the snout and sides of the head but peter out around the gold-rimmed black eye. All the fins, including the frontal-spined adipose, are streaked or minutely blotched with black on a semi-translucent grey ground. There are no metallic reflections from the sides, as in the better-known *C. aeneus* or *C. paleatus*.

In general, *C. punctatus* or the Spotted Corydoras is an active fish and, apart from some quiescent periods in corners or among thickets of plants, it spends most of its time thrusting its snout into the compost and nosing about in risen roots of plants or tufts of *algae* in its searchings for food. I fancy this species has bred in captivity, like *C. melanistius*, but perhaps some more knowledgeable reader will write in to correct me.

A TROPICAL FISH SHOP IN NORTH DAKOTA, U.S.A.

by Janice Williams

THE TELEPHONE RANG. "J. and J. Tropicals" I answered. "Hello Limey, this is Grand Forks International Airport and we have two styrofoam boxes of tropical fish for you." "Thank you, I'm on my way." Hastily I found the chequebook and keys to the shop and piled into the stationwagon. As I drove the fifteen flat and bare miles to the airport I reflected that at least six months ago I did not even know the difference between a goldfish and a guppy.

My interest began quite suddenly. I rejoined my husband in America after a month's holiday in England. He told me on the long drive from Winnipeg that he had taken up a hobby while I was gone and further than that I could not advance. I was astonished to find two aquariums in the living room when I arrived home and even more astounded to discover fourteen more in the basement. I was soon cooking up brine shrimp, measuring out *tubifex* worms and busily engaged in breeding a variety of fish from Bettas to Congo Cichlids.

Our basement became a meeting place for all the various fans on the air force base and trades of all kinds were made. By this time we were practically wall-to-wall with fish tanks. We heard of a small shop for rent in the little one-main-street township outside the gates. We took a look at it and although it was only about 8 ft. × 12 ft. and had no running water, the rent was cheap and we decided to open a tropical fish shop. We found names of dealers in a magazine and wrote off to them. They were all very helpful and offered to put supplies on a truck and ship them up to us. The fish wholesalers explained that they fly in their stock and both agreed to take on our business on a c.o.d. basis to start with. Just as we were receiving our first deliveries my husband came down with pneumonia so I spent almost a day ferrying supplies to him on the couch so he could price them. Most suppliers quoted their price and let you decide what your margin of profit would be. We finally got it all arranged in the shop and then emptied all our

"J. & J. Tropicals" and right, the Main Street of Emerado, comprising the whole town !

aquariums and carried them out there. Then we borrowed the hose from the bar next door and filled them all up.

We were then ready for the fish. My husband drove to the airport and collected them. We soon discovered that it was one thing to order from a catalogue and quite another to look at bag after bag of them and try to decipher which was what and where to put them. We duly soaked them all and let 'em loose. All survived the night and we were open for business the next evening. We were open from 6 to 9 each evening and from noon until the last customer left on a Saturday. North Dakota laws would not permit Sunday openings. The business flourished and we learnt all the time. Some days it would be 92°F in the shade and some nights it would be 40° below with wind and snow. We always opened and we always had a customer or two. The aquariums were all fitted with heaters and the fish survived the tremendous differences in climate. Throughout the whole time we had the shop we hauled every drop of water we used whether it was to top up the tanks or to wash the floor.

Inevitably our turn came with the air force and orders came down. But very nicely my husband was to be stationed in England and after ten years I was coming home. We had no difficulty in selling the shop although it was quite a wrench to part with it. I saw the new owner dragging a large drum of water through the snow to the door with 3 customers already waiting and I realised how much I would miss it and my husband and I both agreed we must open an English branch of 'J. and J. Tropicals' as soon as we could.

PRODUCT REVIEW

hw Marinemix, hw Hydrokoll, hw Trace Elements and hw Limewood Diffusers, manufactured in Germany, and distributed in the U.K. by Wingate & Golding Ltd., Barton Stacey, Winchester, Hampshire SO21 3QL.

hw Marinemix is a synthetic salt water mix, formerly known as hw Meersesalz. The manufacturers claim that it has almost 80 per cent of the Continental market. The salt is guaranteed by the manufacturers to contain trace elements in the exact quantities found in natural sea water, and these trace elements total 62 in number. Added to ordinary tap water the mix is said to be as good as natural sea water—and in some cases even better, due to its purity. There are no hard lumps to dissolve in the polythene packs, and an added advantage is that the complete pack does not have to be dissolved before use. hw Marinemix mixes readily with other synthetic sea salts available to the marine aquarist. It is available in three sizes: 5 lb. pack (15 gallons) at £1·74; 10 lb pack (30 gallons) at £3·00; and 40 lb pack (120 gallons) at £10·38. V.A.T. is extra.

The instructions are printed on the pack in four

languages, the English version reading: "One pound yields 2½ Imp. gal. at a salinity of 1·028. Dissolve the salt in an aquarium or any other non-corroding container. Use at least 1½ gal. of water per pound of salt so that all components can be thoroughly dissolved. Following the complete dissolution of all the components of the salt, aerate the mixture thoroughly and bring it to the proper level of salinity by adding more fresh water as required. The salt water should be thoroughly aerated and filtered for at least 24 hours before any animals are put into the tank, so that the most advantageous pH level will have been attained. If only a partial change of the aquarium water is to take place, it is sufficient to filter the fresh salt water once and to aerate it for two to three hours in advance." Bearing in mind that the details on the pack are given in four languages, I found the following *excerpt* from the written guarantee quite amusing: "We guarantee that the recipe of hw Marinemix will be in appropriation of the newest scientific devel. . . ." I'm not too sure what that part means but it sounds like strong stuff!

More seriously, hw Marinemix would appear to be a well-tested marine salt mixture, popular with Continental aquarists. No doubt many U.K. aquarists will find hw Marinemix to be of value.

hw Hydrokoll is an organic solution for the biological preparation and stabilisation of synthetic sea water. It is said to provide protective colloids, similar to those found in natural sea water, that counteract the toxic effects of heavy metals, phenols, bacterial toxins, etc. It is claimed that hw Hydrokoll converts heavy metals, phenols, bacterial toxins, dyes and fats so that they can be removed by an albumin skimmer more efficiently. It is claimed also that the product eliminates the irritation of mucous membranes, gills and intestines caused by fresh synthetic sea water, and that it almost completely prevents internal and external infections. A 200 mls. plastic bottle costs £1·30 plus V.A.T.

hw Trace Elements solution comes in a 200 mls. plastic bottle, costing £1·30 plus V.A.T. The English translation provided on the bottle is such that the meaning is rather confused; however, most marine aquarists will already know of the importance of trace elements in their aquaria. This product is said to make the water "much more clearer, and all animals are showing its colours in a solitary splendour."

The hw Limewood Diffuser is a wooden air stone (I accept responsibility for this paradoxical description). The distributors supplied the following information: "If you remove the plastic connector from the top of this diffuser, you will notice that the air chamber in the wooden block is far larger than in the diffusers usually available. The German manufacturers claim that this design permits 60 per cent greater volume of air to pass through the diffuser." The cost is 18p plus V.A.T. Under test, I found this wooden diffuser to give an excellent stream of fine bubbles, resulting in good aeration and water circulation. If you've never tried a wooden diffuser, I suggest that you try one. It is much more effective than *some* of the more common air stones available.

B. WHITESIDE.

Fathom Tropical Fish Food, marketed by J. H. Kingdom & Son, 11 Broomlands Drive, New Abbey Road, Dumfries DG2 7JZ.

The sample of this new fish food I received was in a container bearing a temporary label; hence I have very little information about it. The label states that the plastic drum contains 67 cc. of food, and that Fathom is: "A nutritious food containing meat, daphnia, shrimp, fish, larva, natural protein and vitamin B." The directions given are: "Feed sparingly."

The food is not in flake form, but in the form of small pieces, particles and powder. Although my fishes ate it willingly, I was a little concerned that many fine, powdery particles were so small that they were ignored by the fishes, and these particles just fell to the gravel surface.

Perhaps the manufacturer will provide more details on the permanent label.

B. WHITESIDE.

Gyrotox, a remedy for gill and skin flukes manufactured by Zoomedica Frickhinger of West Germany and distributed by Hillside Aquatics, 29 Dixons Hill Road, Welham Green, Nr. Hatfield, Herts. Price £1·20, plus V.A.T., to treat 66 gallons; and £4·60, plus V.A.T., to treat 330 gallons.

Having used and reviewed a variety of Zoomedica products before, and having found them to be of a high standard, I was pleased to note the introduction of yet another one to the U.K. market. Gyrotox is a remedy for gill and skin flukes. "It contains highly active new components against gill and skin flukes. If you see that your fish press their gills against their body, or expand them, a treatment with Gyrotox is indicated. Gyrotox is harmless to fish and plants. Instructions for use and dosage: 1 capsule per 25 litres. After having renewed one fourth part of the water, the next day the necessary amount of tablets should be added to the water; keep the tank well aerated and filter only through filtering wool. After 48 hours the treatment is completed; for security's sake it is recommended to repeat the treatment after 10-12 days. Before every new treatment, one-fourth of the water should again be renewed. After treatment it is recommended to use Biocoryn H3 *aquaplus* for purification of the water."

Fortunately for me, none of my fishes has been suffering from gill or skin flukes, so I have been unable to test the remedy. However, I have no doubt that its efficiency will match the high standard of other Zoomedica products I have already tested.

B. WHITESIDE.

AT THE M.A.F.

TV Star, Anne Beverley, from the show "New Faces", gets to grips with a python at the first Midland Aquatic Festival, a report of which appeared in our October issue

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A DATE FOR YOUR DIARY

THE FEDERATION OF SCOTTISH AQUARIST SOCIETIES

present

THE 3rd SCOTTISH AQUARISTS' FESTIVAL

at the CIVIC CENTRE, MOTHERWELL near GLASGOW

on

SATURDAY AND SUNDAY - 29th, 30th MARCH, 1975

Full Details and Schedules from:- D. Fotheringham Esq.,
23 Royal Park Terrace, Edinburgh EH8.

B.A.F. 1974

THE COLLABORATION between the Federation of Northern Aquarists Societies and *The Aquarist and Pondkeeper* has for 23 years met with great success at Belle Vue where the B.A.F. has been staged annually during that time. This year, happily appropriate to this magazine's Golden Jubilee, all attendance records have been smashed with a gate of nearly 17,000 over the weekend of 12th and 13th October. The reduced size of some of the societies' competing stands increased the amount of space between exhibits and on the eve of the show it seemed that there might be more breathing space during the peak attendance on Sunday than in previous years. In the event, however, any apparent slack was amply taken up by the increased attendance and the hall was packed to capacity. At lunch time on Sunday a queue, four deep, stretched for more than a hundred yards outside the entrance and although it was moving quickly, this length was maintained for most of the afternoon.

The societies competing for the most attractive, neat and safely wired stand continue to offer novel ideas every year and there was no shortage of originality in this field on this occasion. The first prize was secured by Castleford A.S. with their splendid and detailed reproduction of Stephenson's Rocket, whose tender served to house the eight or more aquaria required to be included. Osram A.S. came a close second with a most realistic fairground roundabout in which each of the animal seats contained an attractively set-up aquarium. The third award went to the Village A.S. for their attractive little "weather house," from which emerged alternately a dumpy little woman and her spouse, signifying fair and wet weather respectively in the fashion of those household souvenirs from holiday resorts. Edinburgh A.S. won the fourth prize for a "road works" tableau complete with hut, watchman, brazier, paraffin lamps and flashing amber warning lights.

Dealers were well represented and were kept very busy supplying the wants of enthusiastic visitors, many of whom regard the presence of reputable traders as one of the main highlights of the show.

Northumbrian Aquarists had a most successful time of it and their compact stand was ablaze with award stickers including three firsts, two seconds and a third. Among their winning fishes was a large *Dormitator maculatus*, an old favourite not often seen nowadays, a nice Snakehead (*Channa lucius*) and a beautiful Silver or Bala Shark (*Balantiocheilus melanopterus*). *Brycon facatus*, a handsome characin, was also to be seen on this stand.

Blackburn A.S. included a splendid marine tank among their display. It was far from being a large tank and could have been passed by unnoticed but for the brilliance of colour scintillating from its interior. It was artistically set-up with both skeletal and living coral but the eye-catcher was provided by two scarlet and pink anemones which visitors watched carefully for movement, wrongly but forgivably believing them to be unreal. Deservedly this society won the Challenge Trophy for the best Marine Furnished Aquaria.

The Champion of Champions was a large specimen of *Datnoides microlepis*, with the second prize going to a lemon-curd coloured cichlid, *Cichlasoma cintrinellum*, and the third award to a specimen of *Myloplus schultzei*.

The British Killifish Association exhibited a large number of species which was particularly gratifying in view of the usually poor showing at most exhibitions of these most colourful of tropical fish.

The ever-growing interest in Koi was catered for by the B.K.K.S., whose stand comprised a large shallow pond in which numerous moderate sized colour varieties of Koi nosed around in gaudy splendour.

A large specimen of *Cichlasoma severum* collected the award for the Best Fish in Show for Mr. B. Cooper of Hartlepool A.S., which society took the F.N.A.S. Trophy for Characins with a splendid Pink-tailed Chalcius (*Chalcius macrolepidotus*). This society also received the Challenge Trophy for Breeders (egg-layers) with a specimen of *P. kribensis*.

Buxton and District A.S. had two noteworthy exhibits on their stand in the shape of a large specimen of *Leporinus fasciatus* and a Hasselt's Barb (*Osteochilus hasselti*), one of the bony-lipped barbs.

Mr. and Mrs. Shipman of Grantham and Dist. A.S. receiving their award for the "Champion of Champions" from Mr. George Cooke

Mr. P. J. Whelan of Blackburn A.S. receiving second prize for his "Champion of Champions" entry

Mr. T. Roberts of North Staffs A.S. being presented with 3rd prize for his "Champion of Champions" entry

Mr. B. Cooper of Hartlepool A.S. receiving "Best Fish in Show" trophy

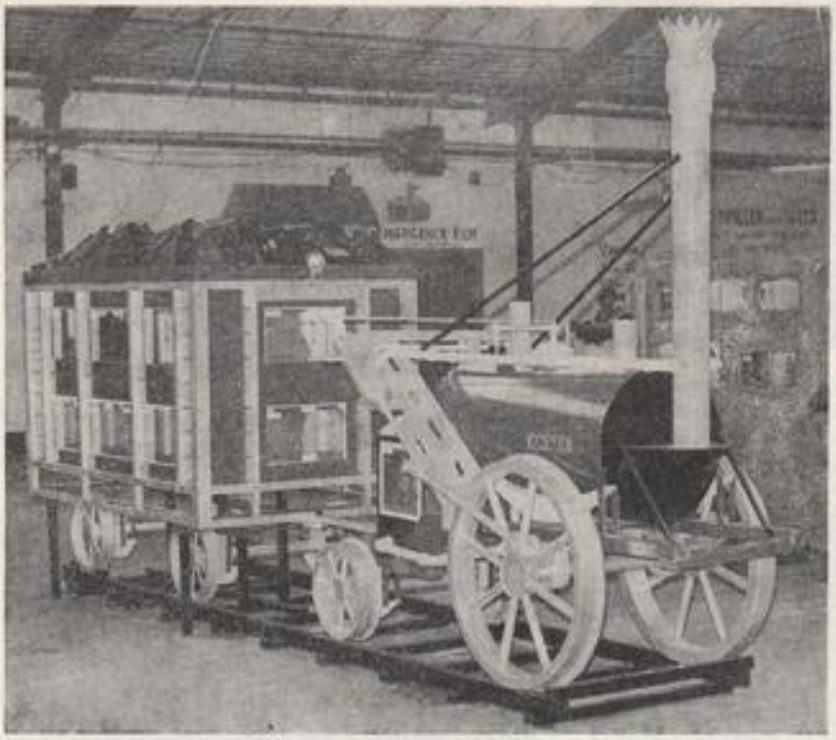
Halifax A.S. won the Challenge Trophy for the best Society Furnished Aquarium with Coldwater and Tropical and the Hammond Trophy for the best Individual Furnished Aquarium (Coldwater).

The Marine section of the hobby could have been better represented although some of the dealers displayed mouth-watering coral sea set-ups in which butterfly fish, bat fish, wrasse and damsels played kaleidoscopic hide and seek.

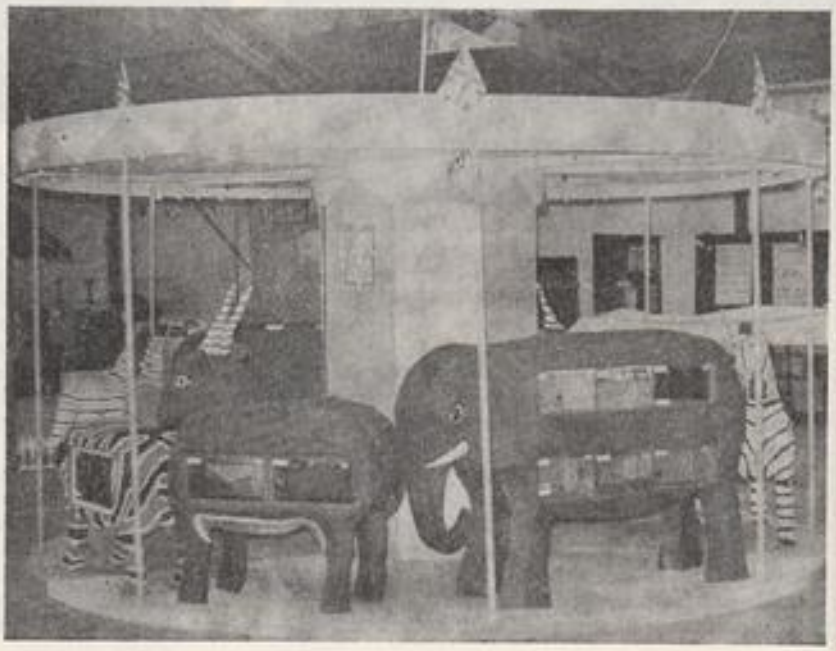
Coldwater fanciers were well catered for and some good specimens of a number of goldfish varieties were in evidence, especially fantails and shubunkins with orandas and moors in close support.

The B.A.F. is always a splendid get-together of aquarists from all corners of the United Kingdom and this year saw no diminution in the geographical scope of its appeal. The North East and Scotland were very well represented and there were numerous visitors from Southern Ireland and the Continent, including some from Germany who expressed their liking for the show and for the novelty of the societies' stands.

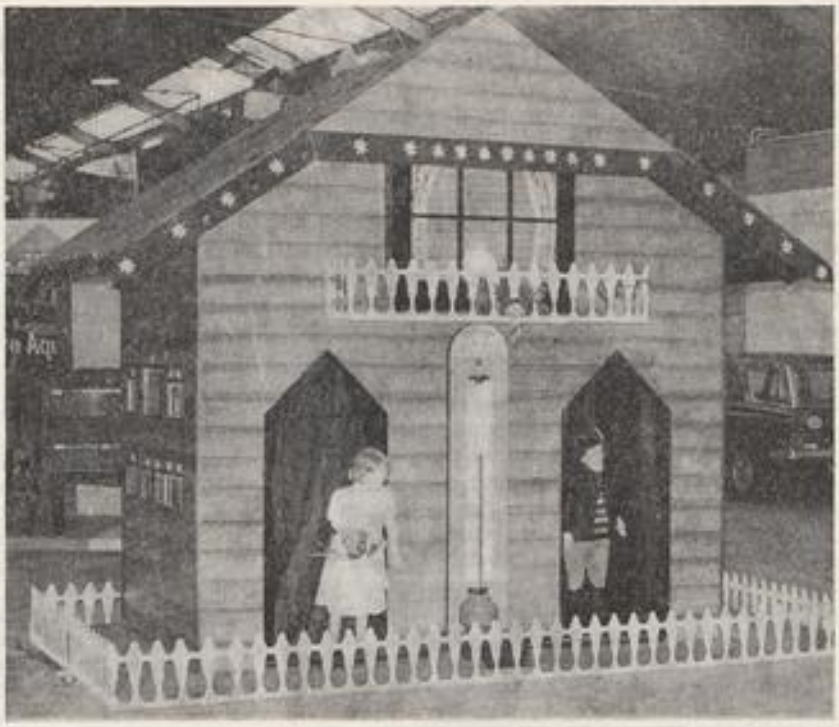
The exhibition terminated, as is customary, with the presentation of awards by Mr. George W. Cooke, President of the F.N.A.S., and to him and his team of enthusiastic organisers we extend our congratulations for a thoroughly enjoyable and successful Festival.



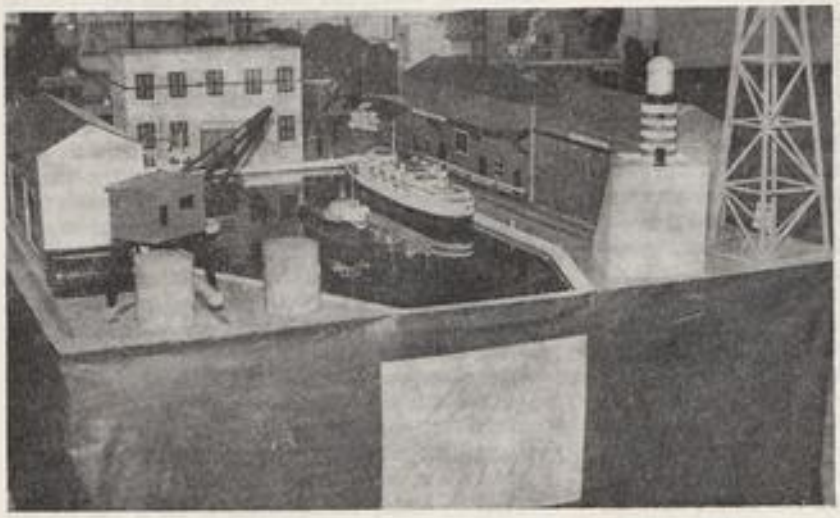
Stephenson's 'Rocket' which won first award for Castleford A.S. in "Most Attractive Stand" contest



OSRAM A.S. were awarded second prize for their colourful roundabout



This Novel Weather House, with 'Working' residents who popped in and out alternately, secured third prize for Village A.S.



Loyne Aquarists were runners-up with this detailed model of a harbour complete with water, ships, Dock Crane, Flashing Lighthouse, Oil Tanks and Warehouses

From a Naturalist's Notebook

by Eric Hardy

"YOU'RE TRESPASSING off the Staithe!" yelled a sudden voice like the guard at Colditz Castle as my friends stood precisely 1ft 6ins from the public footpath bank at Hickling Broad's Whiteslea Mere, in Norfolk, when I took a picture from a small boat jetty of two anglers I chatted to. It was the warden announcing his approach. We came from Decoy Lane, below Rookery farm crosslanes, beyond Catfield, off the east side of A149. Back on the grass trodden by our unprivileged feet, we stood aside for his privileged party to board their boat.

We went off to the aquatic plant haunts on the west side of A149, where royal ferns, orange balsam and bladderwort grow down the left hand dyke off the public staithe end of Fenside, below Catfield Hall. Next day, we visited the southernmost haunt of rare creeping lady's tresses orchid, among houndstongue, ploughman's spikenard and rosebay at the narrow pinewood of Holkham reserve, and met the friendliest of officials from the Nature Conservancy at Wells. This orchid grows also at Stanton Warren (Norfolk) and Houghton Wood in East Riding, and was formerly near Carlisle and south of York.

Why cannot all nature reserves be nationalised, with the same conditions of access for all, instead of having to buy privileges where more and more of the land we were called up to fight for in the last war is not otherwise accessible? Costs? A department of the state called the Nature Conservancy was created for this purpose and costs millions from the privy purse annually.

East Wretham Heath, another Norfolk reserve north of Thetford has small meres, the haunt of grass-snake, adder, common lizard, smooth and great crested newts, of golden dock, grasshopper-warblers and yellow wagtails, and of the rare moss *Physcomitrium eurystomum*. Also of various duck, stone-curlew and ringed plover, and the scarce yellow-bedstraw plant.

Printing costs are hitting most societies. I hear that it cost £600 to print 750 copies of the recent journal of the British Herpetological Society. As Northwestern delegate at last September's London conference of natural history societies, called by the Council for Nature, I was surprised that not a single aquarist or angling club or federation had been invited, though it had a progress talk on the Save the Village Pond campaign. There is a tendency to look down upon aquarists as mere "fish-keepers", as a BHS delegate put it. This is a lapse I've mentioned before, for aquarist and angling societies were the pre-war pioneers of pond-saving efforts before conservation became fashionable among other natural history bodies.

The BHS map of the distribution of the adder exhibited at the meeting showed South Lancashire blank, though an 18 ins. female was taken near Widnes last September. This unusually large specimen was caught by a cat at Barrow's Green and acquired by a Ministry of Ag. friend, expert in keeping reptiles. It vomited two voles it had eaten. With only pre-war records from the local mosslands, apart from a piece of cast skin found at Simonswood Moss in 1969, was this an escaped pet, or an isolated breeding survival which had escaped notice on nearby Bold Heath? The cat which brought it in (and was playing with it) belonged to a local pet-dealer who first recognised it with surprise. I've met farmers pre-war with experience of adders on Simonswood Moss, Chat Moss and Carrington Moss, now much drier and ecologically much altered. Widnes is now in the new Cheshire county, though ecologically South Lancashire.

Cruising off South California, the U.S. research vessel *David Starr Jordan* carried numerous glass beakers of seawater containing anchovy-*larvae* less than 5 mm long, which had been bred in the experimental aquarium at La Jolia. Physiologist Reuben Lasker used these laboratory-reared fish instead of naturally spawned anchovy to test what determines how many young fish survive at sea to reach adult reproduction. Maybe survival depends most on food. Their aquarium development had been temperature-controlled, so that all the fish were at their first-feeding stage. They were placed in samples of seawater from specific areas to find if these had sufficient food to support such young anchovy. Several surface areas failed to support the fish: but when in extensive layers of "water green" at 15-20 metres depth with high concentrations of 40 to 400 cells per millimetre of the dinoflagellate (tailed single-celled mobile plant-plankton) *Gymnodium splendens*, the anchovy fed actively upon this. It is, however, one of the causes of often fatal algal bloom when excessive quantities grow in the sea and drift inshore. It was also the food used to support the anchovy-*larvae* in the laboratory aquarium.

Thus by taking the aquarium to sea it was learned that high concentrations of this plant plankton are necessary for the continued growth and survival of anchovy. It is in such areas that anchovy spawn. It

was also found that the anchovy *larvae* fed on this only when the algal cells were 0.04 millimetres, and larger. Even when the smaller specimens were in large numbers, they did not stimulate feeding. It was also claimed to show that aquarium-reared anchovy respond spontaneously to natural food.

By extracting pituitary gland hormone from a salmon and giving 35 mg weekly injections to grown female eels, Hokkaido University biologists in Japan have successfully hatched eels in their aquarium. One eel laid eggs after 11 injections of the hormone. 40-50 hours later eel-milt was added to the eggs. 100 fry of 3.5 mm hatched, but only half survived.

Seawater in the eels' aquarium was maintained at 18°C before spawning and from 23-25° afterwards. At 2 months the eel-fry were fed with egg-yolk and lobster-eggs. Another Japanese aquarium at the Fukushina Marine station on Kyushu Island has successfully bred sea-urchins after stimulating green sea-urchin females to ovulate by injectiong potassium chloride. In November 1972 it had 300,000 eggs of this common species in a seawater tank. From these hatched 2,500 sea urchins over an inch across.

The most important and exhaustive, authoritative work on the chemistry and biology and the physical ecology of the seaside is *The Biology of Estuaries and Coastal Waters*, a new 678-page work by E. J. Perkins of Strathclyde University, just published by Academy Press at £14.60. Strathclyde has been the centre for a great deal of recent research into the biological problems of pollution, and all who are concerned with the management or use of coastal and estuarine waters should use this as a reference book. It reveals how events in one area are linked with activities in others, and it digests a mass of modern material.

After introducing the general physical and chemical nature of the coastal waters, it progresses through the the plankton and benthos of rocky shores and sedimentary beaches to fouling and boring organisms, the seaweeds, fish and shellfish of inshore waters, their pests and culture in Europe and North America diseases and parasites. Finally, it turns to pollution and waste-disposal and their biological effects, and concludes with the problems facing those responsible for the management of these waters. It is almost a library in one volume for anyone actively interested in inshore life, illustrations being confined to a limited number of practical diagrams. The enormous reference lists might have been more conveniently arranged in alphabetical order. It is essential to the library of every good school, polytechnic and fishery authority, and those who speak or write on pollution and the environment.

WINTER—AND THE GARDEN POND

by B. Fry

IT IS HARDLY possible to exaggerate the importance of tidying up a garden pond before the worst days of winter set in. A neglected pond, at what is known in some gardening circles as the back end of the year, is not only unsightly but unhealthy also. Dead and decaying vegetation, combined with shortening days and poorer quality light, spells pollution, and this must be avoided at all cost because of the trouble it brings.

First, then, among the jobs to be done is the removal of all spent plant life from the water. Next, shorten or thin out submerged vegetation, but mainly where this has bushed out in great mats at the surface, to let extra light in. Follow this up with some necessary attention to sedges and such-like aquatics in the shallows. Remove all but a few inches of the withered foliage showing above the water and cut back the invasive root systems that these and similar plants have to prevent their choking up the margins next spring.

The advisability of maintaing a full pond at this time of the year is another point which cannot be overstressed; for if the water is low and the pond freezes over the occupants are hardly likely to come through the winter unscathed. In point of fact, to over-winter any fish successfully a depth of about two feet of water is called for, and three feet is better. When a pond freezes over make a hole in the ice as soon as possible to let poisonous gases out and fresh air in. But here a word of warning: never bang, bang, bang on the ice with a hammer. Apart from the danger of damaging the sides of the pond, be it concrete or plastic, it is on the cards that the shock-waves set up by the blows will kill the fish. It is quite easy to make a hole in ice by standing a can of boiling water on it. Alternatively boiling water poured direct on the ice will do the trick. The over-cautious pondkeeper will drill a hole in the ice with a brace and bit. But the hole: use it also to siphon away sufficient of the water to leave a small airspace between the ice and the water. This cushion of air should prevent a second layer of ice forming below the first one. As for snow, sweep what you can of this away from a frozen pond with the least possible delay. If this is not done, and the snow lies thick for a week or two the plants and fish will suffer, and no shade of doubt about it.

OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE
All queries MUST be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

by Jack Hems

What is the scientific name of the silver chromide and what length does it attain?

The silver chromide is known to science as *Etroplus suratensis*. It is said to reach more than a foot in the natural state in India but aquarium specimens seem to stop short at about 6 or 7 in.

I have noticed a fleshy appendage located between the anal and ventral fins of my *Leiocassis siamensis* catfish. Does this fleshy tab indicate the sex of this fish?

In all probability the size and shape of this appendage does indicate the sex of *L. siamensis* but up to the time of writing nothing I have read about this fish confirms it.

Where can I obtain the less-common killifish or their eggs?

Visit the specialist aquarium shops as often as possible, for the less-common killifish come and go with amazing rapidity. As you live in the northern half of England, I suggest you get in touch with Mr. K. Hill, 27 Chadwick Lane, Heywood, Lancs. Mr. Hill is an officer of the British Killifish Association and can help you to get in touch with breeders of these fascinating species.

I should be grateful to receive some information on the Siamese tiger fish (*Datnioides microlepis*).

D. microlepis is from Thailand and some places eastwards. It attains more than a foot in the aquarium and is, for its size, a peaceful fish. It requires soft and neutral to acid water and thrives on meat and the regular live foods. To the best of my knowledge, it has not been bred in captivity. A temperature in the middle to upper seventies (°F) suits it well.

I have just purchased a young Jack Dempsey fish. Will this fish be all right in my community tank?

The Jack Dempsey (*Cichlasoma biocellatum*) is one of the most bullying of the cichlids. Therefore no smaller or timid fishes should be present. As it increases in size, it will attack all other fishes it comes up against. In short, the Jack Dempsey in its larger sizes requires a tank to itself.

I am a comparative newcomer to the tropical fishkeeping hobby and the guppies I bought several months ago are dying off. The other fishes, however, are alive and well. What is wrong with the guppies?

Guppies are not long-lived. About eighteen months to two years is their average life-span. Further, they must not be placed with any other fishes which may bite at them or chase them. Such treatment shortens their lives enormously.

Can you tell me where I may obtain a culture of wingless fruit flies?

Write to Edric Higginbottom, The Monastery Lodge, Kirk Edge Carmel, High Bradfield, Sheffield, S6 6LJ, Yorkshire. Mr. Higginbottom is a specialist dealer in a variety of live foods.

I should like some information on the breeding of *Labeo* spp. as I believe I have true pairs of the red-finned and red-tailed black shark.

According to the few reports of the spawning of these cyprinids I have come across in the literature of our hobby, the so-called 'sharks' chase about and spawn in tangles of *algae* or fine-leaved plants such as Java Moss (*Vesicularia dubyana*) growing on or near the floor of the aquarium. The eggs hatch within the space of a few days and the fry require the regular

treatment, that is minute live food and protection from larger fishes.

Would a 36 in. × 15 in. × 12 in. tank be large enough for keeping and breeding Malawi cichlids and what sort of conditions are required?

A tank the size you mention would be large enough for the smaller Malawi cichlids. The basic requirements are hard water giving an alkaline reaction (pH test) and several rocks placed at both ends of the tank to afford sheltering places and a playground. Bear in mind that some Lake Malawi cichlids are very aggressive both in and out of spawning condition and a glass divider is a necessary accessory to part the fish if too much fighting breaks out.

I have bought some *Telmatherina ladigesi* and cannot find any information about this species in my aquarium books. I should appreciate some advice on keeping and spawning this lovely fish.

To flourish well, *T. ladigesi* demands water on the alkaline and hard side, with about a teaspoonful of non-iodized salt added to every gallon of water in the tank. The temperature should be maintained in the middle to upper seventies (°F). Live food such as brine shrimp, white worms and gnat *larvae* should be placed on the menu. If *T. ladigesi* is kept with other fishes, make certain they are non-aggressive, for *T. ladigesi* will not live long in the company of bullying companions. Spawning extends over a period of several weeks to a few months. The eggs are scattered every so often in finely divided foliage and the eggs incubate in about a fortnight. The fry require miniscule live food.

What can you tell me about fish called medakas?

The medaka (the medaka usually seen is a pale gold fish) is quite common in inundated paddy or rice fields, drainage ditches and the shallow freshwaters of Japan. It stands a temperature in the sixties or seventies (°F) and eats anything. The female deposits eggs among the plants every so often and the fry, when they hatch out, look rather like newly born guppies and, like their parents, eat anything alive or dried (and very small).

My local dealer has some fish called *Hypopomus artedi*. Please tell me the name of the family to which this fish belongs and whether one or two would be suitable for my community tank?

H. artedi belongs to the family Rhamphichthyidae. This species is suitable for placing in a community tank provided you bear in mind that it attains a length of about 7 in. In its larger sizes it could, and would, molest much smaller fishes. All knife fishes require plants to hide in. For they do not take kindly to a strong light or being constantly on show. They are active at night and after dark and eat meat, worms and other swallowable live food. A temperature of about 74°F (24°C? is suitable.

I have two 24 in. × 12 in. × 12 in. tanks in which I wish to keep tropicals, but do not wish to go to the expense of running submersible heaters. What species do you recommend?

If the room in which your tanks are placed is maintained at about 72°F (22°C) all the year round, then you could keep paradise fish (*Macropodus opercularis*), White Cloud Mountain minnows (*Tanichthys albonubes*), black-banded sunfish (*Mesogonistius chaetodon*) and a few other species which you will find described in a book such as G. Sterba's *Freshwater Fishes of the World*. But if such a temperature is out of the question forget the whole thing and go in for coldwater fishes such as goldfish, bitterling, weatherfish (*Misgurnus*), and pumpkinseed sunfish (*Lepomis gibbosus*). Fishes which come under the heading tropical fishes (in the books and in dealers' shops) require warm water summer and winter alike.

COLDWATER QUERIES

by Arthur Boarder

In my coldwater tank I have a bass in with goldfish and shubunkins. It has lived peaceably for a year until I recently put in a Moor. It then attacked this fish and I had to separate it from the goldfish varieties. Is there any reason for this attack?

It must be realised that these sunfish are predatory and live mostly on live foods, including small fishes. In habit they can be compared with out native Perch and it is well known how they can swallow a fish not very much smaller than themselves, as they have a huge mouth. I have opened a recently caught Perch and have found in its stomach, fully grown Sticklebacks, spines and all. The reason why your bass did not attack the other fish in the tank may have been that it was introduced into the tank either with them or after them. It would have been too disturbed by the move to take much notice of the others and got used to them. Then, when a fresh fish was introduced, especially a different coloured one, it attacked it as it was intruding on its territory. Keep the bass separate from the other fish and remember that these fish are carnivorous and

even if not big enough to swallow a fish could damage the fins at least.

I have just stocked a garden pond with Golden Orfe and Koi. What is a good diet for these fishes as the Koi do not seem to take flake food?

Many fishes including Koi, are not inclined to feed soon after being placed in a pond. Also it is certain that the pond water has already turned cold. When this happens the appetites of the fishes decrease and they may not take any food at all for weeks on end. As Koi are just another type of carp, although a hybrid, they can eat the usual food as given to carp, which includes goldfish foods. Flake food will be taken when the fish are hungry as will other good types of goldfish food. They do, of course, appreciate live foods, such as garden worms, maggots, etc., but again do not try to feed the fish when the water is cold. If a mild spell occurs during the winter, some food can be offered but never give much at first but see if the smallest piece given is taken immediately.

I have several tanks in a room which is to be painted. It would be very difficult to move these tanks and so I would appreciate some advice to counteract the fumes of the paint. What do you suggest?

The fumes of fresh paint can do harm to fish in a tank unless some precautions are taken. Most modern paints will only give off a lot of smell for about a day. Once they dry out there is little or no smell. See that windows are left open after painting and stretch a wet cloth over the top of each tank when the smell is greatest. Tea towels could be used for this purpose. Also in the morning after painting, draw a sheet of paper across the top of the water to remove any film which may have formed.

My problem is that I have 18 young Golden Orfe which were bred on 17th May, this year, and they are at present in a small pond, of about 50 gallon capacity and 10 inches deep. Shall I put them for the winter in my large pond with larger Orfe, some small Rudd, three carp and a goldfish; leave them where they are; or put them in a 24 × 15 × 12 in. tank in an unheated room?

As the young fish are about an inch and a half long, I suggest that they are put in the large pond. At their size they are not likely to be eaten, especially as the fishes in the pond will not be very hungry during the colder months of the year. I do not think it would be safe to keep the youngsters in the shallow pond as, although the cold will not harm them, if the pond freezes over very thickly they could be in trouble, especially if the water is not very pure. The fish are more likely to survive in the larger pond than in a tank indoors, but if you want to play for safety, why not put six of them in the tank and the rest in the pond, then you may be able to keep them all?

I cannot seem to keep the water in my garden pond clear. The fishes are all healthy and I have bred some Golden Orfe. I have a fountain and waterfall. If I place a layer of gravel on the bottom, will this help?

Keep the base of your pond clear of gravel or earth and have the water plants set in containers. As you have a waterfall, why not try a type of filter from the fall? If you can arrange one or more small pools where the water flows through back to the pond, you can have some filtering material in the pool or pools so that some of the *algae* may be trapped. You can use some of the filtering material as advertised or use some small charcoal, sand and nylon fibres. Clean this material or change it as frequently as is necessary.

Can you please forward to me any addresses where I can obtain any of the more unusual varieties of fancy goldfish? I have visited several establishments of dealers but they only seem to specialise in tropicals and hardly any good fancy goldfish are to be seen. Also are there any coldwater classes for fancy goldfish at Belle Vue show, as I do not want to make the journey if there are none?

I am enclosing the address of someone who, I think, can help you with your search for good fancy goldfish, although I cannot guarantee that he has what you need at the moment. As for the coldwater sections at Belle Vue, there are usually about eight classes of coldwater fishes there. I judged them for many years and there were always a fair number of coldwater fishes on display. I shall never forget these classes as they were the hardest to judge that I have ever come across in all my years of judging. You see there are no separate classes for fishes but all those to be judged were on the respective Society stands. These were spread about the hall and having found which stands had a particular variety to be judged one had then to try to assess the colour or some other feature of one fish against others which could be fifty or sixty yards away. I thought then and still do so, that no judge on earth could do justice to the fishes under such conditions.

I have some fantail goldfish in a tank and they are not acting normally. They either lie on the bottom of the tank or keel over on their sides and I have lost one or two. There are ordinary goldfish in the tank which seem quite healthy. Why is this happening?

(Continued on page 360)

OUR READERS WRITE

Livebearer Breeders

A group of enthusiastic Livebearer Breeders have now formed "The British Leverbearer Association". The aims of the Association are to bring together the vast multitude of individuals whose main interest are these unique species of fishes; to provide a panel of specialist Judges and speakers; to promote regional sections and to generally liaise with each other for the interchange of fish etc.

Anyone interested or requiring further information are requested to contact either:

Mr. R. Lawson	Mr. J. A. Laidler
Secretary	Chairman
84 Grosvenor Road	19 Aln Avenue
Jesmond	Gosforth
Newcastle upon Tyne	Newcastle upon Tyne
Tel: 0632-812625	Tel: 0632-850350

Yours faithfully,
J. A. LAIDLER

Re British Discus Association

Owing to my disaccord with B. A. Middleton, would all would-be members of the above association please contact me as soon as possible in order to arrange a meeting of all who can attend in January.

Your name and address will be registered and a reply given. Thanking you.

F. W. ASHWORTH,
41 Pengwern,
Llangollen, Denbighshire.
N. Wales.

Proturans

I first discovered proturans in my white worm culture. They are small, white, primitive creatures around 1/16in. in length when fully grown. They appear to be blind but are sensitive to changes in light.

I have since found that they can be successfully cultured in my fish house using damp sedge peat as a base and feeding with Bemax.

As a live food to follow microworm and brine shrimp they are ideal. Proturans will happily skip about on the surface of the water obligingly waiting to be eaten by the young fish (in my case, dwarf gouramis and swordtails) if necessary for two weeks or more. Baby fish seem to take some days to acquire the taste for this diet but I have found that when the first supply has been eaten, the second application is greedily consumed.

My method of extracting the proturans from the peat is to take a handful of the culture from where the Proturans are mostly concentrated, place into a jar of water and stir. The Proturans float to the surface and may then be extracted by inserting a rod into the water and when removed they will cling to the rod. They may then be easily transferred to the tank.

Proturans have an advantage over most other foods for young fish. They will live in the tank, if uneaten, for weeks without attempting to escape and if sufficient are provided, the fish have a source of live food which enables them to feed continuously and, in consequence, grow much more quickly than would otherwise be possible.

NORMAN S. BAKER.
"Chetwynd"
10 Crown Close,
Little Stretton,
Church Stretton
Salop.

Mendel's Law

In a magazine whose writers have insisted on more than one occasion in recent times that God made the earth in seven days, the present writing (our readers write) of genotype and phenotype may appear an advancement of the interest in science; but is it?

Little is, in fact, known of genes and to the practical breeder only phenotype can be of interest. Even observed injury may be a product of the influence of genes.

Mendel's laws were based on phenotype and the practical breeders results are based upon observed traits also, as is *all* data available to the general reader of aquarian lore.

Please don't put off the would be breeder by creating obscurity with clap trap. Good fish strains are a product of the selection of those healthy individuals observed as having the desired shape.

Some shapes will always result having first been introduced into a strain, some will only result in certain circumstances but XY, X, or Y could just as well be written as Pee 1, Pee 2 etc. or even urine 64 for all the influence of mysterious letters such Z_1 P^2 or whatever can have on who does or does not produce prize winners. Observed lethal traits are important and they are known as a result of phenotyping.

Please no more fiction. The wonders of philosophy are out of place in the sphere of applied quarium knowledge.

W. F. CLARK,
56 Braeside Road,
Greenock
Renfrewshire,
PA16 0RS

COLDWATER QUERIES (continued from page 358)

As the goldfish appear to be in good condition, it appears that the fantails may have been reared under warm conditions and when the water in the tank cooled down with the colder weather they were badly affected by the change of temperature. The keeling over suggests that there is some swim bladder trouble and this is often caused by a slight chill, especially in the short-bodied types of fancy goldfish. If you can raise the temperature of the water to about 60°F for the winter, the fish should recover and the ordinary goldfish will come to no harm with the warmer water.

Recently, our goldfish are being attacked in the pond by something which leaves a wound on their sides. We have three American catfish, about three inches long, and a Pumpkinseed sunfish. Could these fishes be doing the damage?

Either the catfish or the sunfish could be attacking the goldfish. Both species are carnivorous and could eat small fishes or bite them. They prefer live foods and so if there are none in the pond they could turn their attentions on the goldfish. Catfish are quite unnecessary in a pond as although they are said to be good scavengers, they are no better than a hungry goldfish for this purpose. Also, when in an established pond, it is unlikely that they will ever be seen once the water plants grow and the water matures.

FISH TANKS AND FIBRE GLASS

by L. R. Adsett

WHAT HAVE fibre glass and fish tanks in common you may wonder? Rather a lot as I have discovered. No more expensive metal hoods on my tanks—hoods that rust away after a while, I now make all my own of fibre glass—quite a simple and interesting task.

First you need a mould, which is simply constructed. I had mine made from a piece of 18 gauge mild steel sheet to fit a 24 in. × 12 in. × 12 in. tank.

The piece of steel for the main body of the hood has to be 21 in. long and 25 in. wide and bent to conform with diagram "A". Next we have two pieces of metal measuring 8 in. × 12 in. and shaped as in diagram "B". This, then, is your mould with which you can produce as many 24 in. × 12 in. hoods as you require.

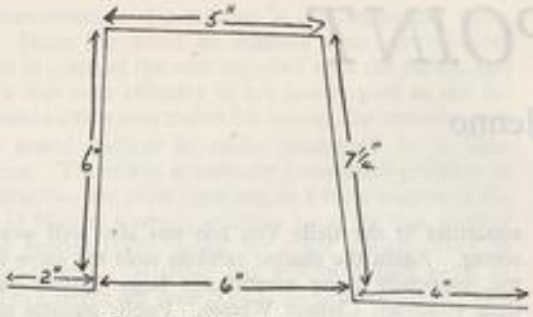
Now, with a fine wet and dry emery paper, thoroughly clean the metal and remove any grease or dirt from the surface (only the inside of the mould has to be so treated).

The next step is to polish the inside of the mould with a wax polish that is not scented (because the scent causes the fibre glass to adhere to the mould)—use a paste wax for this. Wax and polish the inside of the mould at least four times to get a good working surface; the better the surface the better the finish on the completed hood.

Now we come to assembling the mould. Stand the body of the mould on a large piece of board with the two end pieces at each end with the 2 in. lip outwards. It should now look like a hood laying upside down. Put a brick or something similar at each end to hold the ends in position. They must be stable enough to take pressure when working on the inside.

Where the two ends butt up to the body, gently rub a little polish in to fill in the seam. Rub off any surplus polish, we are now ready to make our fibre glass hood.

We now need a fibre glass kit—the same as most garages sell for repairing holes in car bodies. There are three items you will need that are not in these kits but are obtainable from D.I.Y. or Hobbyist stores. One is the Gel Resin which is a very thick resin, a colour pigment of your own choice and a can of acetone or similar solvent for cleaning your brushes and rollers.



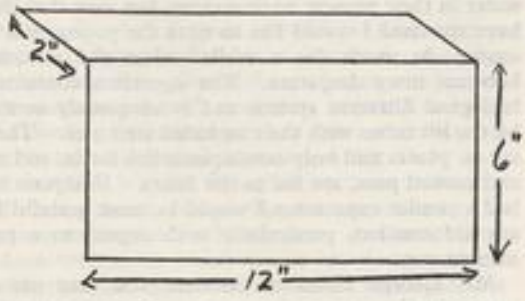
A END ELEVATION

I must stress at this point that it is dangerous to smoke or be near a naked flame while using fibre glass resins, and the work should not be carried out in an an enclosed space.

First, put a little gel resin in a clean tin (about ¼ pint) and add a little colour pigment. Stir until thoroughly mixed, and add 5 cc catalyst and stir this in. Now paint the inside of your mould with this mixture as if you were giving it a thick coat of paint (this has to be done within 7 minutes as it will then start to harden). Now thoroughly wash your brush in a tin of acetone and leave to soak.

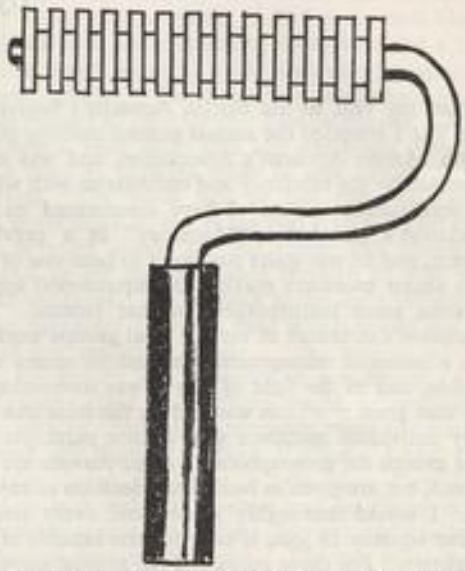
We now have to wait until the job is rock hard (about 45 min.).

Next cut two pieces of fibre glass mat to 27 in. × 21 in. and four pieces to 9 in. × 6 in. To one pint of layup resin (thin resin) add a little colour pigment and stir in well. Add 12 cc catalyst, stir in and paint over the gel coat. Lay one of the big pieces of fibre glass mat over the resin and roll it with a metal roller to exclude all air bubbles. Next take the second piece of mat and treat in the same way leaving an overlap of about 1 in. at front and back of mould. Repeat this procedure with both ends. You have about 20 minutes to complete this before the resin starts setting.



B SIDE OF MOULD

Remember to wash your brush and roller in acetone immediately after use. A 2 in. brush is used, and almost any small metal roller will do as in diagram "C".

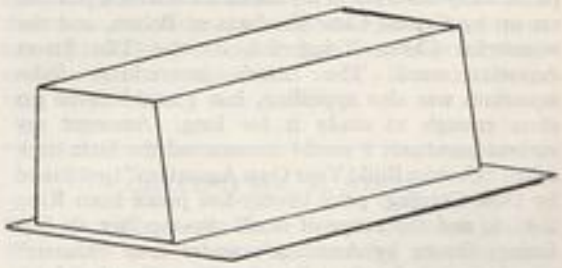


C ROLLER FOR FIBRE-GLASS WORK.

After 2½ hours trim the edges of the fibre glass back to the steel mould with a sharp knife. Leave for another six hours. Now remove the bricks at either end and take off the end pieces of the mould, gently pulling the hood away from the body of the mould. You should now have your completed aquarium hood.

Fibre glass hoods are easy to drill for fitting lights with a few carefully drilled holes in the rear for your heaters, thermostats, etc. You will find that the hood will never need painting and will be very easy to keep clean.

I am now planning a complete fibre glass aquarium for marine fish and hope to describe its construction when it has been completed.



D. COMPLETE HOOD

VIEWPOINT

by A. Jenno

DURING my visit to the British Aquarist's festival at Belle Vue I attended the annual general meeting of the British Marine Aquarist's Association, and was most impressed by the efficiency and enthusiasm with which the organisation is run. I have commented on the association's newsletter "Marinews" in a previous column, and so was quite surprised to hear one of the more senior members making an impassioned appeal for even more contributions to that journal. The association's structure of various local groups working with a common managements committee seems very sensible, and in the light of this it was interesting to note that great emphasis was laid on the facts that the many individual members who cannot participate in these groups for geographical or other reasons are not ignored, but are given as much consideration as anyone else. I would thoroughly recommend every serious marine aquarist to join, if only for the benefits of the newsletter. For those interested the general secretary is Mr. J. Vickery of 26, Rosalind Avenue, Bramford Estate, Dudley, Worcestershire. The B.A.F. itself attracted many aquarists from all over the country and as it was my first visit I found it most informative. I was dissapointed at the lack of decorative aquaria on show, and found that the new (?) procedure of housing the competing exhibits in scattered club display stands made it difficult to compare one entry with another of the same type. Obviously, however, this system must ease the administrative and preparational problems for the show organisers, but I feel at some inconvience to the visitor who wishes to make comparisons. The trade stands made the show in my opinion. The range and quality of the fish stock on display, particularly the marines and the African cichlids, was really good and allowed many of us to examine various species not seen before "in the flesh". Two trade exhibits particularly stood out in my mind, the marine aquarium set up by Crystal Clear Products of Bolton, and the wonderful Clown Triggerfish on the Tilo Street Aquatics stand. The latter's invertebrate Sales aquarium was also appealing, but I could never get close enough to study it for long. Amongst my various purchases I would recommend the little book called "Custom Build Your Own Aquarium" (published by Dow Corning) price twenty-five pence from King British, and the range of small clip-together air line fittings shown by Armitage's under their "Gussie" brand name. Incidentally, the Dow Corning book deals in American gallons, not English. The public aquarium in the Belle Vue zoo was also well worth seeing. Again the marine exhibits stole the show for me, especially those magnificent large Batfish with their attendant Cleaner Wrasse. Public aquaria and similar displays are always depressing in the end however, because no matter how hard the private amateur aquarist tries he can hardly ever compete with the advantages given by sheer container size and the resulting available water volume, and to return home to see the more usual tank sizes, however nicely set up, is always a little discouraging.

I have a nice adult pair of *Cichlasoma spilurum* (the Blue-eyed Cichlid) which I have kept for some time in a twenty-gallon aquarium. During the last three months both fishes have slowly developed peculiar conditions in their gill areas. The male, especially, has grown a large pink "bag" which now hangs down outside the gill-slit on one side, and which seems to vary in size from day to day. The female is similarly affected, but her condition is not as advanced in that she has only a small "bag" which is still inside the gill-slit. I had one bad session with the male when he collapsed on to his side one evening and had great difficulty in obtaining oxygen, and this was cured by the use of methylene blue for it's respiratory properties (see "Diseases of Fishes"—Van Duijn), the fish being all right on the following morning. Other than that one instance, the fishes do not seem affected by the trouble and have, in fact, spawned while in this condition and are guarding eggs at the moment. There are no secondary fungus growths, and the outer skin of the "bag" appears to be natural pink tissue, stretched, of course. I had decided to change the fishes to another aquarium with completely new water in case the condition was anything to do with the somewhat old water in their present environment, but now that they have spawned I would like to raise the young, and so cannot do much for a while unless the situation becomes more desparate. The aquarium contains a biological filtration system and is adequately aerated by the lift tubes with their included airstones. There are no plants and only non-aquatic live foods, cod roe and cooked peas, are fed to the fishes. If anyone has had a similar experience I would be most grateful for any information, particularly with regard to a permanent cure.

Mr. George Hann of Southampton sent me an interesting letter recently on the subject of improving the inlet filtration system of the Otter fountain pump,

VIEWPOINT

by A. Jenno

DURING my visit to the British Aquarist's festival at Belle Vue I attended the annual general meeting of the British Marine Aquarist's Association, and was most impressed by the efficiency and enthusiasm with which the organisation is run. I have commented on the association's newsletter "Marinews" in a previous column, and so was quite surprised to hear one of the more senior members making an impassioned appeal for even more contributions to that journal. The association's structure of various local groups working with a common managements committee seems very sensible, and in the light of this it was interesting to note that great emphasis was laid on the facts that the many individual members who cannot participate in these groups for geographical or other reasons are not ignored, but are given as much consideration as anyone else. I would thoroughly recommend every serious marine aquarist to join, if only for the benefits of the newsletter. For those interested the general secretary is Mr. J. Vickery of 26, Rosalind Avenue, Bramford Estate, Dudley, Worcestershire. The B.A.F. itself attracted many aquarists from all over the country and as it was my first visit I found it most informative. I was dissapointed at the lack of decorative aquaria on show, and found that the new (?) procedure of housing the competing exhibits in scattered club display stands made it difficult to compare one entry with another of the same type. Obviously, however, this system must ease the administrative and preparational problems for the show organisers, but I feel at some inconvience to the visitor who wishes to make comparisons. The trade stands made the show in my opinion. The range and quality of the fish stock on display, particularly the marines and the African cichlids, was really good and allowed many of us to examine various species not seen before "in the flesh". Two trade exhibits particularly stood out in my mind, the marine aquarium set up by Crystal Clear Products of Bolton, and the wonderful Clown Triggerfish on the Tilo Street Aquatics stand. The latter's invertebrate Sales aquarium was also appealing, but I could never get close enough to study it for long. Amongst my various purchases I would recommend the little book called "Custom Build Your Own Aquarium" (published by Dow Corning) price twenty-five pence from King British, and the range of small clip-together air line fittings shown by Armitage's under their "Gussie" brand name. Incidentally, the Dow Corning book deals in American gallons, not English. The public aquarium in the Belle Vue zoo was also well worth seeing. Again the marine exhibits stole the show for me, especially those magnificent large Batfish with their attendant Cleaner Wrasse. Public aquaria and similar displays are always depressing in the end however, because no matter how hard the private amateur aquarist tries he can hardly ever compete with the advantages given by sheer container size and the resulting available water volume, and to return home to see the more usual tank sizes, however nicely set up, is always a little discouraging.

I have a nice adult pair of *Cichlasoma spilurum* (the Blue-eyed Cichlid) which I have kept for some time in a twenty-gallon aquarium. During the last three months both fishes have slowly developed peculiar conditions in their gill areas. The male, especially, has grown a large pink "bag" which now hangs down outside the gill-slit on one side, and which seems to vary in size from day to day. The female is similarly affected, but her condition is not as advanced in that she has only a small "bag" which is still inside the gill-slit. I had one bad session with the male when he collapsed on to his side one evening and had great difficulty in obtaining oxygen, and this was cured by the use of methylene blue for it's respiratory properties (see "Diseases of Fishes"—Van Duijn), the fish being all right on the following morning. Other than that one instance, the fishes do not seem affected by the trouble and have, in fact, spawned while in this condition and are guarding eggs at the moment. There are no secondary fungus growths, and the outer skin of the "bag" appears to be natural pink tissue, stretched, of course. I had decided to change the fishes to another aquarium with completely new water in case the condition was anything to do with the somewhat old water in their present environment, but now that they have spawned I would like to raise the young, and so cannot do much for a while unless the situation becomes more desparate. The aquarium contains a biological filtration system and is adequately aerated by the lift tubes with their included airstones. There are no plants and only non-aquatic live foods, cod roe and cooked peas, are fed to the fishes. If anyone has had a similar experience I would be most grateful for any information, particularly with regard to a permanent cure.

Mr. George Hann of Southampton sent me an interesting letter recently on the subject of improving the inlet filtration system of the Otter fountain pump,

as mentioned in this column in the September issue. Mr. Hann has fitted an Algarde under-gravel filter plate in place of the unit supplied with the pump, and finds this very effective in his indoor pool as the increased surface area makes for less regular attention and the gravel surface is easily unclogged by a light raking. There was apparently some small problem in joining the two units together, so I have suggested the use of Hoover washing machine hoses for this, as they have proved really useful for other modifications to Otter pumps. Whether the system would work as well in a larger out door pool remains to be seen. The filter plate would need to be installed with its gravel in a containing-box, and in a very large pool where the pump is in the middle the connecting hose could be made long enough to bring the filter unit near the side for easier maintenance. I shall certainly fit up such a system in the spring, as anything which improves my present situation would be worth the trouble. The pool in question never completely cleared this year, so the pump never ran for more than a week at the longest before it's strainer blocked up completely. I put this down to a lack of enough oxygenating plant growth in the pool. I read somewhere recently that at the height of the summer the water volume in a pool should be at least two-thirds full of submerged plant growth. This has not been the case in my pool, so I assume I must add more plant next season. I also found that *Elodea* did far better than Hornwort in this pool. I think this is because the pool is made of concrete and is only a year old so that there is probably still some lime getting into the water which the Hornwort does not like. My next-door neighbour has a pool made of large fibre-glass sheets and this grows Hornwort and *Elodea* equally well with the same lighting and other conditions as occur for my pool. In spite of this water clarity problem the fishes have grown really well. I estimate that the small Golden Orfe have doubled in size since the spring, and the growth rate of the Koi is almost frightening. I wonder whether the pool will ever benefit from massed plant growth because the Koi look as though they will soon be big enough to eat it faster than it will grow.

During October I spent a week looking after a friend's retail shop in Erdington, Birmingham, during his annual holiday. One of the problems which came up in conversation with customers several times was that of feeding the larger aquarium fishes while keeping them in relatively small aquaria. A big Oscar in a three-foot tank is in the same position more or less as a goldfish in a bowl, except that we cannot carry the aquarium to the sink to clean it out. An Oscar chews his food with teeth which are in his throat and inevitably this results in a large cloud of small particles exuding from the gills of the fish to foul the water. Thus we need either a highly efficient mechanical filter or a better feeding method. I have tried keeping various scavengers with a large Oscar, to clean up after him, but this does not really work as the particles ejected are so small that they would only be useful to fishes which are themselves so small that the Oscar might easily swallow them. I had a ten-inch Oscar who lived with three others of about two and a half inches in length for some weeks until one day when he swallowed the lot. The interesting point about it was that he refused all food for two days previously. After this I kept a Tiger Botia with him which was provided with a hide of jumbled rocks in one corner of the aquarium. The Botia was so fast that the Oscar could never catch it, but in the end it took a long thin piece of meat meant for the Oscar and somehow managed to get this entangled through its gills and died in the night. To get back to the main subject, it seemed necessary to find a food which would not be chewed but swallowed whole. After various experiments the answer was undoubtedly raw bacon. Cut into suitably sized pieces these would be swallowed whole without chewing, presumably being too tough, and were still digested without ill effect. I kept this particular Oscar for about a year in a three-foot aquarium with only an airstone and no filters quite satisfactorily on his bacon diet. He was sold finally to free the tank for something else. The only other foods that he would swallow whole were live fishes and angler's maggots. I am very much against using healthy fishes as food for others so this was not done, and although he took the maggots greedily enough he used to cough them all up again the next day in a messy ball because I think his digestive processes could not break through their skins, as they would be quite complete and unbroken.

Further to my recent comments on the Uno earthed heating equipment I have been asked by Mr. Ellson of Uno Products to point out that all of these earthing devices are patented (no. 34045) and can in no way be copied or reproduced without permission.

Finally, for those who insist on using live *Tubifex* in their fishes' diet, an aquaintance told me the other day that he has kept his weekly supply fresh for some years now by keeping it in a bag which is hung inside the cistern of his toilet. As he has a large family he says the worms receive many water changes daily without any work on his part and he finds they keep very well and stay fresh throughout the week. He must have a very understanding wife.

CALLING MR. M. JONES

Will Mr. M. Jones whose letter appeared in the September issue under the heading 'A.G.B. and G.S.S.B.,' confirm his address as that published with his letter.

Junior Aquarist

FEEDING YOUR FISH

by R. J. Davis

THERE are many factors that must be taken into account when keeping fishes. These include: adequate surface area; room to live; water quality; compatibility of fishes; feeding; plants and light. It is important to notice that the first two are separate. Just because an aquarium has a large enough surface area to support a certain population, it does not mean that that aquarium can provide enough room for the fishes to live in. The large oscar in an eighteen-inch tank is a familiar example in many shops and shows. Of these parameters, feeding is often the most important, mainly because it is the one most neglected. The average aquarist pays great attention to the other necessities, but frequently he does not provide his fishes with enough of the right kind of food. The reason is probably that the aquarist has spent a lot of money on equipment and fishes but forgets that to feed fish properly is also expensive. Whenever I see an undernourished fish it reminds me of the story about a 'Hi-fi' addict who spent so much on the record player he could not afford any records.

Why do your angel fish never reach that magical figure of six inches, or your blue gouramis that of five inches? In these species and many others, very few aquarium specimens ever reach the size that those in the wild do. The reason for this is not because aquarists have not spent a small fortune on test kits and water softeners, but because they are just not feeding their fish properly. By this I am not suggesting that fish should be fed solely on live foods. Instead I am suggesting that fish should be fed a better and more varied diet and, most important, they should be fed more. Even a small fish can consume a vast quantity of food in one day. I think that the blame for this trend in underfeeding is partly due to the dried fish food manufacturers. On any of their products one will find two statements: "A complete fish food" and "Feed no-more than that which the fish will consume in five minutes." Although both these statements are justified they do imply that one small feeding of that food a day is adequate for the fish. This, is of course, nonsense; you should not feed more than the prescribed amount at one go, but you should feed several times a day. If more is fed at one time a polluted tank will quickly result. The role of dried fish foods is not as a food to be used by itself, but as a complementary part of a balanced diet. The usefulness of dried foods is in providing minerals and vitamins that would otherwise be absent. Dried foods are also practical and should be used to give an extra meal when time does not allow for any other form of meal.

Adult Fish

Having defined the proper use of dried foods; what are the alternatives? The alternatives can be conveniently split into four groups.

(a) This group contains all the usual forms of live foods that can be bought from most aquarium shops. These include: *Daphnia pulex*; Mosquito *larvae*; *Tubifex* worms; glass worms and fly maggots. When feeding these foods it must be remembered that the percentage of water is very large and so in any one individual the amount of food is very small. Therefore large amounts of live food must be fed to equal the food value of a small amount of dried food. *Daphnia pulex* is particularly at fault in this. One bag of these 'water-fleas' contains very little actual food although what there is is of good value. From this it can be seen that the role of *Daphnia pulex* is in providing a change because it cannot possibly be fed in the required amounts. Mosquito *larvae* and glass worms are similar to *Daphnia* with respect to food amount and value. These three types should be fed by emptying the bag into the tank and they are usually eaten very quickly. Some fishes do not eat these foods—in my experience it is usually the large cichlids. The two that absolutely refuse to eat them are oscars and discus. I cannot offer an explanation for the refusal by my discus, but oscars clearly will not eat them because they like to eat their food in large lumps. Even small oscars have large mouths and refuse these foods in favour of large lumps as do most juvenile large cichlids. In my opinion, these three foods are more responsible for disease and introduced fish enemies than the next. Provided *Tubifex* are adequately cleaned they provide an excellent meal for most fishes. They also need to be fed in large quanti-

ties and in a healthy tank no trouble from worms in the gravel should be found because most fish will pull these worms from the gravel. Among the most noted for this are the *Corydoras* catfish and discus. Few fish can resist a *tubifex* worm.

Fly maggots can also be obtained from all fishing tackle shops and they provide an excellent food for all large fish. It is not practical to cut them up but cichlids and goldfish eat them with relish. Maggots are a very convenient food because they are very cheap and clean and can be kept in a small box without any need of feeding them. The only disadvantage is that they pupate rather quickly.

(b) This group includes the foods that aquarists can collect or culture for themselves; something that aquarists do too infrequently. These foods include: Meal worms; *Gammarus* shrimps; Earthworms; Whiteworms and baby fish. (*Daphnia pulex* can also be cultured in ponds, but the supply is very unpredictable and most aquarists find it easier to buy them from a shop.) *Gammarus* shrimps are a useful food for large fish, due to their hard external shell. They can be found in the clean, trout-type streams, especially in the shallow, stoney runs, where they live between the stones. If a large stone is removed the *Gammarus* can be easily taken from the crevices and put in a bucket of water. Often a bucketful of the mud-shingle bed yields many of these crustaceans. It is not practical to breed them in any quantity nor is it practical to keep the shrimps for any period of time. In damp conditions earthworms can be easily found whilst digging the garden, but several more sophisticated methods have been developed by anglers. One is to dig in the compost heap for the small red brandling worms. Another involves tipping various 'secret' solutions on a particular patch of earth, that is kept clear of plant growth. This apparently attracts the worms. This is probably due to the fact that worms tunnel to damp conditions so in that patch they will come nearer the surface than in the drier surroundings. The method I use most often is to search the lawn after dark with a torch. Care must be taken because the worms are sensitive to light and will burrow if the torch is left on more than that which is necessary. The worms will be found half-in, half-out of their burrows and all that needs to be done is to pull them up. To do this without breaking them is something of an art. Another convenient area of grass is the local park. In a park large areas of grass can be searched methodically very quickly and soon a large number of worms will be found. It is not advisable to keep worms for too long, but they can be kept in a damp box full of peat with a small piece of bread, regularly renewed, for several weeks. Before feeding worms, you should put them in a box with some filter wool for several days because their digestive tracts are full of soil. During this time the worms clean themselves by depositing this soil on the filter wool. If this were not done a considerable amount of soil would be introduced into the fishes and into the aquarium. When actually feeding, the worms can be cut into the required size or even ground to feed the smallest of fish, and fed to the fish in the usual way. White worms are another form of worm that can be easily cultured, because they breed very quickly. Cultures can be bought from all aquarium shops. The newly purchased culture should be added to a freshly prepared, non-airtight box filled with some damp peat (but not wet). The containers should be made of clay or cement because they allow diffusion of air and excess water can evaporate, whereas the usual plastic box has neither of these properties. The box should have a light-tight lid, because the worms shy away from light. For this, a wooden box is very good, but it does not allow excess water to evaporate, but all I use is a heavy sheet of cardboard and I find that this keeps out the light very well. The containers that I use are large clay flower pots and I find they meet all the above requirements very well. A sheet of glass is put on top of the peat and any food is placed on top of the peat immediately under the glass. White worm food can be bought, but a piece of bread feeds the worms just as well. The amount of food to give is very important. If too much is given, the food will rot, if too little, the worms will be underfed and few worms breed. The amount of food will vary on the size of the worm population, but generally feed enough to last for two days, when more food is added. Frequently, difficulty is found on trying to collect the worms. This can be easily done by pulling the glass up and the worms can be scraped from the underside of the glass to which they had adhered and the food can also be removed. Usually, a large bunch or worms will be found hanging to the food and these can be easily removed. It is a good idea to dig into the peat every month to turn it over and aerate it properly, preventing it from becoming stale. Depending on your needs, these cultures can be kept in three different ways. The first is for the aquarist with a few tanks. This involves having one culture and taking out a few worms regularly. The second is for the aquarist who has fairly large needs and involves having two cultures and taking worms from the cultures alternately. The third can provide very large amounts of worms. Here a battery of several cultures is kept. When worms are required, one culture is turned out and all the worms removed. Some of these are used to prime a new culture and the rest are fed to the fish. By the time all the other cultures have been used and re-primed the original is again full of worms and ready to be used. The worms are eaten by fishes of all sizes and can be chopped for the smaller ones. They can be fed by dropping a ball directly into the aquarium

after rinsing to remove any soil, or put into a worm feeder. On the whole, white worms are about the best food that the aquarist can easily use. Baby fish and eggs provide a good food for all fish and as all aquarists have unwanted baby fish, most aquarists have fairly good supplies. The size of fry obviously depend on the size of the fish that you intend to feed. If you feed fry to cichlids then it is likely that you will have to raise the cichlid fry artificially, so some thought is necessary before introducing this food as to the consequences.

(To be continued)

FOR THE HERPETOLOGIST'S BOOKSHELF

by Andrew Allen

DURING his early days as a herpetologist, the amateur encounters a major problem: the vagaries of the literature. Public libraries feature only one or two relevant volumes. Bookshops are no more help, their wares chosen for saleability rather than pure merit. Specialized papers will be scattered across dozens of minority learned journals, heart-breaking to locate. And the herpetologist is rather a rare and select beast; so there may be no one handy to ask for advice. The net result can be a costly and irritating baptism of fire.

These articles attempt to furnish just such advice, by evaluating books and discussing in detail the literature upon various topics.

For today I shall just discuss some general characteristics of that herpetological literature, to set later specific articles into a unified context.

Firstly, the literature has been rather small in extent. This stems directly from the economic unimportance of Reptiles and Amphibians, and their relative paucity of species. The volume of print produced bears absolutely no comparison with fields like entomology or the aquarium hobby. Consequently whilst aquarists must ever sift rare literary wheat from mountains of superfluous, ill-written chaff, the herpetologist encounters the opposite problem. He finds rather a limited selection of books, often difficult to trace. And unhappily not all of them merit a search.

But times change. The literature now begins to mushroom, fed by a crop of new articles, papers and books. So now one must not only search diligently for herpetological works; it becomes imperative to discriminate severely when they are found. If not prepared to follow the advice of myself and other reviewers (I hope none would meekly accept our words as gospel), inspect the books in public or university library before putting any cash on the counter. At current prices anyone who buys books blind stakes out priority claim to a padded cell.

With book prices so unstable, any figures that I quote should be treated as guidelines, and nothing more. Changes are quite probable in the interval between my penning these words and your reading them.

Herpetological articles and papers speckle the scientific literature, dispersed across numberless journals from Ecological Monographs through to Ultrastructure Research. Some may be apprehended via bibliographies of the better books. Or, as these are invariably several years out of date, consult the mammoth Biological Abstracts (of which more in later articles); these provide a mind-bending doorway into the darkest recesses of the literature.

Apart from articles in 'The Aquarist', the sole mode of herpetological writing is the British Journal of Herpetology, published twice yearly by the British Herpetological Society. Slim but expensive, it features a hotch-potch of minor papers upon a variety of academic subjects, plus letters and book reviews. Members of the society enjoy use of a library, and receive a newsletter crammed with snippets of vivarium small chat, full of opportunities for contact with others in the field. Membership is a 'must' for serious herpetologists, particularly as revenues go in part towards support of a vigorous conservation programme.

To remain abreast of current advances one must maintain contact with the gargantuan American literature—like the curate's egg in quality, but containing some very important work. I shall discuss this field in due course. Also many vital writings are in French and German; the complete herpetologist should develop a reading knowledge of both languages.

This brief sketch of the scené, in bold but blurred strokes, must needs leave all the vital questions unanswered. But my next article will sharpen its focus and approach the field from a logical beginning. I shall commence by discussing books that give a gentle lay introduction to the biology of Reptiles and Amphibians, and their place in the pattern of life.

BOOK REVIEW

Freshwater Fishes of the World *by Dr. rer. nat. habil. Gunther Sterba, published in America by T.F.H. Publication Inc., distributed in England T.F.H. (Great Britain) Ltd., Reigate, Surrey. Retail price £7·50.*

Even though the British may claim that scientific aquarium keeping is their invention with the publication of the first paper on the theory and practice of the balanced aquarium by Robert Warrington in 1850, it must be admitted that today the Germans lead the world in fish-keeping know-how and pioneering effort, in their apparent success in breeding and rearing "difficult" fish, and also in their willingness to part with their accumulated knowledge. It is therefore not surprising that some of the most authoritative and comprehensive publications are of German origin. This book is no exception, written by one of the world's leading experts, a "hobbyist" of 40-odd years standing and since 1959 the Director of the Zoological Institute of the Karl-Marx University of Leipzig, Germany. It was first published in the German language in 1959 and an English edition appeared in 1962.

Freshwater Fishes of the World (some 850 pages) deals with the identification, biology and care of more than 1,300 species; it also includes many species—even whole families of fish—which are never mentioned in other books. The drawings, distribution maps and anatomical figures are of a very high standard. In the first English edition there were 425 superb colour and black and white plates, most of which had never been published before.

Having always considered *Freshwater Fishes of the World* as THE BOOK I must admit that I am rather disappointed with the T.F.H. edition.

Since the book was written more than 15 years ago and since a great deal of new knowledge has become available about many of the fishes dealt with in the book—breeding behaviour, some more general information, and also some changes of names, etc.—I would have expected the publishers to include such information in this new edition and present it as an up-to-date version of this now well-established publication. Also, of the 425 magnificently reproduced colour and black and white plates in the earlier edition, only the black and white plates appear again—the colour plates being reproduced in black and white. "New" colour plates have been inserted into this book, but readers will find that they are familiar with these colour plates as they have already appeared in various other T.F.H. publications. To my mind, it is a great pity that the excellent colour plates had to be replaced with these familiar photographs—52 of which are by Mr. H. Axelrod. Even the black and white photographs lack crispness as the paper of the book is of a quality inferior to what one would have expected. (Certainly at this price.) No time was spent on amending the index; the original colour plates are still mentioned and it took me a considerable time to find that the publishers had just inserted a new page for the new colour plates; the old spelling mistakes are still there and some new ones make their appearance for the first time. Personally, I would gladly spend a pound or two more for a proper cover since I have found that paperbacked books which are handled a great deal usually come apart after a very short time.

EBERHARD SCHULZE

EAGERLY awaited by many aquarists the "completely revised" edition of Dr. Gunther Sterba's **Freshwater Fishes of the World,** published by Studio Vista at £12·50, has turned out to be nothing more than a hard-covered version of the above-mentioned T.F.H. edition. It seems that Dr. H. Axelrod has secured the entire English language rights for T.F.H. and is also responsible for the production of these volumes even though the initials "SV" appear at the bottom of the titled back. There is no further mention of Studio Vista and these books are, and must be regarded as, a T.F.H. publication, and echo the standard of the paper-backed version.

The promised revisions can nowhere be found; in fact, no revision whatsoever has taken place—the accepted change of name of the Barb family has been ignored completely; *Puntius tetrazona* (Tiger barb) is still classified as *Barbus tetrazona*, *Pelmatochromis pulcher* is still listed as *Pelmatochromis kribensis*, *Aequidens latifrons* is still recognised as a separate species, etc. etc. etc. The mis-spellings and typographical errors in the paper-backed edition are faithfully reproduced.

Another objection I have is the recommendation to read aquaristic literature like Water Life and Aquarium World, a magazine which ceased publication some ten years ago and The Aquarium which was published by William Innes and has disappeared from the tropical fish world.

I can only add that I was most disappointed when I first opened these "new" books and suggest that aquarists find their information in some other authoritative publication which are more up to date, since for £12·50 any hobbyist is entitled to expect something more than an inadequately checked, badly produced version of a standard work elevated to a "new publication" by the addition of some indifferent colour plates and the reproduction of original colour plates in blurred and heavily shaded monochrome.

EBERHARD SCHULZE

THE SUCCESSFUL CULTIVATION OF AQUATIC PLANTS

by Barry R. James

THERE IS NO problem in the aquarium world on which there is so much conflicting thought and where there is so much bad advice given as there is in the planting and maintenance of aquatic plants. This is rather surprising in that the basic principles are so straightforward and simple knowledge, rather than a set of green fingers, is all that is required. Bearing in mind that the primary object of an aquarium is to create a miniature aquascape in which the gravel, rocks, plants, and other decorative materials form a setting against which the fish are displayed, it is obviously essential that the plants should grow successfully.

The requirements for vigorous plant growth are as follows:—

1. Correct illumination, in quality, intensity and duration.
2. The water should be of the correct pH and hardness, and contain no substances such as suspended matter which would interfere with the clarity.
3. The maintenance of the correct temperature range.
4. An adequate supply of minerals and fertilizing agents.
5. A suitable rooting medium.
6. Prevention and control of *algae* and other disease-causing organisms.

Lighting

This is a subject over which there has always been a great deal of controversy, as there are so many ways in which one can light an aquarium with the multitudinous array of bulbs and tubes available today.

In our attempts to grow plants in the aquarium we must bear in mind the way light is utilized by the plant for growth. This process is called photosynthesis. The green pigment, chlorophyl, is present in the stem and leaf tissues of all living plants. This substance acts as a catalyst in the process of a reaction whereby the basic molecules of water and carbon dioxide are combined to synthesize carbohydrate. This reaction can be expressed by the formula:—

$$6H_2O + 6CO_2 \xrightarrow{\text{Light energy}} C_6H_{12}O_6 + 6O_2$$

Water + Carbon dioxide → Carbohydrate + Oxygen

However it has been found by experimentation that the spectrum of light plays a vital part in this reaction, only certain wavelengths being of any use to the plant itself. As the wavelengths of light which our eyes utilize to see are quite different from those needed by the plant to grow, it follows that lamps designed to light our homes and offices are not ideal for the aquarium. Plants have been found to show a high degree of absorption in the blue and red light regions of the spectrum.

It was therfore necessary for the lighting industry to develop special lamps for the agricultural industry to serve the growing need for intensive-light propagation units in order that crops could be produced faster and to extend the growing season independently of natural daylight.

The fluorescent lamp was ideally suited to the task. These lamps produce ultra-violet radiation by discharge in low-pressure mercury vapour. Light of longer wavelength is produced by coating the lamp wall with phosphor. By varying the type of phosphor used it is possible to produce any desired form of light. By coating with a red and blue phosphor the predominent type of light produced lies in the blue and red portion of the spectrum, so essential to plant growth. Such lamps as Gro-Lux, L-Fluora and Toshiba Plantlux are examples of this type of specialised lighting.

However, apart form the quality of light used, two further factors, intensity and duration come into the reckoning. Intensity of this type of lighting should be at the rate of 20 watts per square foot for a period of 10 hours duration per day.

I do not want the reader to be under the impression that only fluorescent tubes of this type are of any use and other types such as Warm White and Daylight can also give satisfactory results in the aquarium using the same wattage and duration as given above. In practice I use a combination of Warm White and a Gro-Lux type as by positioning the Gro-Lux towards the front of the hood one gets the added bonus of

more intense reflective colouring of the fishes as the blue and red rays of the Gro-Lux pick out the similar colours in the fish.

Incandescent lamps can also be used with success. In this case, due to the fact that a large proportion of their output is in the form of heat, a higher wattage must be used. 40 watts per square foot for 10 hours a day will be found satisfactory. Those bulbs marked "Rough Service" which have thicker filaments have a longer life in the aquarium hood than normal lamps. Tubular incandescent lamps as supplied with certain types of plastic aquariums are expensive and tend to have a shorter life in my experience.

Water Chemistry and Clarity

Most water plants are extremely adaptable as regards to pH and will grow happily between 6·8 and 7·5, some being quite successful at readings of 8 or more. However neutral to slightly acid water is preferable as this cuts down the risk of excess *algae* growth which thrive at high pH values. Clean filtered rainwater is probably best but tap water will suffice if no other is available, provided that it is allowed to stand for a few days to remove possible heavy concentrations of chlorine. The hardness of the water can be quite critical for some species i.e. *Cryptocoryne griffithi* will seldom succeed if the DH is much over 5 (German Degrees of Hardness). However, the majority of species are quite happy between 10 and 15 DH. It is obviously wise policy to check on the particular requirements of a particular species before purchase.

The clarity of water is very important as heavy concentrations of suspended matter or vegetable dyes in the water will cut down the amount of light reaching the plants and in the case of suspended matter clog up the stomata of the leaves thereby stifling the plant. This is particularly dangerous with very fine-leaved plants such as *Myriophyllum*.

Temperature

A temperature of between 75 and 78 degrees Fahrenheit will suit the majority of tropical plants but a couple of degrees either way will not cause any harm. Coldwater subjects should not exceed 70 degrees and are happiest in the mid-sixties.

Mineral Requirements

Heavy concentrations of Nitrates and Phosphates in the aquarium should be avoided as this will certainly lead to "*algae* bloom" which can be disastrous. Moderate doses of well-blended fertilising preparations can be used with advantage especially in the early days of a newly set up aquarium. Fertiliser tablets will be found useful for the root-feeding types such as Amazon Swords, etc., and liquid preparations for those plants which feed through the leaves and stems such as *Cabomba*. I have been experimenting with the limited use of Iron Chelates on difficult Calcifuges with some success.

The Base Covering

The planting medium should consist of peat, loam and coarse gravel. No composted material such as leaf-mould should be used. Peat is best used in the form of compressed plates as this does not find its way through the gravel layer as the loose crumbly variety.

These plates should be placed in position on the base of the aquarium leaving a half-inch space between each one. The spaces can then be filled with a good heavy loam if desired. Unwashed gravel of particle size ranging from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. should then be placed on top to a depth of 2 in. at the rear of the tank to $\frac{1}{2}$ in. at the front. Well-washed gravel should then top this layer to a further depth of 1 in. Rocks and bogwood should now be placed in position; the water added and the tank is ready for planting.

Of course, pure gravel on its own may be used and plants can grow quite well in this medium but the addition of peat and loam will produce much lusher growth. Mulm, which is produced by the decay of fish faeces and decaying plant leaves, should be allowed to remain to a certain extent but excess build up should be syphoned off regularly.

The Control of *Algae*

Infestation by *algae* is one of the most difficult problems to cure. *Algae* occurs in three basic forms:

1. Free-swimming microscopic species which in quantity can cause the water to assume a 'pea-soup' appearance.
2. Filamentous types which form tangled masses either resting on the bottom, entwined or attached to plants and rocks.
3. Sheets of blue-green *algae* which cover every surface of the tank.

In order to prevent the excessive growth of *algae* the tank should contain a healthy selection of aquatic plants which when growing vigorously will compete for space, light and minerals. Secondly, the fish population should be chosen in such a way that species which include *algae* as part of their diet should be included. *Hypostomus* catfish, *Gyrinocheilus* Loaches and Mollies are examples of fish which should be included. If in spite of this a build up of *algae* occurs, the aquarist should first try to isolate the change in the environment which has caused the problem. To do this he must try and identify the species of *algae* involved and I shall be dealing with this problem in a later article in more detail. There are now several algicides on the market of a specific nature and if used with discretion can be most effective. One must guard however against sudden death of a big *algae* population as this can cause pollution of the aquarium.

News from AQUARISTS' SOCIETIES

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

AT the annual general meeting of the **Romford & Beaconcree A.S.**, the following officers were elected: Chairman: D. G. Kent. Secretary: D. E. Byfield, 73 Cecil Avenue, Hornchurch, Essex; Tel.: Hornchurch 56052. Treasurer: G. C. Reading. Show Secretary: F. Jacobs. Assistant Secretary: W. J. Baker. Entertainments Secretary: P. Hines. Committee Members: T. Jones and C. Berkley. Venue: St. Augustines Church Hall, Rush Green Road, Romford, Essex, on alternate Thursdays, 14th November. New members always welcome.

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RESULTS of the **Cardiff A.S.** Annual Open Show were as follow: Best Tropical Fish in Show: A. C. Tull, Salisbury A.S. Best Coldwater Fish in Show: Mr. and Mrs. C. Harding, Cardiff A.S. Most Points in Show: Mr. and Mrs. C. Harding, Cardiff A.S.

Classes: BZ: 1, J. Egan; 2, Mr. and Mrs. Guthrie; 3, D. Reed; 4, D. Warmeant. CZ: 1, Mr. and Mrs. C. Harding; 2, B. Purdy; 3, N. C. Bowles; 4, R. Daws. CA: 1, K. Taylor; 2, R. Newton; 3 and 4, C. Turner. DZ: 1 and 2, S. Compton; 3, R. Daws; 4, T. Gardener. DA: 1, C. J. Davies; 2 and 4, B. Purdy; 3, P. Thomas. DB: 1, C. Turner; 2, R. A. Poots; 3, D. Warmeant; 4, G. Churchcill. DC: 1, Mr. and Mrs. C. Harding; 2, C. Morrison; 3, R. Daws; 4, T. Gardener. EZ: 1, P. Thomas; 2, N. Shepherd; 3, D. Warmeant; 4, N. Jones. EA: 1, Mr. and Mrs. C. Harding; 2, M. Guy; 3, R. Newton; 4, A. M. Smith. F: 1 and 2, C. Morrison; 3, B. Purdy; 4, M. Addicott. G: 1 and 2, Mr. and Mrs. C. Harding; 3, N. Jones; 4, Mr. and Mrs. Guthrie. H: 1, Mr. and Mrs. C. Harding; 2, A. M. Smith; 3, R. S. Wigg; 4, D. Warmeant. I: 1, Master John Edwards; 2, R. G. Purdy; 3 and 4, Debbie and Susan Guthrie. J: 1 and 4, Mr. and Mrs. C. Harding. 2 and 3, R. A. Poots. K: 1 and 3, J. J. Edwards; 2, K. Taylor; 4, H. Chick. L: 1, A.C. Tull; 2 and 3, W. Gibbon; 4, D. Reed. M: 1 and 3, D. Warmeant; 2, H. Chick; 4, Mr. and Mrs. C. Harding. N: 1, C. Turner; 2, Mr. and Mrs. Guthrie; 3, Mr. and Mrs. C. Harding; 4, D. Warmeant. O: 1, Timothy and Donna Slade; 2, N. Price; 3, Carl and Donna Price; 4, M. Guy. P: 1, Mr. and Mrs. Guthrie; 2, R. S. Wigg; 3, Master J. Edwards; 4, M. Guy. Q: 1, N. C. Bowles; 2, E. Hurley. R: 1, W. G. Best; 2, R. Newton; 3, G. Lewis; 4, P. Purdy. S: 1 and 2, W. G. Best; 3, A. M. Smith; 4, M. Guy. T: 1 and 3, A. M. Smith; 2, C. Turner; 4, M. Guy. XB-M: 1, Mr. and Mrs. C. Harding; 2, S. Compton; 3, D. Warmeant; 4, R. A. Poots. XO-T: 1, R. A. Poots; 2 and 3, C. Morrison; 4, M. Guy. U: 1 and 2, Mr. and Mrs. C. Harding; 3 and 4: C. Rupert. V: 1, 2, 3 and 4: C. Rupert. W: 1, 2 and 4, C. Rupert; 3, Mr. and Mrs. C. Harding. Z: 1, Mr. and Mrs. C. Harding; 2, R. Daws.

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AT the July meeting of the **Cotswold A.S.** all members enjoyed a tape and slide show called "Every Man an Expert" which was loaned from the Hendon Society. The table show results were: 1, Mrs. G. Hodges; 2, K. Hodges; 3, K. Beadley. Mr. Creed from Wiltshire travelled a very long way to give the Society a talk at their August meeting. This was entitled the "A, B, C of fish and tanks." Results of the August table show were: 1 and 2, K. Hodges; 3, M. Poole.

In September all members enjoyed a very good evening of slides on Manchester Belle Vue "Past and Present" and a talk was given by Gordon Churchill. To finish the evening slides were shown of the Natural History Museum. The results of the table show: 1, Mrs. G. Hodges; 2, K. Hodges; 3, B. Dodson.

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AMONG the recent lectures given at the general meetings of the **Portsmouth A.S.** included one given by Mr. Steven Crabtree on "Reptiles." The society was shown specimens of Iguanas, toads and snakes and learned about their living conditions and breeding habits. Another lecture was given by Mr. M. Mason on "Fish Photography," who with the aid of slides illustrated to members the correct way to set up a tank and camera in order to gain the best results in the photography of fish.

All aspects of fishkeeping are dealt with at the society which meets at the Portsmouth Community Centre, Malins Road, Buckland at 8 p.m. on the first and third Wednesdays every month, with the exception of August when the society hold their annual show, circumstances permitting. New members, both beginners and the more experienced, can be assured of a warm welcome when they come along.

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THE **Newcastle Guppy and Live Bearer Society** held the first ever "All Livebearer" Open Show in this country recently and 206 exhibits were entered by members of local societies. An extra point of interest for many people who attended was the twenty-five entries sent by the Deutsche Guppy-Gesellschaft. Results: Male Molly: 1, 2 and 3, Mr. Fortune, N.G.L.S. Breeding Pairs Molly: 1, Mr. Costain, Priory; 2 and 3, Mr. Dudley, Hartlepool. Male Platy: 1, Mr. Fortune, N.G.L.S.; 2 and 3, Mrs. Howard, Priory. Breeding Pairs Platy: 1, Mr. Parkes, Sheffield; 2, T. Marshall, N.T.F.S.; 3, Mr. Costain, Priory. Male Swordtail: 1, Mr. Turnbull, Mount Pleasant; 2, Mr. and Mrs. Sowerby, Mt. Pleasant; 3, Mr. Quantrill, Priory. Breeding Pairs Swordtail: 1, Mr. Kerr, N.G.L.S.; 2, T. Marshall, N.T.F.S.; 3, Mr. and Mrs. McKenzie, Priory. Male A.O.V.: 1 and 3, Mr. and Mrs. Renton, N.G.L.S.; 2, Mr. Onslow, Loughborough. Breeding Pairs A.O.V.: 1, Mr. Kerr, N.G.L.S.; 2, Mr. and Mrs. Renton, N.G.L.S.; 3, Mr. Parkes, Sheffield. Male Guppy Broadtail: 1, Mr. Wright, South Shields; 2, Mr. Gibson; 3, Mrs. Howard, Priory. Female Molly: 1, Mr. Fortune, N.G.L.S.; 2, Mr. Wright, South Shields; 3, Master Fellows, Killingworth. Breeders Class Molly: 1, Mr. Laydon, South Shields. Female Platy: 1, Mr. Pomeroy, T.A.S.; 2, Mr. Costain, Priory; 3, T. Marshall, N.T.F.S. Breeders Class Platy: 1, Mr. Pomeroy, T.A.S.; 2, Mr. Dunkin, N.T.F.S. Female Swordtail: 1 and 2, Mr. and Mrs. Sowerby, Mt. Pleasant; 3, Mr. Kerr, N.G.L.S. Breeders Class Swordtail: 1, Mr. and Mrs. Fenwick N.G.L.S.; 2, Mr. and Mrs. Sowerby, Mt. Pleasant; 3, Mr. Turnbull, Mt. Pleasant. Female A.O.V.: 1, Mr. Onslow, Loughborough; 2, Mr. and Mrs. Renton, N.G.L.S.; 3, Mr. Duncanson, Priory. Breeders Class A.O.V.: 1, Mr. Yates, N.G.L.S.; 2, Mr. and Mrs. Renton, N.G.L.S.; 3, Mr. Parkes, Sheffield. Male Guppy Narrowtail: 1, Mr. Franks, N.G.L.S.; 2, Mr. Lawson, N.G.L.S.; 3, Herr. Martinelly, D.G.G. Female Guppy: 1, Mrs. Howard, Priory; 2, Mr. and Mrs. Sowerby, Mt. Pleasant; 3, T. Marshall, N.T.F.S. Breeders Class Guppy: 1, Mr. and Mrs. Sowerby, Mt. Pleasant; 2, Mr. Laydon, South Shields; 3, Mr. Daly, N.G.L.S. Breeding Pairs Guppy: 1, Mr. Kerr, N.G.L.S.; 2, Mr. Franks, N.G.L.S. Best Fish in Show: D. Pomeroy, T.A.S. Best Guppy in Show: P. Wright, South Shields. T.T.A.A. Trophy (Male Platy): J. Fortune, N.G.L.S. F.B.A.S. Trophy (Male A.O.V.): Mr. and Mrs. D. Renton, N.G.L.S. Robinson Trophy (Male Molly): J. Fortune, N.G.L.S.

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IN September, Mr. T. Collier of Gloucester gave a most interesting lecture to the members of the **Bristol Tropical Fish Club** entitled "Feeding and Care of Fry and Young Fish". For the past few months there has been a steady growing attendance of new members and it is hoped that interested persons will continue to come along on the third Thursday of the month to the "Black Horse," Old Market, Bristol. Any information required please contact the Secretary, Mrs. L. Littleton, 9, Little Stoke Road, Stoke Bishop, Bristol.

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APPROXIMATELY thirty members were in attendance at the October meeting of the **Gloucester A.S.** for a very interesting lecture and slide show given by Mr. D. Noble of Bristol. The lecture was A.O.V. Catfish, care and breeding, which everyone enjoyed. The results of the annual home aquarium competition judged the previous week were as follow: 1, K. Taylor; 2 and 4, J. Williams; 3, F. Timmins. Monthly table show 'Catfish' results: 1, F. Timmins; 2, G. Dixon; 3, L. Griffiths; 4, G. Perkins.

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RESULTS of Open Show of the **Malvern & District A.S.**:

A.V. Live Bearers: 1, K. Downes (Gloucester); 2, B. Day (Redditch); 3, P. J. Greenwood (Gloucester); 4, J. Hawkins (Redditch). Guppys: 1, J. Ferguson (Bath); 2 and 3, C. J. Nightingale (Birmingham); 4, K. Owen (Bath). Dwarf Cichlids: 1, J. Ferguson (Bath); 2, T. Purvis (Malvern); 3 and 4, C. J. Nightingale (Birmingham). A.O.V. Cichlids: 1, P. J. Greenwood (Gloucester); 2 and 4, S. Wood (Bath); 3, B. E. Cureton (Malvern). Labyrinths: 1 and 2, C. J. Nightingale (Birmingham); 3, P. J. Greenwood (Gloucester); 4, J. Ferguson (Bath). Large Anabantids: 1, C. J. Nightingale (Birmingham). Corydoras: 1 and 4, P. J. Greenwood (Gloucester); 2, J. Ferguson (Bath); 3, G. A. Bowen (Malvern). A.O.V. Cat Fish: 1, J. Ferguson (Bath); 2, K. Owen (Bath); 3, P. J. Greenwood (Gloucester); 4, S. Wood (Bath). Small Barbs: 1, J. Ferguson (Bath); 2, C. J. Nightingale (Birmingham); 3, E. Cureton (Malvern); 4, W. Willis (Malvern). A.O.V. Barbs: 1, G. A. Bowen (Malvern); 2, W. Willis (Malvern); 3, S. Wood (Bath). Characins: 1 and 3, C. J. Nightingale (Birmingham); 2, J. Ferguson (Bath). A.O.V. Characins: 1 and 2, J. Ferguson (Bath); 3, J. Mason (Malvern); 4, T. Purvis (Malvern). A.O.V.: 1, J. Ferguson (Bath); 2, M. Timmins Gloucester); 3, K. Owen (Bath); 4, N. Owen (Bath).

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THE results of the **Hoylake A.S.** open show were as follow: Guppies: 1, Mrs. Lea (Unattached); 2 and 3, Mrs. Houghton (Sandgrounders). Mollies: 1, Mr. Carter (M.A.S.);

2, Mrs. M. N. Rimmer (Sandgrounders); 3, K. Houghton (Sandgrounders). Swords: 1, C. P. S. Norton (Sandgrounders); 2, Mr. and Mrs. Muckle (Unattached); 3, Mr. and Mrs. Skillen (Hoylake). Platines: 1, B. W. Carter (M.A.S.); 2, R. Mathers (Wrexham); 3, Mr. Baldwin (Sandgrounders). Fighters (Male): 1, J. Taylor (M.A.S.); 2, B. W. Carter (M.A.S.); 3, Mr. Payne (M.A.S.). Fighters (Female): 1, R. Mathers (Wrexham); 2, B. W. Carter (M.A.S.); 3, Mr. Baldwin (Sandgrounders). A.O.V. Anabantids: 1, T. Hampton (M.A.S.); 2, P. and H. Batchelor (Leyne); 3, Mr. Batchelor (Leyne). Small Barbs: 1, J. Bate (Sandgrounders); 2, A. Vaissiere (M.A.S.); 3, Mr. Nuttall (Hoylake). Large Barbs: 1, Mr. Batchelor (Leyne); 2, A. Vaissiere (M.A.S.); 3, F. Mulla (M.A.S.). Dwarf Cichlids: 1, B. W. Carter (M.A.S.); 2, C. P. S. Norton (Sandgrounders); 3, P. Whelan (Blackburn). Large Cichlids: 1, A. Barton (Hoylake); 2, T. Hampton (M.A.S.); 3, D. A. Neave (Hoylake). Angels: 1, Mr. Nuttall (Hoylake); 2, C. P. S. Norton (Sandgrounders); 3, S. Harvey (Sandgrounders). Malawi Cichlids: 1, F. Mulla (M.A.S.); 2, Mrs. S. Seymour (M.A.S.); 3, T. Hampton (M.A.S.). Characins (Small): 1 and 2, F. Mulla (M.A.S.); 3,W. Bamber (Sandgrounders). Characins (Large): 1, R. Houghton (Sandgrounders); 2, Mrs. Seymour (M.A.S.); 3, Mrs. D. T. Armour (Unattached). Rasboras: Danios and Minnows: 1, Mr. and Mrs. Muckle (Unattached); 2, C. P. S. Norton (Sandgrounders); 3, W. Bamber (Sandgrounders). Egglaying Toothcarps: 1, Mr. Payne (M.A.S.); 2, P. Snell (Hoylake); 3, Mr. and Mrs. Skillen (Hoylake). Flying Foxes and Sharks: 1 and 3, T. Hampton (M.A.S.); 2, W. Smith (M.A.S.). Corydoras Catfish: 1, G. Harvey (Sandgrounders); 2, T. Hampton (M.A.S.); 3, R. Houghton (Sandgrounders). Loaches and Botias: 1, P. Whelan (Blackburn); 2 and 3, Mr. and Mrs. Muckle (Unattached). A.O.V. Catfish: 1, P. H. Batchelor (Loyne); 2, Mrs. D. T. Armour (Unattached); 3, Mrs. G. Bond (Sandgrounders). Pairs (Livebearers): 1, Mr. Whelan (Blackburn); 2, Mrs. M. N. Rimmer (Sandgrounders); 3, T. Jones (Hoylake). Pairs (Egglayers): 1, P. Whelan (Blackburn); 2, Mrs. G. Bond (Sandgrounders); 3, A. Vaissere (M.A.S.). A.V. Livebearers: 1, Mr. and Mrs. Muckle (Unattached); 2, Mrs. G. Bond (Sandgrounders); 3, Mr. Payne (M.A.S.). A.V. Egglayers: 1 and 2, A. Vaissiere (M.A.S.); 3, Mr. Payne (M.A.S.). A.V. Egglayers (Easy): 1 and 2, A. Vaissiere (M.A.S.); 3, P. Snell (Hoylake). A.V. Fish Junior: 1, Master Barlow (Hoylake); 2, Master B. Roberts (Wrexham); 3, Master J. Taylor (M.A.S.). A.V. Fish Lady: 1, Mrs. G. Bond (Sandgrounders); 2, Mrs. Rowlands (Hoylake); 3, Mrs. Skillen (Hoylake). Common Goldfish & Comet: 1, J. Taylor (M.A.S.); 2, Mrs. T. Jones (Hoylake); 3, R. Mathers (Wrexham). Shubunkins (Bristol or London): D. Harvey (Sandgrounders); 2, J. Taylor (M.A.S.); 3, D. H. Neave (Hoylake). A.O.V. Fancy: 1 and 2, Mrs. B. Harvey (Sandgrounders); 3, Mrs. T. Jones (Hoylake). A.O.V. Coldwater: 1, Mrs. S. Seymour (M.A.S.). A.V. Marines: 1, D. A. Neave (Hoylake). A.O.V. Tropical Freshwater: 1, Mrs. G. Bond (Sandgrounders); 2, P. and H. Batchlor (Loyne); 3, Mr. Batchelor (Loyne). Furnished Tanks: 1, T. Jones (Hoylake); 2, Mrs. Wilkenson (Hoylake); 3, Mrs. Rowlands (Hoylake). Best Fish in Show: Mr. Payne (M.A.S.).

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THE **Hastings & St. Leonards A.S.** met recently to hear Mr. C. George from Eastbourne revisit Hastings to announce the winners of the Home Aquarium Competition which he judged earlier in the year. The winners were: 1, A. McCormick; 2, Mrs. M. Greig; 3, C. Reed. Best Junior Entry: Gary Brookes. Best Plants: Mrs. M. Greig.

At the following meeting three aquarists from London gave an amusing but practical talk on "Setting up a Tank for Breeding." They covered a wide variety of species from Barbs to Cichlids and at the end answered many questions from all those present. The table show judged by D. Hunt was for Characins. The placings being 1 and 3, Miss H. French; 2, P. Martin.

The society meets on the second and last Friday in each month at 18 Cornwallis Gardens, Hastings at 7.30 p.m.

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MEMBERS and guests of the **Llantwit Major A.S.** in their 21st Anniversary year, enjoyed a very pleasant evening on the occasion of the society's annual dinner and dance. Guest speaker, Mr. John Wheeler, Trowbridge A.S. spoke of the success of the society's activities during the past 21 years and highly praised the committee members for their effort in organising the activities of the Society. Particular mention was made of Mr. R. S. Wigg one of the founder members, who is still very much active and also of Mr. J. J. Edwards the show secretary who for the past few years worked extremely hard on all occasions and was an asset to any society. The president Alderman P. J. Smith C.B.E. congratulated the society on attaining its 21st anniversary and wished it good luck for the future.

Presentation of the society's perpetual trophies by the president were as follow: L. Dyson, W/C Smith Cup; G. Lewis, J. Holmes Memorial Cup; A. Ibbertson, Presidents Cup; H. Chick, Miles Thomas Cup; H. Chick, Stanton Cup.

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AT the October meeting of the **South Shields A.S.** there was a most interesting talk and demonstration on making all glass tanks by two of the members Mr. Ruffells and Master Turnbull. In addition there was a very instructive talk by Mr. W. Scott on fishkeeping for beginners. The new meeting place is The Waterloo Vale Centre, South Shields and the new secretary is Mr. Peter Wright, 11 Boston Crescent, Town End Farm, Sunderland, Tyne and Wear.

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FOR their October meeting **Llantwit Major A.S.** (C.N.A.A. F.B.A.S. affiliated) held an inter-club competition with Port Talbot A.S. Llantwit Major came out winners by 32 points to 10. Results as follow:—A.O.V. Egglayers: J. Thompson (L.); 2, H. Chick (L.); 3 and 4 J. Eagan (P). A.O.V. Livebearers: 1, G. Lewis (L.); 2 and 4, A. Ibbertson (L.); 3, R. Newton (L.). K.O. Egglayers: 1, S. Nelson (L.); 2, A Ibbertson (L.); 3, J. Thompson (L.); 4, R. Perkins (P). K.O. Livebearers: 1, Master John Edwards (L.); 2 and 3, A. Ibbertson (L.); 4, R. Newton (L.).

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THE **Loughborough & District A.S.** were the hosts this year for the Bedworth, Leicester, Loughborough inter-club show and social evening held in October. Chief winners were: Anabantids: 1, J. Salisbury (Bedworth); 2, G. Taylor (Loughborough); 3, C. Pratt (Bedworth). Barbs: 1, J. Salisbury (Bedworth); 2, I. Purdy (Loughborough); 3, J. Williams (Leicester). Novice Egglayers: 1, M. Braimbridge (Leicester); 2 and 3, T. Parry (Loughborough). Cichlids: 1 and 2, J. Salisbury (Bedworth); 3, C. Jackson (Leicester). Livebearers: 1 and 2, D. White (Bedworth); 3, G. Lindsey (Loughborough). A.V. Catfish: 1 and 3 D. White (Bedworth); 2, C. Pratt (Bedworth). Characins: 1, H. Richardson (Loughborough); 2, R. Shakespeare (Bedworth); 3, G. Howe (Loughborough). Single Tail Goldfish: 1, and Best in Show, H. Brakes (Leicester); 2, R. Shakespeare (Bedworth); 3, G. Lindsey (Loughborough). Result: 1, Bedworth; 2, Loughborough; 3, Leicester.

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CHANGES in officers of the **Swillington A.S.** are as follow: president: J. Parkin; vice-presidents, G. Binks; secretary, M. Walker, 15 Dearswood Rise, Leeds 17, Yorks.; treasurer, B. Hamburg; show secretary, Mr. Roy and Mrs. Pat Hislop, 1 Firtree Gardens, Leeds 17, Yorks; social secretary D. Stead

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MEMBERS congratulated at the **Bournemouth A.S.** October meeting for their success at the A.S.A.S. Open Show were Mr. and Mrs. Bebb, B. Coombes, Mr. Walker and K. Gibbs. The club's annual awards for the Home Aquaria Competition were: 1, K. S. Gibbs; 2, Mr. Edwards; 3, J. J. Jeffrey; 4, B. Coombes. The October table show results were:—A.V. Molly: 1, 2 and 3, Mr. and Mrs. Bebb. Coldwater Breeders: 1, Mrs. Bebb. A.V. Plants: 1 and 2, Mr. Chatfield. Results at the A.S.A.S. show: K. S. Gibbs, Class H, 1. Mrs. and Mrs. Bebb, Class O, 1; Class P, 1 and 3; Class D, 4; Class S 1; Class Q, 1; Class C, 2; Class Db, 2; Class E, 2. Mr. Walker, Class F, 1, 2 and 3. B. Coombes, Class Z, 1, 2 and 3. Class W, 3; Class Ub.c., 2. 1, 2 and 3.

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RESULTS of the **Grantham & District A.S.** Annual Open Show were as follow:—Platies: 1 and 2, D. and M. Laycock (Sheaf Valley); 3, W. Blundell (Doncaster). Mollies: 1, Mrs. P. Chambers (Wellingborough); 2, Mr. and Mrs. Blades (Chesterfield); 3, T. Chambers (Wellingborough). Swordtails: 1, Mr. and Mrs. Roberts (Doncaster); 2, T. Nicholson (Sherwood); 3, S. Clarke (Aireborough). Guppies: 1, Mr. and Mrs. Scott (Sheaf Valley); 2, D. and M. Laycock (Sheaf Valley); 3, Mr. and Mrs. Caldow (Scunthorpe & District). Small Characins: 1, D. and M. Laycock (Sheaf Valley); 2, W. E. Neville (Grantham); 3, R. Elliot (Corby). Large Characins: 1, Mr. and Mrs. Daines (Doncaster); 2, Mr. and Mrs. Roberts (Doncaster); 3, R. F. Shakespeare (Bedworth). Small Barbs: 1 and 3, W. E. Neville (Grantham); 2, Mr. and Mrs. Daines (Doncaster). Large Barbs: 1 and 3, T. Nicholson (Sherwood); 2, T. Smith (Sheffield). Dwarf Cichlids: 1 and 2, Mr. and Mrs. Binns (Scunthorpe & District); 3, Mr. and Mrs. Cox (Nuneaton). Large Cichlids: 1, Mr. and Mrs. Sellers (Lincoln); 2, K. Usher (Ind); 3, Mrs. Crew (Wellingborough). Angels: 1, Mr. and Mrs. Sellers (Lincoln); 2, Miss D. Hatton (Grantham); 3, D. J. Carnegie (Corby). Corydoras: 1, T. Smith (Sheffield); 2, L. Smith (Castleford); 3, W. Blundell (Doncaster). A.O.V. Catfish: 1, Mr. and Mrs. J. Gabe (Chesterfield); 2, D. Jones (Rotherham); 3, Mr. and Mrs. Fletcher (Doncaster). Loaches: 1 and 2, Mr. and Mrs. Binns (Scunthorpe & District); 3, K. M. Fox (Peterborough). Killiefish: 1, T. Smith (Sheffield); 2, L. Smith (Castleford); 3, G. White (Scunthorpe & District). Minnows and Danios: 1, T. Smith (Sheffield); 2 and 3, R. Illiot (Corby). Sharks: 1, W. Blundell (Doncaster); 2, S. Clarke (Aireborough); 3, Mrs. M. Crew (Wellingborough). Rasboras and Foxes: 1, T. Smith (Sheffield); 2, Mr. and Mrs. Copley (Doncaster); 3, Mr. and Mrs. Fletcher (Doncaster). Fighters: 1, D. and M. Laycock (Sheaf Valley); 2, L. Smith (Castleford); 3, Mr. Klunder (Ind.). A.O.V. Anabantids: 1, Mr. and Mrs. Simpson (Worksop); 2, Mr. and Mrs. Daines (Doncaster); 3, Mr. and Mrs. Blades (Chesterfield). Breeders (Livebearers) 1-10: 1 and 2, K. Usher (Ind.); 3, A. Feasey (Doncaster). Breeders (Livebearers) 11-20: 1, Mrs. Kilvington (Doncaster). Breeders (Egglayers) 1-10: 1, H. Kuhn (Lincoln); 2, T. Chambers (Wellingborough); 3, M. Armstrong (Grantham). Breeders (Egglayers) 11-20: 1, Mrs. Wells (Doncaster); 2, Mr. and Mrs. Fletcher (Doncaster); 3, H. Kuhn (Lincoln). Pairs (Livebearers): 1, Mrs. Q. Usher (Ind.); 2, K. Usher (Ind); 3, Mr. and Mrs. Daines (Doncaster). Pairs (Egglayers): 1, D. and M. Laycock (Sheaf Valley); 2, Mrs. Wells (Doncaster); 3, Mr. and Mrs. Scott (Sheaf Valley). A.O.V. Tropical: 1, Mr. and Mrs. Shipman (Grantham) Best Fish in Show; 2, Mr. and Mrs. Gabe (Chesterfield); 3, Mr. and Mrs. Simpson (Worksop). Novice (Livebearer): 1, P. Bolder (Grimsby); 2 and 3, W. Blair (Hucknall). Novice (Egglayer): 1, Miss J. Usher (Ind); 2, Master M. Bryant (Doncaster); 3, W. Blair

(Hucknall). Goldfish and Comets: 1, Mr. and Mrs. Bull (Derby); 2, A. Crew (Wellingborough); 3, S. Clarke (Aireborough). Shubunkins and Fancy Goldfish: 1, S. Clarke (Aireborough); 2, Mrs. and Mrs. Barlow (Grantham); 3, R. Shakespeare (Bedworth). A.O.V. Coldwater: 1, Mr. and Mrs. Blades (Chesterfield); L. Smith (Castleford); 3, R. Shakespeare (Bedworth). Juniors (Livebearer): 1, Miss K. Simpson (Worksop); 2, A. Feasey (Doncaster); 3, Miss J. Cavill (Doncaster). Juniors (Egglayers): 1, Miss K. Simpson (Worksop); 2, P. Smith (Sheffield); 3, Miss J. Usher (Ind.).

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A special meeting of the **Grantham & District A.S.** was held in October and the following officers were elected:—chairman, C. Shipman; secretary, P. Harris, 27 Clyde Court, Grantham, Lincs.; treasurer, M. Elsom; committee, W. E. Neville, M. Pattison, J. Jones, T. Gardiner.

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MAIN item at the October meeting of the **Suffolk Aquarist & Pondkeepers Association** was a slide show. The subject was "Breeding Catfish" and was enjoyed by all present. Several new members were welcomed to the club. Details of the visit to London were finalised and the committee and some other members of the club would be presenting a fish tank later to an old peoples home.

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THERE were 440 entries for the **Scunthorpe & District A.S.** First Open show in October. Results: Guppies: 1 and 2, D. & M. Laycock (Sheaf Valley); 3, Master J. Emerson (Castleford). Platies: 1 and 3, D. & M. Laycock (Sheaf Valley); 2, W. Blundell (Doncaster). Swordtails: 1, Mr. and Mrs. L. King (Doncaster); 2, Jackson and Bolder (Grimsby and Cleethorpes); 3, Mr. and Mrs. Stephenson (Sherwood). Mollies: 1, Miss K. Simpson (Worksop); 2, Mr. and Mrs. D. Caldow (Scunthorpe); 3, Master D. Burr (Scunthorpe). A.O.V. Livebearer: 1, Mr. and Mrs. Kilvington (Doncaster); 2, Mr. and Mrs. Cohen (Castleford); 3, Mr. and Mrs. Feasey (Doncaster). Small Characins: 1, D. and M. Laycock (Sheaf Valley); 2, T. Smith (Sheffield); 3, Mr. and Mrs. Daines (Doncaster). Large Characins: 1, Mr. and Mrs. Bailey (Sherwood); 2, Mr. and Mrs. Roberts (Doncaster); 3, Mr. and Mrs. Bradshaw (Sheaf Valley). Dwarf Cichlids: 1, Mr. and Mrs. Tyson (Sth. Humberside); 2, Mr. and Mrs. A. Binns (Scunthorpe); 3, Mr. and Mrs. L. Burr (Scunthorpe). Rift Valley Cichlids: 1, Mr. and Mrs. Sellars (Lincoln); 2, Mr. and Mrs. Fletcher (Doncaster); 3, Mr. and Mrs. A. Binns (Scunthorpe). Angels: 1, Mr. and Mrs. Sellars (Lincoln); 2, Mr. and Mrs. Kilvington (Doncaster); 3, Mr. and Mrs. Roberts (Doncaster). A.O.V. Cichlids: 1, B. Wyrsale (Scunthorpe); 2, Mr. and Mrs. Tyson (Sth. Humberside); 3, Mr. and Mrs. D. Caldow (Scunthorpe). Small Barbs: 1, Mr. and Mrs. Vickers (Doncaster); 2, Mr. and Mrs. Fletcher (Doncaster); 3, Mr. and Mrs. Norton (Sth. Humberside). Large Barbs: 1, T. Smith (Sheffield); 2, Mr. and Mrs. Cohen (Castleford); 3, Jackson and Bolder (Grimsby and Cleethorpes). Corydoras and Brochis: 1, D. and M. Laycock (Sheaf Valley); 2 and 3, W. Blundell (Doncaster). Armoured Catfish: 1, K. Lancashire (Doncaster); 2, Mr. and Mrs. Simpson (Worksop); 3, Mr. and Mrs. Bradshaw (Sheaf Valley). A.O.V. Catfish: 1, Mr. and Mrs. Fletcher (Doncaster); 2, Mr. and Mrs. Bailey (Sherwood); 3, Mr. and Mrs. Cohen (Castleford). Killies (Top and Switch Spawners): 1, T. Reid (Worksop); 2, T. Smith (Sheffield); 3, Mr. and Mrs. Sellars (Lincoln). Killies (Bottom Spawners): 1, T. Smith (Sheffield); 2 and 3, Mr. G. White (Scunthorpe). Small Anabantids: 1, Mr. and Mrs. Roberts (Doncaster); 2, Mr. and Mrs. Daines (Doncaster); 3, Mr. and Mrs. Kirk (Sth. Humberside). Single Colour Fighters: 1, D. and M. Laycock (Sheaf Valley); 2, Mr. and Mrs. Lawson (Worksop); 3, Mr. and Mrs. Cohen (Castleford). Multi Colour Fighters: 1, 2 and 3, Mr. and Mrs. L. Burr (Scunthorpe). A.O.V. Anabantids: 1, Mr. and Mrs. Simpson (Worksop); 2, Mr. and Mrs. Robinson (Scunthorpe Museum); 3, Mr. and Mrs. Stephenson (Sherwood). Loaches: 1, Mr. and Mrs. A. Binns (Scunthorpe); 2, Mr. and Mrs. Daines (Doncaster); 3, Mr. and Mrs. D. Caldow (Scunthorpe). Sharks and Foxes: 1, W. Blundell (Doncaster); 2, F. Evans (Worksop); 3, Mr. and Mrs. Guy (Doncaster). Rasboras: 1, T. Smith (Sheffield); 2, Mr. and Mrs. Daines (Doncaster); 3, Mrs. Wells (Doncaster). Danios and Minnows: 1, Mr. and Mrs. Guy (Doncaster); 2, Mr. Searby (Sth. Humberside); 3, Mr. and Mrs. Kirk (Sth. Humberside). A.O.V. Freshwater up to 8 in.: 1, T. Smith (Sheffield); 2, Mr. and Mrs. L. Burr (Scunthorpe); 3, Mr. and Mrs. Bradshaw (Sheaf Valley). A.O.V. Freshwater over 8 in.: 1, Mr. and Mrs. L. Burr (Scunthorpe); 2, Mrs. J. Simpson (Worksop); 3, Mr. Clayton (Immingham). A.V. Marine: 1, Mr. and Mrs. A. Mawson (Worksop); 2, Mr. and Mrs. D. Caldow (Scunthorpe); 3, Mr. and Mrs. R. Brown (Scunthorpe). Pairs Livebearers: 1, Mr. and Mrs. Daines (Doncaster); 2, Mr. and Mrs. Copley (Doncaster); 3, Mr. and Mrs. L. Burr (Scunthorpe). Pairs Egglayers: 1, Mrs. Wells (Doncaster); 2, T. Reid (Worksop); 3, W. Blundell (Doncaster). Breeders Livebearers 1-10: 1, Mr. and Mrs. Cohen (Castleford); 2, Mr. and Mrs. Copley (Doncaster); 3, Mr. and Mrs. Sellars (Lincoln). Breeders Livebearers 11-20: 1 and 2, Mr. and Mrs. Kilvington (Doncaster). Breeders Egglayers 1-10: 1, Mr. and Mrs. Bradshaw (Sheaf Valley); 2, Mr. and Mrs. Sellars (Lincoln); 3, Mr. and Mrs. Cohen (Castleford). Breeders Egglayers 11-20: 1, Mr. J. Rhoades (Scunthorpe); 2, Mrs. Wells (Doncaster); 3, Mr. and Mrs. Fletcher (Doncaster). Novice Livebearer: 1, B. Smart (Scunthorpe); 2, Master A. Feasey (Doncaster); 3, Mr. and Mrs. Kirk (Independent). Novice Egglayer: 1, B. Smart (Scunthorpe); 2, Mr. and Mrs. D. Davey (Scunthorpe); 3, Mr. and Mrs. S. Mason (Scunthorpe). Single Female Livebearer: 1, Miss J. Cavell (Doncaster); 2, B. Jackson (Doncaster); 3, Miss K. Feasey (Doncaster). Single Female Egglayer: 1, Mr. and Mrs. Sellars (Lincoln); 2, Mr. and Mrs. Simpson (Worksop); 3, F. Evans (Worksop). The Best Fish in Show Award went to T. Reid of Worksop.

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FOR the October meeting of the **Association of Goldfish Breeders** there was a table show of this year's breeders on show and these were discussed by members. P. Kadwell judged the show and gave his comments. Results were as follow: Veiltails: 1 and 2, D. Nutt; 3 and 4, R. Illsdon. Singletails: 1, B. Cook.

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AT the **Suffolk Aquarist and Pondkeepers Association** annual show held in October, there were 21 classes and these were judged by Mr. E. Nicole, of the F.B.A.S. An E.A.F.A. fish competition was won by Norwich. Results: Best Coldwater Fish: A. Cook. Best Tropical Fish: V. Green. Best Breeders, most popular exhibit and best supported class: V. Green. Best Furnished Tank: M. Hart. Junior Cup winner: K. Cook.

Furnished Aquaria: 1, M. Hart; 2, Mr. Norris; 3, Mr. Turnbull. Characins: 1 and 2, V. Green; 3, K. Cocker. Rasboras: 1, V. Green; 2, L. Jermy; 3, C. Beurtkreutz. Loach: 1, V. Green; 2, C. Beurtkreutz; 3, Mr. Turnbull. Breeders: 1, V. Green; 2, C. Beurtkreutz; 3, F. Auffret. Egg Laying Tooth Carp: 1, V. Green; 2 and 3, F. Auffret. Corydoras and Brochis: 1, V. Green; 2, C. Beurtkreutz; 3, L. Jermy. Danios: 1, Mr. Fenton; 2, V. Green; 3, K. Cook. Single tail Goldfish: 1, M. Hart. Labrynths: 1, C. Beurtkreutz; 2, L. Jermy; 3, C. Beurtkreutz. A.O.S. Coldwater: 1, 2 and 3: A. Cook. Barbs: 1, Mr. Thurlow; 2, Mr. Woolard; 3, V. Green. Swordtails: 1, W. Card; 2, C. Beurtkreutz; 3, W. Card. Catfish: 1, W. Card; 2, K. Cocker; 3, B. Mole. Mollys: 1, C. Beurtkreutz; 2 and 3, W. Card. Twintail Goldfish: 1 and 2, A. Cook; 3, W. Card. Platys: 1, W. Card; 2, L. Jermy; 3, W. Card. Male Guppys: 1, 2 and 3, K. Cocker; Cichlids: 1, V. Green; 2, Mr. Turnbull; 3, Mr. Sutton. A.O.S. Tropical: 1, W. Curd; 2, C. Beurtkreutz; 3, Mr. Woolard.

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COLOURED Slides on aquatic flora and a talk were the main items at the October meeting of the **Mid-Sussex A.S.** The table show was judged and prizes awarded as follows: Novices: A. Holmes. Fish of Year: J. and B. Burtles; Breeders (Live Bearers): C. Roffe; Breeders (Egglayers): D. Soper. Plants: D. Soper.

Any further information may be obtained from the Secretary, Mr. J. Reeve, 36 Rumbolds Lane, Haywards Heath. Tel: 3702 (evenings).

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A VERY informative talk on Angel fish, their habitat and the best ways of caring for these fishes was given at a recent meeting of the **Brighton and Southern A.S.** by Mr. R. Mills. The table show as judged by Mr. J. Stillwell and after he had pointed the fish, he helped members with their showing problems.

The Chairman, Mr. B. Rice, announced that Mr. B. Sayers was now on the committee due to the fact that a past member was unable to continue doing the good work for the club, that he had in the past. Mr. R. Bohannon was thanked by members for his work done so far this year. Any further information on the Society may be obtained from the Secretary, Mr. S. Lock, 55 Newmarket Road, Brighton. The Society meets on the first Monday in the month at the K. and T. Social Club, Franklin Road, Portslade at 8 p.m.

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THE BRITISH KOI-KEEPERS' SOCIETY

MORE than 100 members attended at the Conway Hall, Red Lion Square, London, on Sunday, 1st September, in order to meet Mr. S. Kamihata and Mr. N. Takanashi of the Kamihata Carp Breeding Company, Japan.

Mr. E. A. Allen, the Society Chairman, welcomed the distinguished visitors, and in his reply, Mr. Kamihata regretted the short notice, but he was most pleased to meet members of the British Koi-Keepers' Society and to present a letter from Dr. Takeo Kuroki, President of the All Japan Koi-Keepers' Society whose 8,000 members share an equal interest in keeping the beautiful fish, Nishikigoi.

A cine film of the Niigata Prefecture of North Japan showed many scenes of the famous carp breeding area around Yamakoshi Village, and included the techniques of breeding, rearing, grading and feeding, together with views of an auction in progress. This was followed by some excellent slides of Japanese gardens, ponds and Koi. Many aspects of koi-keeping were discussed in detail and a better understanding reached of the situation in Japan.

The meeting concluded with an expression of thanks and presentations to the visitors for their time and trouble in addressing the Society and answering numerous questions. The Society welcomes all who are interested in keeping the Japanese fancy carp, and further information is available from the Membership Secretary, Mr. D. C. Davis, 137 Gayfield Avenue, Brierley Hill, Staffs. DY5 2BX.

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Bethnal Green A.S. will be holding their annual Dinner Dance on 8th February, 1975. Details from Secretary, J. E. Connolly, 39 South View Drive, South Woodford, London E18 1NR. Tel: 01-530 3946.

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BRITISH MARINE AQUARIST ASSOCIATION

THE annual general meeting was held in Manchester at the B.A.F., and although a large number of members attended, the Committee would have liked to have seen more as membership participation is both vital and encouraging to the management committee. Many things of interest to members were discussed, among them the idea of purcashing new printing equipment. This would enable the Association to improve the appearance of the already excellent "Marinews" magazine.

Unfortunately the annual subscription has had to be increased to £3. Many valid reasons were given for the increase including increased printing costs, ink, paper, etc., and increased postal charges. Even at £3 though, members are getting good value for their money. A fact packed 20 page monthly magazine plus all the help they need for successful marine fishkeeping from the accumulated knowledge of all the membership.

To any lone marine aquarist on the brink of joining the B.M.A.A. the increased subscriptions start on 1st January, 1975. Join now at the old fee of £2. Application forms are available from Mr. J. H. Vickery, 26 Rosalind Avenue, Bramford Estate, Woodsetton, Dudley, Worcs. DY1 4JW.

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CHARACIN STUDY SOCIETY

THE inaugural meeting of the above Society is being arranged in early 1975, for the election of officers. It is also proposed to hold an exhibition and a slide show of Characin in the coming year.

Any persons interested in joining the Characin Study Society, please contact Mr. M. West, 76 Lingfield Avenue, Kingston-on-Thames, Surrey.

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SECRETARY CHANGES

South Humberside A.S.: B. Newson, 131 Stanley Street, Grimsby.

South Shields A.S.: P. Wright, 11 Boston Crescent, Town End Farm, Sunderland, Tyne and Wear.

Swillington A.S.: M. Walker, 15 Deanswood Rise, Leeds 17.

Grantham and District A.S.: P. Harris, 27 Clyde Court, Grantham, Lincs.

Federation of Northern Aquarium Societies, D.B.M.A., Glen, 16 Nuttall Avenue, Whitefield, Manchester M25 6QA. Phone: 061-766-8852.

AQUARIST CALENDAR

1975

2nd March: Keighley A.S. 7th Annual Open Show at the Leisure Centre, Victoria Park, Keighley. Benching 12—2 p.m.

16th March: Don Valley A.S. Open Show, Staff Dining Rooms, British Steel Corporation, Stockbridge, nr. Sheffield Works. Schedules from Show Secretary, Mrs. B. Hartley, 11 Hall Royd Walk, Silkstone Common, Barnsley.

6th April: Medway A.S. Annual Open Show. Further details later.

6th April: Heywood and District A.S. Open Show, Civic Hall, Church Street, Heywood, Lancs.

20th April: Coventry Pool and A.S. Open Show at Templars Junior School, Tile Hill Lane, Coventry. Show schedule (s.a.e.) from S. Wooldridge, 23 Lime Tree Avenue, Tile Hill, Coventry.

20th April: Merseyside A.S. Open Show, Rainhill Village Hall, Exchange Place, Rainhill, Lancs.

27th April: Loyne Aquarist Open Show at St. Paul's Hall, Scotforth, Lancaster.

18th May: Goole A.S. Open Show. Show Secretary, P. Shipley 76 Jefferson Street, Goole, N. Humberside DN14 6SJ.

18th May: Middleton and District A.S. Fourth Open Show will be held at Hollin High School, Hollin Lane, Middleton. Schedules later. Only members of recognised Aquarist Societies may exhibit. No independent entries can be accepted.

25th May: Corby and District A.S.: Open Show, Corby Civic Centre, Corby, Northants. Show Secretary, A. Slow, 176 King Street, Kettering, Northants NN16 8QS. (Details and Show Schedule Mid-March).

1st June: Newcastle Tropical F.S. Open Show will be held in St. John's Church Hall, Westgate Road and Grainger Street junction, Newcastle upon Tyne. Schedules will be available shortly from L. R. Lawson, 84 Grosvenor Road, Jesmond, Newcastle upon Tyne 2.

CHAMPION OF CHAMPIONS

Competition Results

1st	2nd	3rd
Mr. and Mrs. Shipman	P. J. Whelan	T. Roberts
Datnoides microlepis	Cichlasoma citrinellum	Mylopus schultzei
Grantham and District A.S.	Blackburn A.S.	North Staffs. A.S.

RESULTS OF OTHER FESTIVAL COMPETITIONS

Best Society Tropical Furnished Aquaria: 1, Halifax 64 pts.; 2, F.G.A. 63 pts.; 3, Northumbrian 60 pts. Best Society Coldwater Furnished Aquaria: 1, Halifax 53 pts.; 2, Blackpool 51 pts.; 3, Edinburgh 49 pts. Best Individual Tropical Furnished Aquaria: 1, A. Vaissiere (Merseyside) 74 pts.; 2, Mrs. S. Glen (Bury) 73 pts.; 3, J. G. Robertson (Northumbrian) 72 pts. Best Individual Coldwater Furnished Aquaria: 1, D. L. Shields (Halifax) 71 pts.; 2, A. Mills (Bury) 69 pts.; 3, H. Pennhall (Osram) 61 pts. Best Aquascape: 1, H. Pennhall (Osram) 75 pts.; 2, D. Copeland (Middleton) 70 pts.; 3, Mrs. O. M. Mathews (N.G.P.S.) 67 pts. Best Novelty Aquascape: 1, H. Haslam (Belle Vue) 78 pts.; 2, E. Seymour (Merseyside) 69 pts.; 3, A. Kenny (Village) 68 pts. Common Goldfish and Comets: 1, W. H. Ramsden (N.G.P.S.) 70 pts.; 2, L. Leadbetter (Blackpool) 67 pts.; 3, T. Forsyth (Edinburgh) 65 pts. Shubunkins (Bristol and London): 1, B. M. Rothwell (N.G.P.S.) 74 pts.; 2, B. M. Rothwell (N.G.P.S.) 71 pts.; 3, B. M. Rothwell (N.G.P.S.) 69 pts. Moors: 1, W. H. Ramsden (N.G.P.S.) 70 pts.; 2, W. H. Ramsden (N.G.P.S.) 66 pts.; 3, W. H. Ramsden (N.G.P.S.) 63 pts. Veiltails: 1, B. M. Rothwell (N.G.P.S.) 81 pts.; 2, B. M. Rothwell (N.G.P.S.) 74 pts.; 3, F. Foote (Accrington) 67 pts. A.O.V. Fancy Goldfish: 1, W. H. Ramsden (N.G.P.S.) 71 pts.; 2, W. H. Ramsden (N.G.P.S.) 68 pts.; 3, C. H. Whitsey (Accrington) 63 pts. A.O.V. Coldwater: 1, W. R. Ramsden (N.G.P.S.) 68 pts.; 2, M. and J. Nixon (Middleton) 64 pts.; 3, D. Dawson (Osram) 58 pts. Guppy: 1, A. Charlton (F.G.A.) 75 pts.; 2, J. Hutchings (F.G.A.) 69 pts.; 3, K. Greenhalgh (F.G.A.) 67 pts. Guppy (Pairs): 1, P. Williams (Lanarkshire) 76 pts.; 2, Mr. and Mrs. P. Lowe (F.G.A.) 75 pts.; 3, D. Glen (F.G.A.) 74 pts. Livebearer A.V.: 1, G. P. Norton (Sandgrounders) 68 pts.; 2, D. Glen (Bury) 66 pts.; 3, T. Burton (Blackburn) 65 pts. Livebearer (Pairs) A.V.: 1, R. I. Payne (Merseyside) 65 pts.; 2, Mr. and Mrs. Blades (Cresswell) 62 pts.; 3, F. Williams (Lanark) 58 pts. Angel: 1, L. Taylor (Hyde) 65 pts.; 2, L. Taylor (Hyde) 63 pts.; 3, M. Wild (Accrington) 61 pts. Angel (Pairs): 1, Mr. and Mrs. K. Ellis (Cresswell) 59 pts.; 2, Mr. and Mrs. D. Greenhalgh (Bury) 51 pts.; 3, L. Booth (Hyde) 46 pts. Dwarf Cichlids: 1, Miss J. Gullane (Buxton) 78 pts.; 2, Mr. and Mrs. A. Buckley (Bury) 77 pts.; 3, T. Hoerocks (Osram) 71 pts. Dwarf Cichlids (Pairs): 1, Mr. and Mrs. Blades (Cresswell) 66 pts.; 2, N. Wainwright (Hartlepool) 59 pts.; 3, Miss J. Gullane (Buxton) 55 pts. A.O.V. Cichlid: 1, B. Cooper (Hartlepool) 82 pts.; 2, J. G. Robertson (Northumbrian Aquarists) 70 pts.; 3, N. Wainwright (Hartlepool) 69 pts. A.O.V. Cichlid (Pairs): 1, J. D. Watson (Hartlepool) 66 pts.; 2, A. Bebbington (Northumbrian) 63 pts.; 3, Dr. P. A. Lewis (Huddersfield) 62 pts. Fighter (Single): 1, J. J. Robertson (Northumbrian) 70 pts.; 2, W. Smith (Osram) 67 pts.; 3, L. McCourt (Northumbrian 62 pts. Gouramies A.V. and Paradise: 1, M. Gray (Northumbrian) 75 pts.; 2, J. Nixon (Middleton) 74 pts.; 3, P. Gudgeon (Hyde) 72 pts. Gouramies A.V. (Pairs) and Paradise: 1, R. Tomkinson (Glossop) 75 pts.; 2, A. Christie (Lanarkshire) 71 pts.; 3, N. Snell (Halifax) 70 pts. Barbs A.V.: 1, R. Tomkinson (Glossop) 70 pts.; 2, Mr. and Mrs. Ward (Middleton) 68 pts.; 3, P. Batcholer (Loyne) 67 pts. Barbs A.V. (Pairs): 1, A. Vaissiere (Merseyside) 69 pts.; 2, R. Wilkinson (Halifax) 68 pts.; 3, Mr. and Mrs. Blades (Cresswell) 64 pts. Characins A.V.: 1, E. Williams (Hartlepool) 72 pts.; 2, L. McCourt (Northumbrian) 71 pts.; 3, M. Wood (Huddersfield) 70 pts. Characins A.V. (Pairs): 1, G. Gillespie (Castleford) 71 pts.; 2, F. Thorne (Village) 62 pts.; 3, Mr. and Mrs. A. Buckley (Bury) 61 pts. Carp or Minnow: 1, Miss J. Gullane (Buxton) 79 pts.; 2, J. Gardner (Loyne) 71 pts.; 3, J. C. Robertson (Northumbrian) 65 pts. Carp or Minnow (Pairs): 1, R. Blackwell (Middleton) 66 pts.; 2, W. Bamber (Sandgrounders) 65 pts.; 3, Mr. and Mrs. A. Buckley (Bury) 64 pts. Catfish A.V.: 1, G. Gillespie (Castleford) 81 pts.; 2, J. Beavers (Hartlepool) 78 pts.; 3, J. G. Robertson (Northumbrian) 76 pts. Catfish A.V. (Pairs): 1, F. Williams (Lanarkshire) 80 pts.; 2, H. Garthwait (Hartlepool) 79 pts.; 3, R. Blight (Basingstoke) 74 pts. Egglaying Tooth Carps: 1, B. Wiggins (B.K.A.) 73 pts.; 2, L. Greenall (B.K.A.) 70 pts.; 3, K. Hill (B.K.A.) 69 pts. Egglaying Tooth Carps (Pairs): 1, B. Forrester (B.K.A.) 70 pts.; 2, K. Hill (B.K.A.) 69 pts.; N. Wood (B.K.A.) 67 pts. Loach A.V. (Single): 1, P. Whelan (Blackburn) 76 pts.; 2, N. Clarke (Buxton) 71 pts.; 3, E. Seymour (Merseyside) 69 pts. A.O.V. (Single): 1, R. Newsorthy (Northumbrian) 79 pts.; 2, R. Newsorthy (Northumbrian) 77 pts.; 3, M. Sneddon (Hartlepool) 76 pts. Breeders (Egglayers) Points Norm 1-10: 1, D. Chamberlain (Hartlepool) 67 pts.; 2, M. Strange (Basingstoke) 65 pts.; 3, J. Furness (Castleford) 64 pts. Breeders (Egglayers) Points Norm 11-20: 1, Mr. and Mrs. Blades (Cresswell) 83 pts.; 2, D. Dawson (Osram) 82 pts.; 3, A. Vaissier (Merseyside) 80 pts. Breeders (Livebearers) Points Norm 1-10: 1, Mr. and Mrs. F. Lowe (F.G.A.) 62 pts.; 2, M. Strange (Basingstoke) 61 pts.; 3, Dr. P. A. Lewis (Huddersfield) 58 pts. Breeders (Livebearers) Points Norm 11-20: 1, M. Strange (Basingstoke) 63 pts.; 2, D. L. Buckley (Heywood) 56 pts.; 3, T. Kilvington (Sheaf Valley) 51 pts. Breeders Coldwater: 1, B. M. Rothwell (N.G.P.S.) 74 pts.; 2, B. M. Rothwell (N.G.P.S.) 69 pts.; 3, B. M. Rothwell (N.G.P.S.) 65 pts. Plants: 1, T. G. Robertson (Northumbrian) 85 pts.; 2, H. Pennhall (Osram) 84 pts.; 3, A. Beasley (Bury) 78 pts. Marine Furnished Aquaria: 1, Blackburn A.S.; 2, R. Bell (Edinburgh); 3, T. Taylor (Basingstoke). Marine Fish: 1, D. L. Buckley (Heywood) 77 pts.; 2, L. McCourt (Northumbrian) 74 pts.; 3, K. Smith (Middleton) 73 pts. Marine Fish (Pairs): 1, L. McCourt (Northumbrian) 70 pts. Special Awards: Best Fish in Show: B. Cooper (Hartlepool) 82 pts. Best Tropical Fish: B. Cooper (Hartlepool) 82 pts. Best Coldwater Fish: B. M. Rothwell (N.G.P.S.) 81 pts. Best Other than Best in Show:—Tropical Livebearer: A. Charlton (F.G.A.) 75 pts. Tropical Egglayer: G. Gillespie (Castleford) 81 pts. Coldwater: B. M. Rothwell (N.G.P.S.) 81 pts. Most Attractive Stand: 1, Castleford; 2, Osram; 3, Village; 4, Edinburgh. Society with 4 Highest Pointed Awards: Northumbrian. Individual Exhibitor Most Awards: B. M. Rothwell (N.G.P.S.). Exhibitor Most Cards in Breeders: B. M. Rothwell (N.G.P.S.).