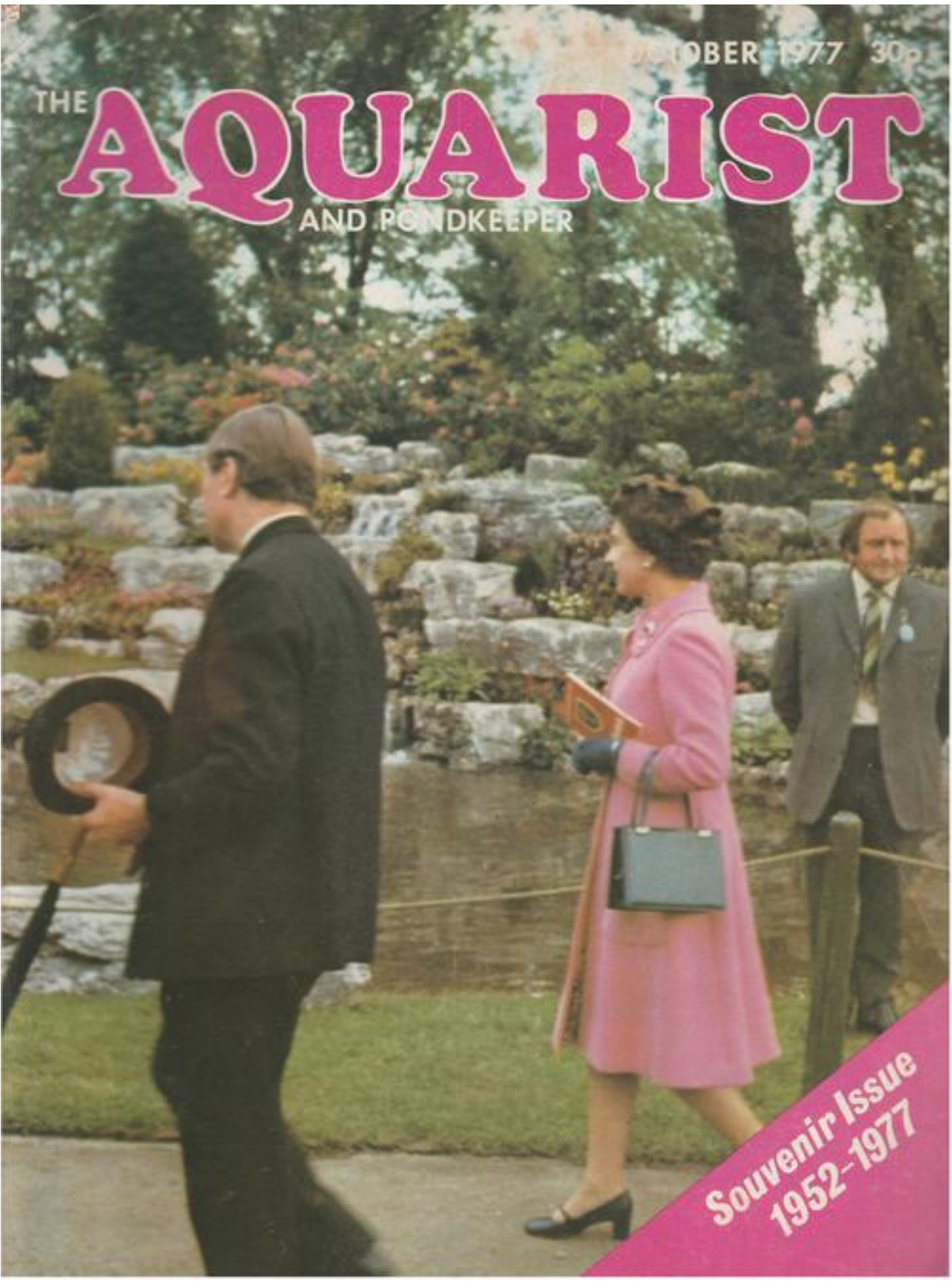


OCTOBER 1977 30p

THE AQUARIST

AND PONDKEEPER



**Souvenir Issue
1952-1977**



THE AQUARIST

AND PONDKEEPER

The Aquatic Magazine with the Largest Circulation in Great Britain

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OUR COVER:

A picture of H.M. The Queen
taken during her private
visit to a recent Chelsea
Flower Show.

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October, 1977

WHAT IS YOUR OPINION?

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

Photographs by the Author



WELCOME TO the Royal Jubilee issue of your favourite aquarium magazine. I trust you will find this month's selection of views and opinions of interest. No doubt most readers have their own special memories of seeing or meeting members of the Royal family during their visits to various parts of the U.K. My pupils and I had the pleasure of putting on a display of our prize-winning school magazine for one of the Royal visits and we were excited at the prospect of seeing the Queen, the Duke of Edinburgh and Prince Andrew for the first time. We were thrilled when the Queen and the Duke stopped and chatted with us; and very flattered when Her Majesty left our display clutching a copy of our school magazine. I would have liked to ask if any of the Royal residences sported tropical fish tanks; but an opportunity did not arise because the girls in my party were far too excited at seeing the handsome Prince and the boys were left almost speechless with the excitement of the occasion. Do any readers know if some members of the Royal family still keep tropical fish? If so, please drop me a few lines as I'm sure other readers would be interested to know.

Mr. Charles Noden Baskerville is show secretary of Wyre Forest Aquatic Society and he resides at 201 Collis Street, Stourbridge, West Midlands. He writes: "May I congratulate you on the W.Y.O. section of *The Aquarist*. I think the success of this article lies in the informality of it. It's rather like a society meeting after the formalities are over: the members get together, different topics crop up, and they are discussed. Also, the informality allows all aquarists reading it to relate to it; whereas, maybe, a formal article on, say, blue acaras might be passed over on the basis, 'Well, I don't keep them,' it would be read in W.Y.O. because it would be dealt with in a letter from someone and would be more personal..."

Fish Showing

Mr. J. A. Dymott's home is at 39 Harlech Drive, Leyland, Preston, Lancs. He holds some strong views and has the following to say: "I cannot believe Mr. Mills' letter concerning the showing of fish. I have yet to see what a fish, isolated in a glass container, has to offer the potential aquarist; and I certainly do not agree with his statement about bread-

and-butter stuff; quite the opposite. I feel that most unusual fish come in because of a request from an aquarist, not a pot hunter. I have always tried to keep an open mind on shows, leaving it for those who support them to carry on, even though I have certain views of my own against showing; but I cannot allow an honourable truce with such a bigoted letter as that by Mr. Mills.

"Being a strong South American cichlid-lover I hope few take up Arthur McCabe's idea concerning more information on R.V. cichlids in your column. Although I have nothing against Arthur, or the Rift Valley fraternity, I feel that we are already swamped with literature on these fish at the expense of other species. Certainly R.V. cichlids are vividly colourful—but there are others which can compete, more so in the non-R.V. cichlids of Africa—such as the subgenera of *Pelmatochromis* and *Hemichromis*, especially the 'B' morph of *H. fasciatus* when in breeding colours. To a lesser extent those of S. America can be attractively coloured, although their colours are more subtle and in the form of hues. My two favourite coloured cichlids until now are female *Crenicichla saxatilis* and female *Crenicichla acutirostris*. The next assortment of unusual and attractive coloration would include Texas cichlids, Jack Dempseys, golden severum, wild severum, female convicts, *Geophagus acuticeps*, *Cichlasoma erythreum*, *Aequidens rivulata*, *Aequidens pulcher*, etc. The above selection gives a wide variety of yellows, oranges, reds, blues, greens, browns, etc., and on top of that the markings and patterns are unique to the species—unlike many of the R.V. where a number of species are almost identical in coloration or markings.

"No doubt people in their small-minded way will state that they are all aggressive bullies, not to be trusted with smaller fish, etc. I usually have only one word to reply to these people—if I may use it—'Cobblers'! Anyone who can't even keep small convicts with guppies, i.e., convicts up to 3 in., without losing guppy tails, can't call himself an aquarist. In all probability most aggression in community tanks is caused by non-cichlids attacking each other; but because the dog has a bad name through people not knowing enough about the subject before writing books and such, the aggression is automatically blamed on

the cichlid. If a S. American cichlid is aggressive, blame yourself for not giving it the right conditions rather than blame the fish. In my opinion the five most aggressive fish, in order of aggression, are: (1) red tailed black shark; (2) platies; (3) black shark; (4) *Pseudotropheus auratus*; and (5) angel fish. This list is compiled even after keeping over fifty-five different species of cichlids—from R.V. to pikes, via red devils and rams. The secret of being a successful aquarist, particularly with cichlids, is being able to modify the decor of the tank to suit the particular needs of the fish. It is not the fault of the fish that it is in an unnatural environment and it is up to

shots I've received from any reader to date. The prints were of Oscars, 'kribs,' a tin foil barb and a cardinal. I've asked Mr. Liotard if he'd care to send us some details of his photographic technique; if he does, I'll include the details later in this month's column. Mr. Liotard had the following to say in his original letter: "I have been keeping tropical fish for 8 years now. During that time I have read many books and magazines on tropical fish and have always made sure that I can meet the requirements of any particular species of fish before purchasing it.

"At present I have 4 tanks in operation, the largest being 53 in. x 15 in. x 18 in. This tank contains



those who call themselves aquarists to make sure that the fish has a reasonably happy existence—which would automatically put showing of fish right out!

"Finally, I have been trying to get together within the B.C.A. a band of S. American cichlid enthusiasts to try to combat the extreme tilt towards R.V. cichlids in their literature, but with only one response from within England, one from an Englishman in Germany, and one from Australia there is not much chance of getting anything worth-while going. Therefore, if anyone who reads this who prefers S. American cichlids—not necessarily specialises in them—would like to write to me, it may be possible to get a S.A. swap club going where fish and information could be exchanged. I look forward to hearing from such people."

Fish Photographs

Mr. Maurice Liotard's home is at 80 Brookfield Road, Cheadle, Cheshire, and he sent me seven excellent coloured prints that he took of some of his fishes. His fish photographs are among the best coloured

a 10 in. Oscar which, when bought 2 years ago, was only 3 in. in length. The Oscar is fed almost exclusively on beef heart, with earthworms, raw cod and cooked peas as a change of diet. The tank has 2 U/G filters fitted and twice per week 10 gallons of water are replaced with water that has stood for a week. The only plant used is *Riccia*, which offers shelter from the top light. The heaters are surrounded by several large stones because the Oscar used to open his mouth and charge into them, banging them against the side of the tank. Maybe he was getting his own back, for a few weeks before this started he burnt himself on a heater and this needed attention every day for a week. The fish had to be caught and held just above water level; then the wound was treated with a treatment to prevent fungus. Sounds easy, doesn't it; well it was—until the fish decided it had had enough; with one beat of its tail, water was splashed in every direction. The next 10 minutes were spent mopping up and removing *Riccia* from the wall and floor.

"I would recommend the Oscar to anyone who can

meet the needs of a fish this size, i.e., a large tank, regular partial water changes, and a diet consisting of meaty foods. While on the subject of food, can anyone suggest any other food suitable for an Oscar, bearing in mind I don't own a power filter? I have to be very careful when feeding earthworms as the Oscar, being a messy eater, could soon foul the tank with them. You'll have to excuse me, it's time to go and cut up some more beef heart."

Excess Phosphates

Ulster's Lough Neagh—the largest freshwater lough in the British Isles—is giving cause for concern to both fishermen and freshwater biologists. Apparently sewage is producing a high level of phosphates in the lough and this is providing an ideal source of fertilizer for algae. The algae themselves are causing the main problems: they are thriving in the water and cutting off oxygen supplies—particularly to the lower levels—and fish are being badly affected. It has been said that calm weather for a week could result in a large number of fish deaths; indeed, some sections of the press have said that it could become another Dead Sea. I understand that the thick layers of floating algae prevent oxygen from entering the water and, thus, the fish suffer from a lack of oxygen—particularly at the lower levels. Let's hope that the entry of phosphates to the lake can be controlled, thus discouraging the growth of algae that could so seriously affect the fish population—particularly the freshwater eels. Those of us who keep a few exotic fishes in our aquaria sometimes tend to forget the very real environmental problems that we create for our own native species in their natural homes—both marine and freshwater.

I was saddened to learn, today, that Manchester's Belle Vue Zoo will be closing later this year. It will be missed! I was interested to learn of the results of a particular magazine's survey on the popularity, etc., of different pets. Although my Scottish terrier, Corra, gives and receives a lot of affection, I also obtain a lot of pleasure from my tropical and coldwater fishes—even if there's no exchange of empathy.

Photo Techniques

Mr. Liotard, of Cheadle, has kindly replied to my letter asking him about his fish photography techniques. He writes: ". . . The camera I used was a Chinon CE Memotron with an f/1.4 lens. The film was Agfa CNS 2, ASA 80, for colour prints. All the photographs were taken with the use of a Prinz Jupiter electronic flash unit. The flash was set at automatic and the f/stop on the camera to f/4. The flash unit was held at an angle of 45° from the tank to prevent reflections from the glass. The photographs of the Oscar and tinfoil barb were taken at a distance of about 2-3ft. For the photographs of

the kribensis and the cardinal tetra a set of extension tubes was needed, No. 1 tube being used for the kribensis, and No. 2 for the cardinal. I have found that the best time to take photographs is after the fish have had a good feed. This seems to be the only time that they are still long enough for the camera to be focused.

"I have just finished reading *Photography for Aquarists* by Dr. Herbert R. Axelrod and would not dream of using some of the techniques listed in his book. In the book he says he uses a drug to put the fish to sleep and then 'positions the fish by squeezing it between two pieces of glass.' He goes on to say, 'For dramatic effects drug the fish and place him in the photo tank without a restraining glass. Just jam him between the stiff leaves of a plastic plant.' Well, as far as I'm concerned the health and happiness of my fish come first and fish photography is just an interesting pastime."

Photograph 1 shows one of my attractive, little *Corydoras* species. Please send me details of your experiences with the breeding and feeding of these most interesting fishes.

This month, August 1977, has been very like previous Augusts in that I've received very few letters for this feature. I've come to expect this as many readers go off on holiday and don't have time to write letters telling me of their experiences with aquaria and their inmates. However, it's ironic that this month I've received at least as many letters as in any other month since I began this feature over ten years ago; the only difference is that about 95 per cent of the letters resulted from my offer of a starter sample of Java moss. Letters have continued to pour in all month—I received *nine* requests this morning—despite the fact that my excess Java moss went down a couple of weeks ago, earlier in the month. I've had to spend a lot of time and deplete my stocks of envelopes writing to disappointed readers telling them that, at present, I have no more Java moss to give away. I must say I was really astonished by the number of requests I received from readers—and sad that I was unable to supply those whose letters reached me later in the month. I had to re-glaze the tank in which the Java moss flourished and it has taken it a little time to settle down again; however, the small piece of moss that I retained has begun to grow again and, hopefully, I may have more pieces to give to readers later in the year. Please *do not* send me any more requests at present; keep your eye on this feature in future issues: I'll let you know when I have more excess Java moss—even though it would take a battery of tanks of thriving Java moss to supply all those who wrote, to date. Those unable to wait could consider purchasing some Java moss from some of our advertisers who sell plants by post. One specialist firm, in its advertisement in the August

edition, offers Java moss—under its correct name, *Vesicularia dubyana*—at 25p, plus 35p postage.

Clarius Catfish

A letter that I included in my June columns, written by Mr. Tony Hancox, of 57 St. James Road, Prescott, Merseyside, has brought a second one from the same gentleman. He writes: ". . . Since writing my last letter I have moved house. I could write a book about that as I had to move 12 tanks ranging in size from 18 in. to 6 ft. The *Clarius* catfish I wrote about in my last letter was about 7 in. long when I had to move. Once caught, I transported it in a large bucket with a sealable lid. I was shocked to find how strong it was. It used its body as a whip to knock away the bucket when I put it into the tank. Anyway, after many tries and a good soaking I was successful. Now, 12 months later, it is housed in a 48 in. x 18 in. x 18 in. tank, alone. It is 15 in. long, and has a mouth of about 1½ in. across. It is the albino variety and the colour seems to glow a beautiful pink. I would hate to try to catch it now. The feelers on its nose and mouth are a full 3 in. long; it locates its food with these as it has not got very good eye-sight—a trait I have noticed in other albino fish.

"Apart from catfish I concentrate on cichlids. I am quite successful at breeding them but when it comes to selling them to shops they just don't want to know. I have just bred some *Tilapia* mouthbrooders; they are a beautiful orange colour with a few black patches, but because they grow to approximately 6 in. no shop will touch them; so nine times out of ten I either give them to friends or feed them to other fish. What a waste! So, it seems that to get back some of my outlay I will have to breed zebras, or swordtails, or similar. Have you heard of this trouble before?" (Albino animals of any species have pink eyes and usually have weak sight. I have heard from other breeders who have found it difficult to sell certain species of fish to shops. Obviously shops stock only those fish they think will sell sooner or later; but it seems a pity that anyone who manages to breed a particular species—other than mediocre guppies—should have to use the fry as fish food because he cannot find anyone who wants them).

Plant Failures

Mr. Bruce Smith's home is at 93 Highbury New Park, London N5. He writes: ". . . Reading your column over the past few months I have noted that the problem of plants failing to grow in the aquarium has popped up frequently. My two close friends are also experiencing difficulties in this respect; and yet my 24 in. x 12 in. x 18 in. tank is 'infested' with plants of various species. I just wonder if the number of fishes one keeps in one's tank has any bearing on this. My friends 'go by the book' and have only a dozen or so fish in their tanks; yet in my tank I have:

1 mono, 1 black widow, 4 platies, 2 adult (and 5 young) mollies, 1 half-beak, 2 silver tips, 4 glowlights, 1 neon, 1 sand loach, 2 sucking loaches, 2 other loaches, 5 kribensis, 4 harlequins, 2 zebra danios, 1 scissortail, 4 baby swordtails, 2 dwarf gouramies, 1 white cloud mountain minnow, 6 guppies and 1 other fish—a grand total of 47! And my plants thrive—as do my fish, which are constantly spawning. I change 10 per cent of the water every 2 weeks. Obviously, living so close together my friends and I share similar water conditions. So, I just wonder!" (Although there are limits to the numbers of fish one can keep in a tank of a given size, the fish in a specific tank supply most of the nutrients required by plants for good growth. In tanks that house very few fish, or tanks that are kept too clean, plants can fail because they are starved of essential food materials. One should aim to strike a balance between numbers of fish, numbers of plants, and cleanliness. It is not only possible but also easy to have the water in an aquarium crystal clear while having enough mulm round the plants' roots to encourage good plant growth).

I was pleased to receive the following letter from one of our young, feminine readers—13 years old Sarah Wilson, of 24 Scotts Lane, Wellington, Somerset. Sarah writes: "I wish to tell you about my 24 in. x 12 in. x 12 in. tank of goldfish. I have been keeping fish seriously for just over two years. The oldest fish, a comet, I have had for over six years. The other occupants of the tank are: one common goldfish which I have had for two years, a calico fantail (one year), a moor, a London-type shubunkin and, the pride of my collection, a red cap oranda which I have had just over a month. The moor has survived cataracts on both eyes, and an attack of fungus.

"My fish are fed on various flake foods, plus brown bread crumbs and an occasional feed of scraped, lean beef which they enjoy immensely. My tank is stocked with bunched weed as I cannot find any other types for sale in this area. I would dearly love to have some *Vallisneria* or other such plants in my tank! (Any offers? B.W.).

"The tank receives no artificial light but is on an east window-sill, with a board behind to help prevent too much algae from forming. An aerator is used and roughly one-third of the water is siphoned away fortnightly and replaced by fresh. I enjoy reading *The Aquarist* and always find some useful hints in it."

Native Marines

Because of the shortage of current letters this month, I'm dipping into my large envelope of letters received in the past. One can assume that, in the interim period, some letter writers may have modified their opinions; however, the letters should still make interesting reading. Mr. Roger N. Cooper sent me

the following information from 2 St. Edmund's Avenue, Hunstanton, Norfolk: "In response to your request for details of readers' experiences with native British marines, the following may be of interest to you. I have been keeping coldwater marines for almost two years now, concentrating mainly on those to be found within the range of my shrimp net along the shores of the Wash and the North Norfolk coast.

"I have several tanks in my set up, some using U/G filters, and others using filter plates of my own design, the latter giving me a higher rate of turn-over and more efficient aeration. In conjunction with these I use ordinary, internal, corner-type carbon filters. Gravel used is a mixture of fine gravel and coarse sand from the beach; and natural sea-water, either from Hunstanton, which needs to be stood

frozen shrimp and lugworm, and so do most of the invertebrates. In addition, the shrimps and prawns take marine flake food readily. My chief feeding problem is that the pipefish only take live shrimp and fish fry, ignoring completely any other form of food. Except in the hottest weather I am normally able to keep up to a week's supply of live shrimp in hand. In fact, it is high temperatures which are my biggest headache, and with the prolonged hot spell we have been experiencing, temperatures in even my largest tanks have risen to 74-75°F—almost more suited to tropicals! However, most of the fish resist these temperatures quite well as there are marked fluctuations in temperature in their natural habitat in the Wash, at least.

"I have never found it necessary to make regular



before use as it contains a fair amount of suspended silt, or from Cley-next-Sea where it is much cleaner, the shore consisting of a shingle bank at this point. In neither case can I get a positive nitrite reading when tested.

"At present I have a wide variety of species of vertebrate and invertebrate life, my prize specimens being a female great pipefish, *Syngnathus acus*, and a female snake pipefish, *Entelurus aequoreus*, both specimens being about 18 in. long. I have also specimens of the five bearded rockling, sole, turbot, plaice, whiting, gunnel, eel-pout, fatherlasher and sand goby. The whiting were caught on rod and line last October. I also have two wrasse which were successfully transported the three hundred miles from Brixham after a holiday.

"Amongst the invertebrates I have beadlet anemones, hermit crabs, green shore crabs, long legged spider crabs, as well as shrimps, prawns and other crustacea such as the barnacle, and molluscs such as winkles, whelks and topshells. Feeding presents few problems as all the fish take live or

water changes; just topping up with tap water to make good losses due to evaporation. The inclusion of chalk pebbles and the naturally occurring crushed shell in the gravel seem to compensate for the continual depletion of the calcium salts by the crustacea as they shed and reform their hard exoskeletons as they grow.

"Disease has presented few problems so far: those animals I cannot cure are quickly dispatched. However, I have had some success with a liquid silver preparation used for treating fish, in isolation, which have developed a film over the eyes. The chief cause of fish mortality in my early days was allowing insufficient time to elapse for maturation of the filter bed. Whenever I set up a new tank these days I allow at least three to four weeks to elapse and during this time only one or two small shore crabs and a few shrimps occupy the tank whilst the filter bed matures and the nitrite level drops to a level too low to measure with my present test kit, i.e., less than 1 p.p.m. I have had little success with seaweeds, other than sea lettuce, *Ulva lactuca*; but even this becomes coated

with other algae after a time; however, several fronds attached by the holdfast—they have no true roots—to a pebble look very attractive for a time and provide cover for the other occupants of the tank, as well as removing nitrates from the water. Algal growth on the walls of the tanks does become unsightly after a time, but is easily removed; and anyway, the winkles and topshells, which are vegetarians, graze upon it.

"I have found most of the species I keep to be compatible in what must be to them close quarters, with the exception of the shore crabs. Once these have fulfilled their function in helping to mature new tanks they are returned to the sea. I have, however, kept one through several moults, and this crab now occupies a tank of its own and will soon be transferred to a larger tank with only the bare minimum of equipment, as it regularly removes the airline from the airlift and has, on occasion, uprooted the airlift pipe itself from the filter plates!

"Last year one of the smaller species of pipefish, *S. rostellatus*—as in all pipefish the male carries the eggs—liberated about fifty fry from the egg pouch. These lived for about four to six weeks until I experienced several failures with brine shrimp hatches. Had it not been for these I think I could have grown them on and returned them to the sea. I find it a very interesting and rewarding hobby, and always hope for new species in my shrimp net." (Do any other readers keep native marines? If so I should be pleased to hear from them).

Bala Shark

Mr. P. Loweridge (?) wrote the following to me from 3 Cinnthorn (?) Cottages, Hatch Beemcham, Taunton, Somerset. It concerns the bala shark, *Balantiocheilus melanopterus*. He writes: "... I would like to relate a few experiences I have had with this fascinating species. When bought it was about 2 in. long. Now, two years later, it has reached a length in excess of 8 in., looking fuller with a much darker edge to its finnage. Under a (coloured) tube it takes on a yellow-golden hue on its underside, which becomes more prominent with consistent feeding of live food, i.e., *Tubifex*, which in this part of the country is difficult to obtain.

"Feeding at all levels, the bala shark will, I have found, take all types of food; scavenging at floor level it picks up the gravel from the base of the tank, cleans it, and expels it near the front; thus, every 2-3 weeks gravel has to be put back where it was taken from. Another fascinating way of feeding is to use tablet food, stuck on the glass. The noise from these being eaten is quite loud and can be heard in the next room. The bala shark seems to have a false skin over its mouth and often stretches it, looking as if it is yawning. Although normally slow moving, when frightened it is capable of high speed, tending to jump from the water.

"Occasionally, scales which have gone missing for a variety of reasons are replaced within a very short period of time. Although a very inexperienced photographer I have found nothing but trouble with this species because of the reflections off its body of the flash light. I hope I haven't dwelt too long on the subject but the fish has long been a favourite of mine. It is peaceful, easy to manage and beautiful to the eye."

Jewel Cichlid

"Claverton," 12 The Strand, Ryde, Isle of Wight, heads a letter I received some time ago from Mr. Sid Stephens. He had the following to say about the jewel cichlid, *Hemichromis bimaculatus*. "... I thought I would make the effort and pass on details of my experiences with this beautiful species. About 16 years ago I purchased two of these fish that turned out to be a true pair. I put them into the only tank available, an 18 in. x 10 in. x 10 in., on their own, and fed them on all meaty foods, including white worms. They grew quickly and at 3½ in. they spawned. At this stage their breeding colours were fantastic, comparable only to tropical marines, and stayed like this until I removed the babies two months later. All I can remember now is that the water was clean, kept at around 70°F, and contained an air-stone. The fish laid their eggs on the outside edge of a clay flowerpot. When I saw them I immediately got out the books; one writer explained that if one wanted to breed them commercially the thing to do was to take the parents out as they would surely gobble up the young—if they had not previously eaten the eggs. But if numbers didn't matter one could leave the parents in and so observe the parental care taken by the adult fish.

"I did the latter for two reasons: the first was because I didn't want a lot of babies that I couldn't even give away—which was the case eventually; and the second was because, being born an awkward cuss, I thought I would attempt to do the opposite to what the books said one should do. In their fantastic breeding colours the fish took turns at fanning the eggs; and in four days the eggs hatched. Then the parents dug little hollows in the gravel and transferred the fry from one to another until they became free swimming. If one strayed from the fold one of the parents collected it in its mouth and brought it back. Here I must add that the adult fish were fed on masses of white worms, and the babies on carefully ground white worms.

"At two months and a good fat ¾ in. long I transferred the young to a 6ft. x 15 in. x 12 in. tank. When I reached 160 I stopped counting and would swear that the parents did not eat one of them. Every person I gave four or six to always ended up with just one; they just killed each other off."

Continued on page 268



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

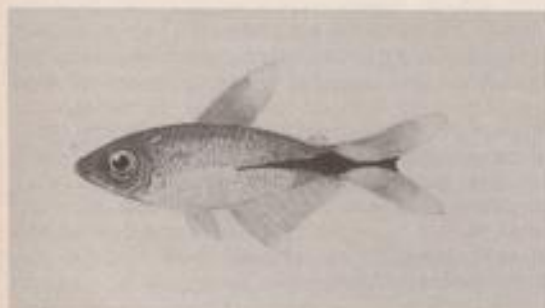
All queries **MUST** be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

I have just acquired some silver-tipped tetras. I should like to know the maximum size this species can attain, the foods most suited to it, temperature requirements and how to tell the sexes apart?

The silver-tipped tetra or *Hemigrammus nanus* can attain a length of about 2 in. It has a healthy appetite and grows well on any live or dried foods suited to small omnivorous fish. It flourishes best, however, on a diet rich in live foods such as gnat larvae, white-worms, and substitutes for live foods such as finely shredded raw red or cooked meat. A temperature of 75°F (24°C) is right for general maintenance. Ordinarily both sexes look much alike in shape, size and colouring. A well-grown male, however, tends to have brighter colours than the female and when in breeding condition, the anterior part of his body assumes a reddish brown hue.



Hemigrammus nanus

Please give me as much information in the space at your disposal on *Acanthopthalmus kuhli*.

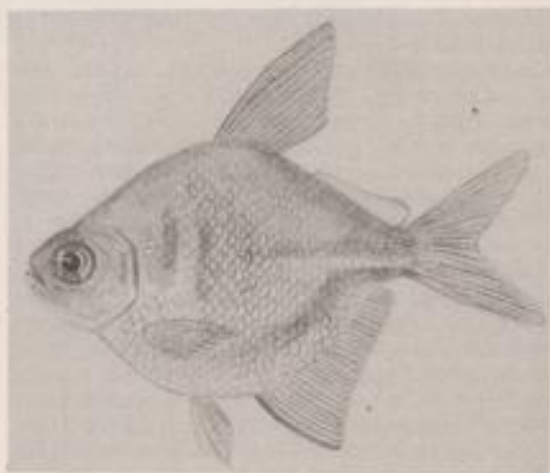
This species is a true loach of the widely distributed family *Cobitidae*. It is native to the southern parts of the Malayan peninsula and a large area of Indonesia. In the aquarium it makes itself scarce among plants, in drifts of sediment or under stones. Hence it is

by Jack Hems

not on view many hours of the day. It does, however, scurry about across the floor of the aquarium on odd occasions and particularly at night. It likes to eat small worms, tiny pieces of meat and crushed flake food. A female in breeding condition shows bloated sides. A temperature in the middle to upper seventies (°F) is recommended.

What is a disc characin?

The popular name of disc characin is applied to rather a fugitive species known to science as *Ephippicharax orbicularis*. It is the only member of its genus, is very compressed or disc-like in shape and attains a length of about 4 in. It is native to a large area of central and northeastern South America.



Disc Characin

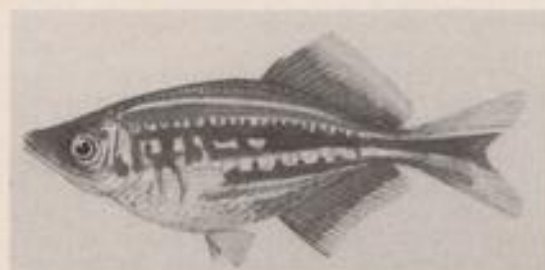
Please give me some information on bichirs.

Bichirs are highly predatory fishes native to most of Africa lying in the tropical zone. They are elongate,

in at least one case serpentine, in shape and range in length from hardly more than a few inches to upwards of 2 ft. In the main they are beautifully coloured and patterned and make spectacular occupants of a single species tank. It is advisable to give a largish bichir a roomy tank to itself. Keep the tank properly covered, for the fish are clever jumpers. Food is usually taken alive: smaller fishes, earthworms, and so on, are nosed against and then snapped up. So narrow strips of raw red meat can be offered. Bichirs looked after properly are well-known for their longevity.

Would you please give me the names of some fishes that would be suitable for sharing a tank with a 3 in. *Balantiocheilus melanopterus* that I hope to grow on to full size in a 5 ft. long tank.

The silver or bala shark, to give the above species



Giant Danio

its popular names, is all right with any fishes that do not chase it or bully it away from its proper share of food. I suggest, therefore, such species as the cardinal tetra, lemon tetra, Schubert's barb, the half-striped barb, the various colour varieties of the angel fish (*Pterophyllon*) and, say, the giant danio (*Danio malabaricus*). The silver shark will take most of its food from the bottom and, in general, ignores the behaviour of other fishes though it will rise to the middle levels of the water to snatch at particles of flake or favourite live foods such as whiteworms.

What other fishes could I keep with two young blue acaras?

If the tank they are in is larger than the regular 24 in. by 12 in. by 12 in. size, then furnish it with plenty of plants and some lime-free pieces of rock to afford retiring places and try *Aequidens maronii*, popularly called the keyhole cichlid, *Cichlasoma meeki* or the firemouth cichlid, *C. spilargenteum*, *C. festivum*, rosy barbs, clown barbs or, say, Australian rainbow fish. Unless the blue acara is engaged in courtship and breeding it almost always minds its own business. In a confined space, however, it will almost certainly adopt a belligerent attitude towards the firemouth cichlid (or vice versa) or bully the easily scared *C. festivum* too frequently for the good of its health. The fire-

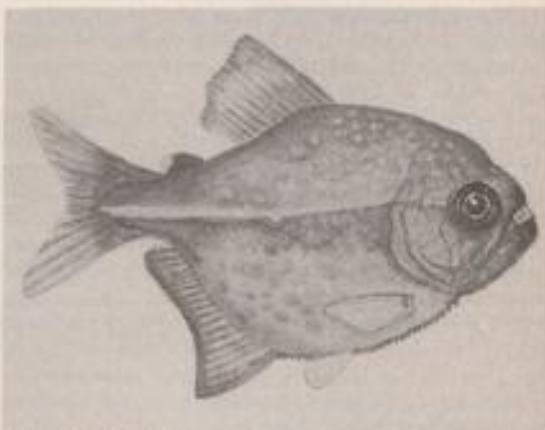
October, 1977

mouth cichlid, in its larger sizes, is more likely to look for trouble or invite trouble than the other cichlids named above. The barbs and the Australian rainbow fish should keep out of harm's way.

Are most gouramies compatible with each other or are there some species that should be kept out of a community tank?

By and large, the different species of gourami can be kept together provided they are roughly the same size and the tank they are placed in is roomy and is well furnished with dense thickets of tall-growing plant life. These basic requirements are necessary because it is characteristic of the males of most species to bully when engaged in courtship or tending a bubble nest housing eggs or newly hatched fry. At such times they make frequent rushes at other gouramies or members of their own species and invariably treat their female partners, prior to and after spawning, very badly. For all that, some species of gourami are milder-mannered than others. Chief among the milder-mannered gouramies are the pearl gourami (*Trichogaster leeri*), the moonlight gourami (*T. microlepis*), the honey gourami (*Colisa channa*) and the so-called croaking or sparkling gouramies described under the generic name of *Trichopsis* or *Ctenops*.

My local dealer keeps three large piranha in a 3 ft. tank. Up to the present time there has been no fighting. Is it possible that the pugnacity and blood thirstiness of the piranha has been grossly exaggerated?



Serrasalmus natterii

There are true piranha and a number of fishes that bear a close resemblance to the piranha in shape and outline. If your dealer has three true piranha that have been living together in a confined space without falling out it is very fortunate indeed—for your dealer

and the fish in question. If and when the piranha do fall out the result will not be a pleasant sight. They have razor sharp teeth and rapidly snapping jaws and use them both to tear their enemies or prey to pieces. *Serrasalmus nattereri* is very bloodthirsty.

What type of peat is best suited to creating the conditions most suitable for keeping and breeding blackwater fishes?

Pure moss peat such as Fison's. By pure I mean moss peat taken straight from the bale or bag and not sold loose in garden shops that are not over particular about its storage and sometimes get it mixed up with floor sweepings or dropped chemical fertilizers.

I have a 36 in. by 15 in. by 15 in. tank which houses two 3½ in. marbled cichlids, one plecostomus catfish and a few plants. I should like to introduce a pair of blue gourami into the set up but my dealer is against the idea because he says the cichlids would prove too aggressive. What is your opinion?

Your dealer is right. The marbled cichlid or oscar (*Astonotus ocellatus*) attains a maximum length of about 9 in. and long before it reaches full size it develops a bullying nature. The blue gourami, though it can also do its share of bullying, is no match for the more powerfully built marbled cichlid and would soon become bruised and badly battered. The plecostomus or hypostomus catfish is usually left alone because it stays quiescent for long periods of time and seldom moves about until nightfall or after.

I have been told that it is best to furnish a cichlid tank with nothing but sand and rocks because plants are either chewed to pieces or uprooted. Is this correct?

It is not correct. Quite a number of cichlids are more at ease with plenty of plants around them—not for eating but for the shade and shelter they afford—and species and varieties of *Pterophyllum*, *Apistogramma* and *Symphysodon* are all tolerant of plant life. Then again, such cichlids as *Nannacara anomala*, *Aequidens maronii*, *Pelviachromis pulcher* and the

pygmy Egyptian mouthbrooder do not tear plants to shreds.

I am having a great deal of trouble obtaining any information from fellow aquarium keepers and books on Mexican livebearers. Can you help me with regard to their feeding, care and breeding habits?

Your query came as a great surprise. Most of the really popular livebearers sold in this country originated in Mexico. For instance, the green swordtail (*Xiphophorus helleri*), platies, several mollies, gambusia and so on. You have probably read the less comprehensive books or the badly written ones. The best book on livebearers is, without question, *Livebearing Aquarium Fishes* by Kurt Jacobs. At least one of our advertisers can supply this fine book from stock for £6.05 post paid. Generally speaking, livebearers demand nothing special in the way of food or temperature (providing it is in the seventies (°F)). As for breeding, a female livebearer will drop young about every couple of months throughout the year. In a thickly planted tank, the fry will stand a good chance of escaping the cannibalistic attentions of the parent fish.

I have not been at all fortunate in my numerous attempts to breed the Siamese fighting fish. Have you any tips you can pass on regarding the conditioning and selection of parent fish and, after a spawning has taken place, the care and feeding of the fry.

The best advice I can give you is to write to this office for a copy of the *Fighting Fish of Siam* by Dr. F. N. Ghadially, which will cost you a mere 22p post paid.

Some of my fishes have bent or deformed spines. Please can you give me a reason for this deformity?

Old age, a deficiency in diet, inadequate light combined with an inadequate diet, a genetic weakness: these are the usual causes of a deformed spine. You failed to mention whether your fishes developed the trouble after purchase or were weakly looking from the start. Always take careful note of the shape of a fish and its general condition before you purchase it.

WHAT IS YOUR OPINION continued from page 265

Send me a few lines on any of the following: (a) cultivating *Cryptocoryne* species—and the one you find grows best in your show tank; (b) your experiences with *Blyxa* and *Acorus* species; (c) how you cultivate micro worms; (d) hibernation and your tortoise; (e) specialist fish clubs/societies as sources of information and good stock; (f) the advantages and disadvantages of specific types of fluorescent lighting tubes; (g) your opinion on any large shows you have attended recently; (h) the materials you use in your aquarium

filters, and why; (i) the major changes you've noted in our hobby during the past twenty-five years; (j) the usefulness and reliability of the most recent types of aquarium thermometers; (k) breeding barbs; (l) where and how you have your main show tank sited, and the attention it attracts when non-aquarists visit your home; and (m) for how long have you been keeping fishes, at what age did you begin, and what particular aspects of the hobby have held your attention?

COLDWATER QUERIES

by Arthur Boarder

I have a two foot tank with two 3 inch Tench and a few Sticklebacks. I have caught a two inch long Eel and wonder if I can keep and feed it with the other fishes?

You can keep the young Eel all right in your tank and feed it on small garden worms and other live foods, such as white worms and maggots. You must realise that the fish is carnivorous and as it grows could bite or eat other small fishes. Also, keep a good cover on the tank or it might crawl out.

I have a number of fancy goldfish and would like to know what other types there are available and how can I find out what they should look like?

You have a good selection of fancy goldfish according to your list. Others available are:—Pearl scales, Moors both fantail and veiltail types and also a Celestial. My book gives a general description of most fancy goldfish. However, for exhibition purposes there are differing standards for varied societies, but the main requirements are about the same. You quote the sizes of your tanks in gallons. This is not a good indication as to their capacity for the stocking with fishes. The safer method is to quote the surface area of the water in a tank. The deeper the container in proportion to its surface width the less fishes will it hold. For instance, a small fish in a two pound jam jar is not likely to survive for long, but empty the water into a shallow pie dish and the fish would survive.

I have a pond 7 ft. x 5 ft., with a few fish in it. I wish to add two calico fantails and wonder if they will be safe in the pond throughout the winter. I have a heater to use in bad weather to stop the pond from freezing over completely.

I consider that the calico types of fancy goldfish are not quite as hardy as the scaled types. However, if you use the heater in severe weather you should be able to keep the fish safely. Do not allow the ice to become too thick and clear most of it by playing a hose on it. Also remove any melting ice and you may have to change a quantity of the water after the pond has been frozen over, as the water usually becomes polluted at such times.

I have a garden pond with various fishes including some golden orfe. Two of these, about nine inches long, have their eyes covered by a white film so that I think they have gone blind. What can I do to cure this trouble?

From your description I think that the fish are suffering from Worm Cataract. This is caused by many tiny flat type of worm or fluke. This is not catching for other fishes in the pond from the affected ones. The worms go through a series of changes and may have got to your fish via water snails as these are one of the hosts to the developing worms. The fresh water whelk or pond snail, *Lymnaea stagnalis* is a favoured host. As can be realised, this trouble is very difficult to cure as the film can protect the worms. You can try holding the fish in a wet cloth and wiping the eyes carefully with cotton wool dipped in an equal part of iodine and glycerine. This could be repeated for a few days. You could try T.C.P. instead of the iodine.

I have a pond 9 ft. by 8 ft., with various fishes and golden orfe. I saw the orfe going through the action of spawning but did not think much of it at the time. I later saw many tiny fry which have now turned a lovely golden colour and so I realise they are orfe. Their numbers have decreased and I suppose they have been reduced by the parent fish eating them. Is it unusual for orfe to spawn in a small pond?

Some years ago I would have agreed that it is unusual for orfe to spawn in a smallish pond. However, I have since seen them doing so in a pond smaller than yours. It appears that medium sized orfe will spawn in water which is to their liking. You should have transferred the eggs to a safe container so that they could have hatched in safety. As they are now an inch and a quarter long they should be fairly safe from the other fishes as they are fast swimmers.

I am converting a garage into a room and intend to construct a raised pond about 26 feet surface area. In the winter the temperature of the room will be 70-74 F., and cooler in the summer. This seems an impossible temperature for coldwater fishes and I wonder if I should keep tropicals in it. Your advice will be appreciated?

Your proposed pond should be quite all right for fancy goldfish. I would not have tropicals as for one thing they are not usually as long lived as coldwater fishes and another point is that although so many are very attractive when viewed from the side of a tank, they have dark backs, as a protection from predatory birds, and would not show up very well in your pond. I suggest that you have three shubunkins, three red-scaled fantails and a couple of fantail moors as a

contrast. These fishes will thrive in your pond and although termed coldwater fishes many are kept at a fairly high temperature in living rooms and thrive on it. Any of the usual coldwater plants will grow well and as you intend to have overhead and under water lighting the pond should look quite attractive.

I have heard of artificial breeding of types of fancy goldfish. Can this be done and if so how?

It is quite possible to artificially spawn fancy goldfish and I have done this successfully many years ago. However, there are a few important points to consider. I have found that it appears to be only possible when the fish are either actually spawning or ready to do so. Any attempts to perform this operation when the fish are not ready could, in my opinion, be likely to cause some damage to the fish. The advantage of this process is that where one has a pond with more than one variety of fancy goldfish, it is possible to select a particular pair from which to obtain eggs which have not been fertilised by the wrong males.

A hatching tank is prepared with some fine leaved plants, such as Hornwort, *Ceratophyllum demersum*. Wet the hands and hold the female fish, belly uppermost, in one hand just below the surface of the water. With the thumb and finger of the other hand apply gentle pressure from the head end towards the vent. The eggs will flow out in a steady stream. Swish the tail a little in the water to disperse the eggs somewhat. Then take the male fish and repeat the process. The milt will be extruded as a milk-like fluid. Do not apply heavy pressure and if no eggs or milt is obtained leave until another time. The

idea of wetting the hands first is so that as little interference is caused to the mucus covering of the fish. I do not advise this course with normal fishes which will breed when they are ready but in circumstances such as I have quoted, it is very beneficial.

I have two goldfish in a basin in my garden and for three weeks I have been waiting for them to spawn but they have not done so. Could you give me information on breeding them?

I do not know how large your basin is, but it does not seem to be a suitable receptacle in which to keep goldfish, let alone breed them. First of all you must have the two sexes and then when they are mature (usually two or three years old) if well fed, they should breed. There is quite a lot to learn about breeding fishes that is not possible to deal with in a letter. Get my book, "Coldwater Fishkeeping" as all the information you need is there.

I have a garden pond constructed with concrete and it has cracked badly and has also some fine hair cracks. How can I make the pond waterproof?

The best way is to line it with a good liner such as Butyl or Plastolene. This will make a permanent seal and be much less trouble than trying to use fresh concrete mix or to paint it with one of the sealants. When using the latter system, you would have to dry out the pond completely and perhaps wait a few days before the operation could be completed. With a liner, you could catch the fish, remove the plants and any mulm, insert the liner, fill up with water and return plants and fishes the same day.

BOOK REVIEW

Aquarium Fishes of the World. By John H. Prescott, Bantam Books, 75p.

This paperback is well-written, informative and up-to-date in the matter of nomenclature. This is to be expected from the author who is Executive Director of the New England Aquarium in Boston, Massachusetts, U.S.A. Some good drawings and more than 120 photographic reproductions in true colour embellish its pages.

"Fishes have stimulated man's imagination for thousands of years." Thus the author begins his six pages of Introduction. "The Japanese and Chinese have cultured carp simply to be looked at." Mr. Prescott then reminds us that the coloured carp popularly known as koi have been, and still are, "selectively bred to be viewed from the surface."

The first public aquarium—the Aquarial Gardens—in the United States was built some ten years before

the outbreak of the Civil War. It, too, was situated in Boston. Now there are public aquariums in most important and not-so-important cities scattered over the U.S.A. They are attended by several million visitors every year. Thenceforward, the author proceeds to his main task of describing how fishes are distinguished from other vertebrates, their chief anatomical features and vital senses and the techniques required to keep them in the home aquarium. There is, indeed, a great deal of helpful information on water, lighting, heating, aeration, filtration, foods and feeding problems and disease. The book is not restricted to freshwater fishes alone; a number of beautiful marine species are covered in the text. There is a useful bibliography. The list of World Aquariums might have been better.

Jack Hems.

THE AQUARIST

KOI QUERIES

I am in the process of making a pool with the intention of putting Koi into it. However, some friends of mine had trouble last winter with Koi, that appeared to be healthy enough, dying off for no apparent reason. They had had some of these Koi for about three years; is it possible that you could give me a reason for this?

I can only hazard a guess at why apparently healthy Koi should die after a period of three years. During this time the Koi should have grown and thus become stronger but were they left to spend the winter in dirty, unhygienic conditions? Koi pools should be kept clean at all times, which fact many people do not appreciate, but to leave any fish to overwinter in the accumulated dirt and debris of several months is hardly fair and pools should be made as clean and healthy as possible before the onset of really bad weather. This is basic good fishkeeping. All too often, I am afraid, pond fish are left to get on with it as best they can throughout the winter-months and yet are still expected to be in prime condition whenever their owners consider the weather, or time of year appropriate for "looking at the fish." If all the fish kept in outdoor ponds, Koi, more than any others, make greater demands upon their owners if they are to survive. They create more mulm, require more oxygen and certainly must not be neglected for any length of time if they are to maintain their health.

The other question to ask is the depth of the ponds in which the Koi were overwintered? Most of us will agree that last winter was a long, changeable one with alternating periods of relative mildness and severe frost. Such conditions inflict great hardship upon Koi, especially in shallow ponds. It will be readily understood that larger volumes of deep water maintain a more even temperature, both in winter and summer, than shallow waters which need only a short time to become quite warm or quite cold. Such rapid fluctuations of temperature must be avoided if Koi are to remain in good health. I hope that you will make your pool deep enough for Koi, certainly no less than four-five feet deep in one area where they can spend the coldest weather in comparative safety.

My Koi, which I bought earlier this year, have grown and are now about 8 in.-9 in. long and seem to be quite healthy. I have been told that they must be brought indoors for the winter and I could do this, but I would like to know if this is advisable as I have never had Koi during winter-time before.

October, 1977

by Hilda Allen

As with practically everything else opinions can vary on this particular subject but speaking for myself I would never consider bringing in Koi of this size. Small Japanese Koi of around 3 in.-4 in. and home-bred Koi of between 2 in.-3 in. will all be this year's babies and should be kept warm enough through their first winter to ensure they have a good start in life. After that first winter I believe that Koi that have been well-fed and cared for during the following year should be capable of wintering out-of-doors providing, of course, that the pond is deep enough. I will agree that Koi would appreciate generally warmer conditions than most of us are able to provide but Koi have been overwintered here quite successfully for a number of years now. Some of my own Koi are approaching their ninth English winter out-of-doors and most have spent at least five or six years outside.

If you do decide to bring your Koi indoors they will bring you a lot of pleasure and a lot of work. They will feed continuously and strict attention must be paid to cleanliness with the inevitable water-changing and, hopefully, some form of filtration. The work involved may become tiresome after a few months but it won't go away! Rather it will increase as the Koi grow under warmer conditions and there is no hope of returning them outdoors until the water temperatures approach being equal and even then the transition can be dangerous when late frosts occur.

Carp are hardy, adaptable fish and although Koi are somewhat more delicate as yet, they should be given the opportunity to adjust to our conditions if we ever hope to produce healthy, robust, British Koi.

Looking ahead, it would seem that unless you have unlimited facilities, your Koi will have to face the rigours of wintering outdoors sooner or later and I cannot advise keeping them too "soft" any longer than is necessary.

Over the past two years I have bought about twenty small Koi from various garden centres and pet-shops and I have lost at least fourteen of these. Can you tell me why I should lose so many?

You have my sympathy, but your story is by no means a new one. I must first ask the state of your pond into which you introduced the Koi. If it is very dirty or green and not aerated as is often the case, then the Koi would stand little chance of survival.

in such conditions. However, if the pond is reasonably healthy and other pond fish appear to thrive in it then one must look to the state of the Koi when purchased. It is always best to stand and look at the behaviour of the Koi offered for sale. If they are swimming actively and searching for food with all the fins in use then they are worth observing. Koi with any bruising, raised scales, parasites or other obvious troubles must be avoided. Split fins are not serious as given time these usually mend. Many small Koi have large heads and emaciated bodies and many just lie on the bottom of the containers. However beautiful their colours do not buy such fish in the belief that you can save them because the chances are that you will not succeed. All too often they have been moved from pillar to post with little consideration for their well-being after the stress of importation, and many die soon afterwards. The problems of disease are very real, some are obvious and some are latent, but *ALL* new purchases of imported fish *MUST* be quarantined for at least 8-10 weeks. This is where a second, quarantine pond is advised. New purchases must never be added to established, healthy stock who can quickly succumb to any new disease. To the beginner, buying Koi can be a shattering experience but always

look for healthy fish and refuse all the others and then quarantine the apparently healthy ones.

Once we become involved with any form of livestock we must expect disease and death at some time but good husbandry and knowledge can prevent a great deal of trouble. It has been said before "that cleanliness is next to Godliness" and where fishkeeping is concerned this is quite true. Clean conditions may not cure disease but they keep healthy fish healthy.

Last month's British Koi-Keepers' Society Open Show was an overwhelming success which attracted 3,000 visitors to view more than 500 Koi on display. Dr. Dodo, Dr. Kawaguchi and Mr. Tsubokura travelled from Japan to act as judges and, assisted by Mr. Ray Hanson, the owner of last year's U.K. Supreme Champion Koi, had a difficult task. The quality of the Koi was superb and B.K.K.S. members brought their own Koi, from home-bred youngsters to large family favourites many miles to compete.

The top six Koi, in order, were:—Taisbo Sanke; Showa Sanke; Yondan Kohaku; Kin Ki Utsuri; Gin Shiro Utsuri; Gin Rin Showa. Great credit must be paid to the hard-working members of the Birmingham and District Section of the B.K.K.S. whose efforts ensured the complete success of the show.

PRESS RELEASE

Higher Wattage Heaters

ARMITAGES are once again in production with higher wattage aquarium heaters. Their range covers the "Presetmatic" and "Controlomat" thermostatic heaters (combined units) and the "Superb" separate heater. An important modification has been incorporated into these units. An aluminium split tube grips the glass over the heater section to spread the heat evenly (see illustration); the whole unit is then covered by a silicone rubber sleeve which is bonded to the glass and the aluminium. This not only meets the Electrical Safety Regulations requirement for double insulation, but also provides extra strength should the unit be given a hard knock when out of the tank.

This particular method of double insulating aquarium equipment has two advantages. Firstly, it has no *external* metal parts—any external metal parts will contaminate a marine tank or wine-making equipment. Secondly, there is no *external* glass tube—naturally glass is much more susceptible to breakage if it does not have the protection of a silicone rubber sleeve.

The product illustrated is a 150 watt "Controlomat," with the unique calibrated temperature control dial in the head of the unit. This simple control gives flexibility to adjust and set the temperature at exactly the required level.



THE AQUARIST

1952-1977

SOME RECOLLECTIONS

BY

GEORGE COOKE, President, F.N.A.S.

WELL what was I doing 25 years ago exactly and what in the intervening years and even if I can recall it all, how do I condense it to a few lines? My private life was altered greatly when my only sister died in 1952. She 'ran' the family farm near Moreton in Marsh in the Cotswolds and I had the task of organising the selling of the farm and the stock. We had only just completed a modern milking parlour and built up a herd of Ayrshires. It was a sad time. Then my friend from boyhood, Jack Fell, died leaving me to look after his garage and his very new and only son. Then another old friend went and I found his affairs and his son (my first Godson) to supervise. All this time I was also Show Secretary for the Federation of Northern Aquarium Societies. Planning the B.A.F. for that year with C. Graham as Organiser and H. Hall as Chief Steward. That BAF was the first fully undertaken by the Federation.

I see I've slipped into recounting fishkeeping. The BAF of that year still had the exhibits in row after row of tanks. Easy for the judges but unattractive to the general visitor and a real headache and backache for the very few volunteers left to clear up the show. There were ten sections, A to J, subdivided into classes, eg. Section D, Class 14: any variety of Molly—this attracted 17 entries as did Class 16: Swordtails. Section E, Small Egglayers, was divided into 9 classes and attracted in all about 120 exhibits.

Every exhibitor had to be issued with a copy of his entry and a pass out section—an enormous task as stewards had to be posted at close of show to deal with these as no fish could be removed without a counter signature and copy.

There were about 160 individual exhibitors.

The 1953 BAF was run on very similar lines but H. Hall took on as organiser and F. Bentley as Chief Steward. There was no push to take my job and there was no BAF as such in 1954, just a Federation show. We licked our wounds and got our wind back after a few had been left to clear up completely the '53 show.

In the meantime Harold Hall came up with the idea

that each society should be made responsible to stage and clear its own exhibits and to make the idea work the pill was coated with the idea of Tableaux plus quite high money prizes. The show was original—it achieved its objects of taking the work-load off the few—and it has been copied in London, Scotland, the Continent and Yorkshire; as indeed have most of the contents of my BAF Schedules—it will have saved someone a good deal of work and I trust helped the hobby.

By the way, I think this '55 show was the one which actually paid our expenses and left a foundation fund. Harold Hall was Organiser, Tom Lee Chief Steward and I remained Show Secretary but had Mrs. Peggy Hammond as Assistant who kept her boss in order!

In that year 13 Societies competed, since when we have had a maximum of thirty-five and so the BAF has progressed. I believe it was 1958 when I first doubled as Show Secretary/Organiser, and I'm still saddled with the job. I must not conclude this brief review of the festivals without emphasising that none of it would have been as it has become without the unstinted help from the directors of *The Aquarist & Pondkeeper* and its executives, coupled with the support of the traders.

Now to personal fishkeeping. I was born a naturalist, this instinct passing to me through my Warwickshire Grandfather, a noted man in the late 18 to early 1900s.

Skipping the pre-war years, I mean the 1939-45 one, I recall buying the *A. & P.* and *Water Life* in May 1947. New tropicals were only available if smuggled into the country, mainly by German sailors via South America. Early stock to the few were costly, for example, Tiger Barbs at £4.10s; breeding size Angels, £78 pair; large, 5 to 7 in. Swordtails, £5 to £7, but they were magnificent. A very few Black Sailfin Mollies even more expensive. Soon, however, a few of us mastered the trick of breeding and rearing some of the less common fish in large quantities and the young fetched 50s. each to the trade in 500 lots or so. Examples: Glowlights; Bleeding hearts; Angels;

Continued on page 278



MARINE QUERIES

by Graham F. Cox

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

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

My aquarium is 60 in. x 18 in. x 18 in. I recently purchased some crushed shells for substrate for setting the tank up for marines. When I purchased it, I was told to bleach it. This I did to precise instructions. I have also boiled it, and washed it thoroughly at least eight times. When I placed it in my tank all was well until I switched the airlifts on, there was a strong smell of chlorine. I have since changed the water twelve times, but I am still experiencing the same problem. I would be grateful if you could help me with your advice.

What you should have done is:—

(1) Bleached the cockle-shell in a solution made up of one (1) cupful of "Brobat" or "Chlorox" in $\frac{1}{2}$ bucketful of tapwater for 3 days.

(2) Poured off the remaining bleach solution at the end of the 3 days, and left the cockle-shell under a fiercely running tap (with frequent turning over) for one hour or until you could no longer smell bleach (whichever was the sooner).

It was not necessary to boil the cockle-shell.

Finally, I would advise you that you have probably been throwing good seawater away. If you have been using a correctly-formulated sea-salt, there is a large reserve of chlorine/fluorine neutralising chemical "built-in" to the formulation, so that no smell of chlorine would have been possible.

Consequently one is forced to the conclusions either that:—

- (a) you have been using a poorly-formulated sea salt, or
- (b) you have mistaken the pungent smell of carbon dioxide (which is always evolved by a newly-dissolved sea salt for the first 6-12 hours of its life) for chlorine.

What type of filtration do you recommend for a proposed marine aquarium?

(1) The only type of filtration which is absolutely necessary for a marine aquarium is a tight-fitting U/G filter of high turnover-rate capacity (i.e. airlifts of at least $\frac{1}{4}$ in. diameter), which draws the artificial seawater through a deep (—at least 3 in. average depth) filter bed made up of a first layer of coarse cockle-shell (about 1 in. deep) and a final layer of oolitic coral-sand of minimum depth — 2 in.

However, since you already have an external filter there would be no harm in using this as well since the only short-coming which the U/G filter has is that you cannot easily use highly-activated marine charcoal with this type of filter. With an internal or external box-filter, however, the use of marine charcoal to remove the yellowish, toxic, phenol-related compounds which slowly accumulate in captive seawater is quite easy.

Warning—all highly-activated marine-grade charcoals have a very low density, i.e. they float on water. Consequently, before placing such a charcoal in your box-filter it is important that you should pour boiling water over it (an old saucepan or basin is ideal to keep for this purpose) and leave it to stand for half an hour before use. *Remember*—"Cheap and cheerful" (i.e. low activity) charcoals are made from coal and therefore are so dense that they sink. Their low activity (—100-200 square metres per gram) is quite adequate for freshwater aquarium usage, but not good enough for the marine aquarium where an activity level in excess of 1,000 sq. metres/gram is required.

It should also be mentioned here that whereas you could use filter-wool together with the charcoal if your tank is intended to house a fish-only display, if you were considering keeping invertebrates in the

aquarium it would be very inadvisable to include filter-wool since this would remove planktonic life-forms from the seawater.

(2) *Oxygen requirements of invertebrates.* The oxygen requirements of invertebrates to all intents and purposes, may be regarded as being identical to those of corals, i.e. with two large diameter airlifts operating 24 hours a day plus a wooden air diffuser, there is no danger of anoxic conditions developing.

(3) *Angle-iron framed aquaria.* There is no danger of poisoning your marine-life with such a frame since iron and stainless steel (ultra high quality) are the only two metals which one can safely allow to make contact with seawater. It is important, however, that you paint the iron frame extremely carefully (first coat metal primer, second coat non-lead undercoat, third and fourth coats non-lead gloss paint) before commissioning the tank otherwise the seawater (perhaps the most corrosive liquid on Earth!) will corrode your frame away within a few months. The significance of this is that firstly your display will look very unsightly and secondly that in time the unsupported glasses which make up the tank might eventually explode!

(4) *Compatibility of beginner's fishes.*

(i) *Damselfishes.* Almost all species of Demoiselle fishes can be regarded as being compatible with each other on an inter-specific level, i.e. you could have a collection of one Domino damsel, one Humbug damsel, one Saffron-blue damsel and one Electric-blue damsel and would probably have no problems amounting to real aggression—just the usual inter-Damsel bickering which rarely comes to anything. However few damsel fishes are truly compatible in a small aquarium at an inter-specific level *except* where mated pairs of fishes are concerned. That is to say that unless you (or your dealer) can reliably sex damsel-

fishes and thus select one male and one female damsel, I would not advise you to buy two damselfishes of the same species.

The one exception to this rule where one is considering tanks of 3 feet (1 metre) or larger is the beautiful little Filipino Saffron-blue damsel (*Pomacentrus melanochir*) which doesn't exceed 1-1½ in. (2.5-3.0 cms) in length and is remarkably non-aggressive for a damselfish. *Caution:* Do not confuse this species with the much larger Indian Ocean Yellow-tailed blue damsel (Ceylon, East Africa, etc.). This large species superficially resembles the Pacific Ocean Saffron-blue damsel, but is extremely aggressive.

(ii) *Clownfishes.* I have never regarded this family of small, cheap and colourful marines as suitable for the beginner's sea aquarium, because they are very prone to disease (principally *oodinium*—"marine velvet") in newly-established tanks and unskilled hands. However, since all the American hobby literature does recommend clowns to beginners, it should be mentioned here that the red clown fishes, i.e. common clownfish (*Amphiprion percula*), Tomato or Fireclown (*A. ephippium*), Bandless Fireclown (*A. frenatus*) and Maroon Clown ("*Premnas*" *biaculeatus*), should not be kept together in the same sea aquarium if the latter is less than 6 feet (2 metres) long.

(5) *Marine dried foods.* Both Aquarian and Tetramarin marine flakes are very good, but all corals greatly benefit from regular feeds of chopped earthworm, whiteworm, gamma-irradiated frozen Mysis, squid, shellfish, etc. *Caution:* Do not buy frozen seafoods if they are not gamma-ray irradiated. Despite the fact that these excellent (and cheap!) foods have been on the market now for over four years, the Retail division of my Company still has to deal with half-a-dozen cases each year of aquarists who have wiped out their entire collection of corals with diseases introduced on non-irradiated seafoods.

GEORGE COOKE REMEMBERS continued from page 274

Ramirez; Glass Fish; Belgian Flag; Dwarf Gourami; at this time Neons for example, had not appeared.

My own successes (I bred some 27 species) was due perhaps to my realisation that young fry need the right type of live food as soon as the egg sac is used up. I had access to a score of ponds and man-made enclosures and collected gallons of this minute living animal life weekly. In fact, I limited my tanks to 22 for I calculated I needed the balance of any time to collect the food. Additionally, I was a member of the San Francisco Aquarist Society and had a share in the rights to collect and market Brine Shrimp eggs from that bay. Mrs. Grindal and her worm first came to me and this I developed and distributed but I've written of this elsewhere I think.

What are my thoughts on the hobby? Well there do not appear to be anything like the number of really skilled fish breeders as there were; perhaps the car and TV are competitors for spare time and this leads me to observe that we do not have nearly enough workers in the hobby. Leave it to the "Georges" is too prevalent. To be critical is easy but it would appear that in particular good efficient Hon. Secretaries are far too scarce and it is too easy to fill the gap with willing but incompetent volunteers. On the other hand, the Books and magazines available to both the skilled and beginner are very easily available—most of the colour is good and near accurate and *The Aquarist and Pondkeeper* will, no doubt, continue to guide the novice and entertain the others for ever.

POISONOUS AMPHIBIA

by Andrew Allen

THE Amphibians are the veritable Borgias of the living world. From species to species the variety of toxins, poisons and hallucinogens conjures up visions of the overcrowded cupboard of some Renaissance alchemist, and sends the modern organic chemist into raptures. Indeed, the poisons of the amphibia were well known to the ancients, and are in the forefront of current research into the synthesis of complex molecules.

Nikander of Kolophon and the younger Pliny both recorded the symptoms of poisoning due to the secretions of the European salamander, *Salamandra salamandra*. The hallucinogenic properties of toad-skin lay behind the witches' flights of the Middle Ages, and the Shamanistic journeys of the Palaeo-Siberians. Chinese and Japanese physicians of the early dynasties employed the dried toad secretions known as *chan su* and *sen-so* as cardiotonic agents, exploiting the thin borderline between toxic and therapeutic effects.

Amphibian poisons are exclusively associated with the skin. This is a predictable corollary of the rather special role that its skin plays in the life of the newt or frog. While the skin of lizard, snake, bird or man is primarily an impermeable barrier against the outside world, that of the amphibian is a surface of interaction: the focus of water exchange, ion relations and respiration. It is richly supplied with glands whose complex secretions serve to protect this delicate layer against desiccation and abrasion. The glands and their compounds are readily modified into sacs of virulent poison.

Mucus Glands

Sometimes the secretions of the mucus glands evolve into poisons. The mucus of the edible frog (*Rana esculenta*) irritates cuts and, in one experiment, killed a goldfinch into which it was injected within one minute. I haven't read the original paper, but it sounds like an indefensible piece of research.

More often, the poisons develop from the granular glands, and it is to this category that the most potent examples belong.

Salamandrine is a skin secretion of the European salamander and a mixture of several dozen alkaloids. The symptoms noted by Pliny were those of a Central Nervous System poison: chronic convulsions, paralysis, death by respiratory failure. The milky white fluid, copiously secreted, is enough to deter most predators, particularly when associated with such startling black and yellow warning colours. To a human, a tiny drop of fluid placed in the mouth causes pain, uncontrollable flow of saliva, and total paralysis of tongue, lips and gums; that is, a strong local anaesthetic effect reminiscent of a visit to the dentist.

Several European newts—*Triturus cristatus*, *T. marmoratus*, *T. alpestris* and *T. vulgaris*—possess similar poisons. Those of the crested newt are particularly obnoxious, both haemolytic and neurotoxic, and often serve to deter such predators as the grass snake and European terrapin. Anyone who holds a crested newt between his teeth for a few seconds will discover why.

Tarichatoxin is extracted from the skin of the Californian newt, *Taricha torosa*. A fascinating instance of convergent evolution between phylogenetically remote lines: tarichatoxin is identical to the tetrodotoxin of the puffer fish, *Sphoeroides rubripes*. Widely employed in research into the biochemistry of the nerve synapse, the compound causes vasodilation, vomiting and death. 0.003 oz. is sufficient to kill 7,000 mice.

Walking Poison Sacs

The larger Bufonid toads are walking poison sacs. The granular glands are grouped into the paratoid complexes behind the eyes, sometimes into complexes along the calf of the leg, but are also distributed over the entire body. When scared, the muscles controlling the glands contract, squeezing an acrid fluid onto the surface of the skin. Among the truly lethal toads are the 10 inch *Bufo paracnemis* from Brazil, Bolivia and Northern Argentina; *B. alvarius*, the Colorado

Continued on page 282

River toad; the Marine toad, *B. marinus*; and the South European sub-species *spinulosus* of our own *B. bufo*. All contain sufficient poison to kill a predator the size of a large dog, with plenty to spare. Unlike the salamander, none of these toads bear warning colours. The Bufonid poisons cause inflammation of the eyes, foaming at the mouth, damage to mucus membranes, convulsions, respiratory paralysis, and death through suffocation or heart failure.

Wily predators circumvent the poisons by employing insensitive claws or beaks to rip away the skin of the live toad, eating only the harmless interior. Crows, magpies, seagulls, rats and badgers have all been observed to develop and learn such tactics.

The acrid white fluid conceals a complex armoury of poisons. Bufotenin promotes the sensation of flying through the air, hence its use in "witches' potions." It is a hallucinogen, closely related to mescaline in structure (the drug discussed by Aldous Huxley in "The Doors of Perception"), and it is possibly on account of this compound that mongooses in Hawaii and the West Indies become addicted to eating the skins of the marine toad.

Bufogenins and Bufotoxins are compounds derived from Cholesterol, and very similar to the toxic alkaloids of plants. As poisons, they stop the heart. In moderate doses, they improve the contraction power of a sick heart, and decrease the beat frequency; it was for this digitalis-like property that the oriental physicians employed toadskins; the practice was imported into Europe during the 17th and 18th centuries, but later superseded as plant alkaloids became available. The local anaesthetic effect is stronger than that of cocaine, and similar in its biochemistry.

In addition, a series of biogenic amines mimic dopamine and epinephrine, flooding the normal neurotransmitters of brain and adrenal medulla, and thus disrupting mental balance and co-ordination.

Members of the genus *Leptodactylus* feature neuromuscular blockants related to nicotine. *Bombina variegata*, the Yellow-bellied toad, employs serotonin, thus aping yet another transmitter within the brain. Atelopotoxin from the South American species *Atelopus varius*, *A. ambulatorius*, *A. cruciger* and *A. planispina* is a cardiac poison, widely employed by the Indians of Panama, Costa Rica and Columbia as an arrow poison.

Poisoned Arrows

But the doyens of the South American poison frogs are the Dendrobatids. Small, flamingly coloured frogs of the forest floor; the effectiveness of their poisons is evidenced by their numerical abundance and immunity to predation. The Indians of Tropical America kill the frogs by impalement on a spike, and roast them until drops of poison fall into a jar. The poison ferments, slowly; the arrow tips are dipped

and then dried. The poisoned arrows paralyse and kill a bird or monkey inside a couple of seconds.

Among the plethora of Dendrobatid alkaloids, Batrachotoxin is the most potent. It decreases permeability of cell membranes toward Sodium ions, and irreversibly blocks the transmission of impulses across nervous junctions, thus causing instantaneous and total paralysis.

If his hands are free from cuts, and he washes well, the vivarium keeper need not fear the poison of any amphibian: they are adapted to defence, not to offence and hunting. And, as a general rule, the poisons in no way affect suitability for the community vivarium (assuming that vivarium to be fairly large: a giant toad squatting in a tiny pool will surely contaminate the water). There are a few exceptions. I note particularly the American pickerel frog, *Rana palustris*, which is known to poison water with its skin secretion and thus cause the death of animals sharing the same pool. Also, the secretion of the giant tree frog *Hyla vasta* causes irritating red rashes on the skin, even in the absence of cuts.

The herpetologist should also take care when feeding frogs and newts to his snakes. For example, smooth newts have been known to poison garter and viperine snakes, although grass snakes and several other species take the newts with impunity. Crested newts are ignored by many European snakes and terrapins, but could cause fatalities in exotic species encountering them for the first time.

Evolutionary Questions

This armoury of varied poisons begs one or two evolutionary questions. For example, many frogs and toads possess poisons similar in structure to those described, but inadequate in quantity or virulence to impart protection against predators. Thus there is no indication that the common frog enjoys reduced predation as a consequence of the poisons that it undoubtedly possesses. But if the poisons confer no defence against predators, how did they come to evolve? Why do all amphibians possess poisons, yet only a minority use them as defensive weapons?

As always, the answer appears to lie in a change of role. The amphibians developed their poisons as a skin defence against the millions of bacteria that pullulate in water, air and soil, and always threaten to invade through that delicate respiratory surface (a problem that does not face the reptiles: they just build a "dead", impenetrable wall). The reality of the threat is confirmed by the multitude of skin lesions and sores that carry away any ailing amphibian, conditions which the herpetologist knows only too well—particularly if his charges are overcrowded. Ubiquitously developed as bacteriocides and fungicides, the poisons were ripe for modification into anti-predator devices once they had attained a certain threshold of virulence.

COLOUR AND COLOUR CHANGE

by Christopher Storey

ANYBODY who has kept fish or crustacea in an aquarium must have noticed that they can change their colour. An example that will be familiar to everyone is shown by the angel fish (*Pterophyllum*). When showing normal colouration it is silvery white with vertical black stripes, and is a beautiful sight. In its natural conditions in the Amazon this colour pattern helps to conceal the fish by breaking up its outline, making it difficult for predators to distinguish the angel since it merges into the aquatic vegetation that it lives amongst. Should the angel fish be startled though, all the colour drains from the black bands, which pale until they are the same colour as the rest of the body. The colour change is to help the angel fish escape its predators, but there are various other reasons why they occur.

Most fish show a change of colour when they breed. This is generally an intensification of their normal colour patterns, as seen in the Jewel Fish (*Hemichromis bimaculatus*), the Siamese Fighting Fish (*Betta splendens*), Discus (*Symphysodon aquifasciata*), and

many others, but some fish develop specific regions of colour. This can be seen in the red patches that develop on the chin of the Firemouth Cichlid (*Cichlasoma meeki*), the Pearl Gourami (*Trichogaster leeri*), and the classic case of the red belly of the breeding male Stickleback (*Gasterosteus aculeatus*).

Breeding colouration serves the purpose of attracting members of the opposite sex, and indicating that they are ready for spawning. Often fish that develop breeding colours are territorial, such as the Stickleback, and the colour acts as a warning to help them to keep and defend their territory from other males.

It is not generally known that male guppies (*Poecilia reticulata*) show very specific colour patterns according to the stage which has been reached in courtship. A male guppy has five body regions that can go black—see Fig. 1. Region 1 is not shown in the diagram since this involves an over-darkening of the whole body. When a male starts courting a female, region 1 (the whole body) slightly darkens. Then as courtship proceeds region 1 lightens to its original colour and region 2 goes black—this is a spot on the caudal peduncle. As the fish becomes more excited region 2 fades and region 3, a stripe down the length of the body, darkens. The final change which occurs is a fading of region 3 and the development of region 4—recognised as a black patch behind the operculum. This ultimate change precedes copulation. Region 5 is not concerned with mating but is developed due to

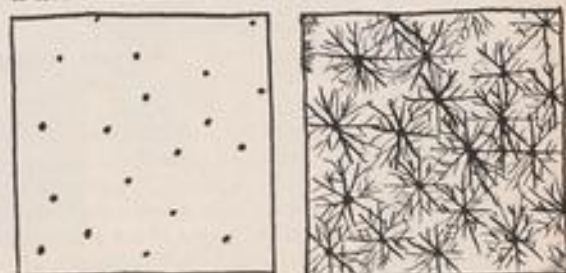
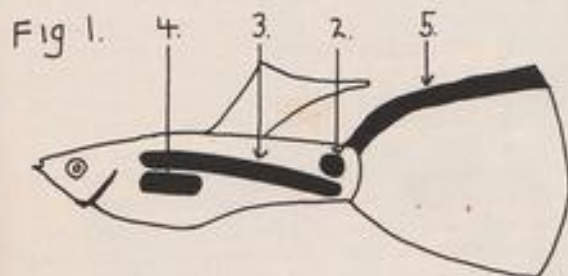


Fig 3.

Fig 4.

excitement created by aggression.

It is an unfortunate fact but sometimes these changes cannot be seen because they are concealed by the beautiful body colours that have been developed by fancy guppy breeders.

The reason that most readily springs to mind for a colour change is that of camouflage, and certainly everyone will have heard of the remarkable abilities of the chameleon. Change in colour to merge in with the background is not very evident in the usual species kept in aquariums, but guppies, mollies and other live-bearers can, and do, lighten and darken their bodies to blend more closely with the background.

But to find the fishy masters of camouflage one must look to the ocean floors. The flat fish (*Paralichthys albiguttus*) is probably the most impressive of all and can put a chameleon to shame. It is able not only to adapt to the colour of the background, but also to the actual pattern of the background. There have been many photographs published of this fish, placed on variously patterned backgrounds, showing the wide range to which it can adapt. Shrimps and prawns have a great ability to change from one colour to another and the best example, which can be found in rock pools around the coast of England, is Hippolyte, the aptly named chameleon prawn. This can make its body green, red, yellow, brown, black, orange or any mixture of the colours so that they become the same colour as the background. Whether it is on sand, a green, or a red seaweed makes no difference to these masters of colour change.

Another reason why colour change occurs, has been suggested, to try and explain the reason why certain reptiles change their colour. Most examples are those animals which live in the desert and so are subjected to the powerful heat of the sun. In the middle of the day, when the sun is at its hottest, a lizard will lighten the colour of its skin so as to reflect many of the sun's rays. This prevents overheating. But in the cooler temperatures of the early morning the lizard will darken its skin colour so the sun's rays are absorbed. This will warm up the lizard so it can become more active. By using this method, a cold-blooded animal has some means of controlling its own temperature.

This remarkable ability of some animals to change colour is due to even more remarkable cells called chromatophores. These are large, specialised cells which contain differently coloured pigments, and they are found scattered throughout the skin. The pigment within a chromatophore can move and at one extreme will be concentrated into a small dot in the centre of the cell—the contracted state (see fig 2(a)). The other extreme is when the pigment is fully dispersed and so the whole of the cell becomes the colour of the pigment—the expanded state (see fig. 2 (e)). The pigment, of course, can also occur in intermediate states (b, c, d). It is easiest to explain how chromatophores enable an animal to change colour by considering only one

colour—here I shall use the colour black. Since an animal can contain several different coloured chromatophores, to consider all of them at one time would only lead to confusion. For example, the shrimp (*Crangon vulgaris*), has at least six different coloured chromatophores and they can all vary independently from one another. Figure 3 represents an area of skin under low magnification. The pigment in the chromatophores is condensed into a small blob in the middle of the cell, i.e., contracted. In this condition the black pigment does not contribute to the overall colour and the area of skin would appear white. Figure 4 shows the same area of skin when the pigment in the chromatophores is in the expanded state. It now occupies the whole of the chromatophore and contributes fully to the colour of this area of skin so it would appear black. This area of skin could, for example, be from the black band of an angel fish. Normally the area would be black, but when the angel fish is startled the area would become white because the pigment would become contracted. After a period of time, when the fish has got over the shock, the pigment will become expanded again so the black band will return. When an animal has many pigments the way the change occurs is exactly the same, but by expanding and contracting them to different extents, certain colours predominate over others. In this way an animal can produce many combinations of colour patterns.

What causes the pigments in a chromatophore to change from state to state is a message from the brain which can either be a nervous impulse or a hormone. The nervous impulse will pass along the nerves and the response to such a message is usually very quick—as when an angel fish is startled. When the message is in the form of a hormone the response is often much slower, since the hormone has to be released from the gland where it is made and then distributed, via the bloodstream, to the body. Crustacea use hormones for this purpose and changes take from about thirty minutes, as in the shrimp (*C. vulgaris*), to a few days.

As I stated earlier, these cells are large, so large in fact, that in crustacea they can be seen with the naked eye. A close look will reveal the different colours present, but the true spectacular beauty of the cells can only be really appreciated with magnification. A hand lens will give you a glimpse of what there is to see, but if you have access to a microscope the fine detail will be visible and the sight will be that much more impressive. The best way of observing them is to wrap the animal in cotton wool that has been dipped in seawater (freshwater if it is a freshwater animal). This will keep it safe and still whilst you are examining it until you return it to the water. If suitable animals are obtainable, such as *Crangon* or *Leander* the prawn, I guarantee it will be well worth your while to have a look at these interesting cells for their intriguing beauty never fails to impress.

WHEN I was asked earlier in the year whether I would like to join a group of tropical fish importers to visit Colombia, South America to inspect the facilities of Dr. Jose Ivan Colorado Lopez and his associates I had no second thoughts about this offer, especially when I was told that part of the itinerary was to spend some time in Leticia where we would actually go out on the river with fishermen to catch our own fish. In fact, we were going to be shown the whole operation:—catching the fish, the transport back to the collecting station near the Amazon river at Leticia and finally the holding and export facilities at Bogota. We were invited on this trip as consultants; it was hoped that we would be able to advise the various parties on how to improve the handling of the fishes so that the very heavy losses could be reduced and

The temperature must have been more than 90 degrees Fahrenheit but having left a cool and overcast London the change was most welcome.

At Bogota El Dorado airport we were met by a great number of people, but I suppose we were all much too tired to take in all their names. They all seemed very pleased with our arrival. When I reclaimed my luggage I noticed that someone had opened my case and taken 40 rolls of colour film. Later, I also found that they were in desperate need of a red shirt. Not having locked my case could have turned into a real disaster since I had in the same case also my passport, all my traveller's cheques and also all my credit cards; the hoped-for wonderful time at the Amazon river could easily have turned into a nightmare. The films I was unable to replace since

AMAZONAS

Written & Illustrated by Eberhard Schulze

PART ONE

also that the fishes would arrive in a much healthier condition in Europe.

The 'group' consisted of Cliff Murray from Glasgow, George Parson of Parson's Fish-Imports, Maurice Cott of Terenza Ltd., Gosport, Tom Faithfull of Faithfull-Fisheries and myself.

A few days before our departure our guide-to-be Mr. Ernesto Quintero, a native of Colombia, gave a cocktail party at his London home so that the group could get to know one another. A representative of the airline, who were also the co-sponsors of this trip, was also at the party to wish us all a safe journey and it was agreed that, if we did not have too much trouble with the piranhas or the candiri fish or even a tribe of Indians, well-known for their head-shrinking activities, we were going to have a wonderful time.

The airline was generous enough to put us through their VIP routine:—I must say it is certainly the only way to travel but, unfortunately, these opportunities do not come too frequently. The flight from London to Bogota was long and uneventful. The first contact with the 'tropics' was at Caracas where we had about one hour while the aeroplane was being re-fuelled.

this size (120) is not generally known or used in Colombia and the only two rolls I found had already expired in 1972. Still, I bought them and now had only 9 complete rolls or 135 shots and I became very mean with my picture taking.

We were taken to a hotel in the international part of Bogota and had hoped to have an early night—Bogota time—when an even greater number of people arrived at our suite. It seemed that our guide, Ernesto Quintero, had organised his whole family, all his friends and business associates to turn up to welcome us. We had to have another few drinks, a few more kisses and many more hugs before we were finally left alone to catch up on our sleep. I was very pleased and most touched by the warm reception we were given by all those strange people, they all seemed very genuine.

The next few days we became tourists and were shown all the usual sights: we visited the Gold Museum, the only one of its kind in the world where over 15,000 precious gold objects, most of which are Pre-Colombian in design, are on display; we were shown the heart of the old city, the Plaza Bolivar

with the statue of the Liberator in the centre, the Cathedral, the El Sagrario chapel, the Municipal Palace and the Capitol. We were taken up the Andes Mountains by cable car to the Monastery of Monserrate; we were taken to Zipaquire, 30 miles north of Bogota, where a cathedral is built inside a salt mine and capable of accommodating more than 15,000 people. We saw a great deal of Bogota and its surroundings; our hosts Ivan Colorado, Dr. Hernan Perea Prieto and their wives, Ernesto Quintero and his family were certainly able guides.

Although our stay in Bogota was very interesting and enjoyable, I was very glad when we left for Laticia. Laticia is considered the gateway to the Amazon and is located at the southern-most part of Colombia. It is a small place with about 6,000 inhabitants, a few fairly comfortable hotels, a miniature airport and where all the electric lights would go off at 11 pm. Although our hotel, the Parador Ticuna, was very close to the mighty waters of the Amazon river, the water supply was very haphazard and many a morning we were forced to have breakfast before we were able to have a decent wash. As we had arrived towards the end of the rainy season part of the town was still under water; not surprising perhaps, as the whole area had the worst rainfalls for more than 19 years. Luckily, our stay there was not spoiled by the weather since we only experienced one tropical downpour. Our contact there was going to be Hernan Suarez, a tropical fish collector, who was going to take us on one of his collecting trips. Apart from him, several other well-known tropical fish collectors have their base at Laticia and the most experienced are perhaps Rafael Wandurraga, who was the first one to send the beautiful Peruvian Green Discus to Europe and has become quite a celebrity in town, and Johnson, a big American who had specialised and mainly collects the various species of Corydoras.

The first day on the Amazon river was spent by going about 30 miles upstream in a small boat with a group of Germans, two French girls and some Americans. Hans Heydler, a German who got 'stuck' at Laticia after having travelled all over the South American Continent, was our guide for the day and certainly knew all the little openings along the banks of the rivers. We visited Monkey's Island, the jungle settlements of the Jaguar and Tiguna Indians and a lake with hundreds of *Victoria amazonica* water lilies. The perfectly round shaped leaves measure approximately 3 feet across and it is said will take the weight of a human. None of our party was willing to have a try.

A boy of the Jaguar Indians became our guide for a walk through the jungle. The jungle was dark, humid and wet and very slippery. The wildlife in the jungle is supposed to be abundant and varied but apart from a few unusual and colourful birds nothing

was to be seen. We saw the occasional beautiful flower or bloom on a tree or bush but our main aim was to follow the person in front without stepping on to a snake or touching anything which might be poisonous. Although we were instructed not to touch anything it sometimes proved impossible to walk a few steps without temporary support from a fallen log or tree or anything which might prevent one from falling over. It seemed we had all mastered the art of staying upright in these conditions when I had to manoeuvre a very slippery bit. I could feel that I was not going to make it. Since I tried to protect my camera which I was carrying in my right hand and did not want to ruin, I had no choice but to reach out with my left hand towards a tree to try to steady myself. As I could see nothing unusual I was very surprised to feel a terrific pain as soon as I had touched the tree and found that I had 21-3 inch long black and very sharp spines in the palm of my hand. For a brief moment I thought I was going to pass out. In trying to remove these spines most of them got broken off. On the 'long' journey back to Laticia I felt cold and very miserable and my hand swelled up and doubled in size. I was given antibiotics and painkillers but they did not seem to ease the pain and I was quite willing to give up taking part in any further activities. The next morning the remaining fragments were removed from my hand by a young doctor at the Laticia hospital. (About 4 weeks later I developed a rash on my left arm and it was diagnosed as a delayed mild case of blood poisoning). No wonder Hans Heydler and Ernesto Quintero were concerned with the condition of my hand at the time.

On the way back to Laticia we also collected our first sample of water from the river for analysis. As soon as we arrived back at the hotel George Parson and I (although I did not really feel like doing anything) brought our testing equipment and carried out the first test of the Amazonian water. Having both obtained a reading which we thought was not possible we spent some considerable time re-calibrating the testing equipment. The next set of tests gave an identical reading and I remember very well the surprise of the members of the entire party. The water of the Amazon river was not as we all had expected: soft and acidic. It was very unlikely that both our testing gear had broken down and we accepted these readings and everybody was busy making notes of them:—Amazon River, about 30 miles upstream from Laticia, Temperature, (measured at source) 31°C., the pH value was 7.4 and the conductivity was 158 uS. Although the water looked very turbid and almost opaque at the source it was quite clear in our glass collecting vessel but had a slight sediment.

We had all been conditioned by writers like Axelrod, Hans Mayland, Dr. Rolf Geisler and others to believe otherwise. We accepted the findings of our first test and decided to carry out as many tests over as



Left: Sunset over the Amazon

Below: A fisherman of one of the lake which form after the Amazon Floods.



Right: A Jaguar Indian village.



Below: Aerial view of Laticia.



wide an area as possible in the remaining time. We came to the conclusion that it is very likely that the water composition during the rainy season is different to that of the dry season since large areas are flooded and a number of minerals are released into the water, whereas during the dry season a great deal of rotting vegetation is bound to have an effect on the composition of the water.

We were fortunate enough to meet an American biologist who confirmed the results of our tests and who was also willing to supply us with the results of his water analysis which he promised to carry out over a period of several months. I have no doubt in my mind that we will find that the waters will become 'softer' and acidic during the course of the Amazonian summer.

During the next few days we took every opportunity to collect water samples from as wide an area as possible and Hernan Suarez was kind enough to ferry us about in his boat. We went to several lakes in the Peruvian part of the Amazon; we had a hazardous journey to Benjamin Constant which meant we had to cross the Amazon River at Laticia in his small boat:—even though the Amazon River had just started 'round the corner' and had another 2,000 miles to go before it would finally flow into the Atlantic it was already more than 1,200 meters wide and the crossing took much longer than most of us had hoped for. To comfort us we were told that this kind of small boat never sinks but the idea that the Amazon River was full of blood-thirsty piranhas was never far from our minds. The fisherman must have realised the concern of some of us and slowed down the boat until we reached the safety of the other bank. I suppose after a while we got used to this kind of travel and the journey to the Brazilian side was a pleasant two or three hours. On the way back I saw the most fantastic sunset I have ever seen. The whole ball of the sun was still clearly visible on the horizon and reflecting beautifully on the now gentle waves of the Amazon River when I tried to adjust my camera. This must have taken me about one minute when suddenly the sun disappeared behind the trees of the jungle and turned the whole of the sky into a golden-orange colour which no photograph can really capture and words are not adequate to describe.

On that day and during the week of 21 May to 25 May, 1977 we carried out most of our tests of the Amazonian waters. For those hobbyists interested in water chemistry of the region around Laticia I will state our findings:—Amazon River, about 5 miles upstream from Laticia: pH 7.8, Conductivity 160 uS, Amazon River, at Laticia: pH 7.4, Conductivity 190 uS, Peru, Lake near Laticia: pH 7.7, Conductivity 160 uS, Peru, Saraiba Lake: pH 7.4, Conductivity 160 uS, Javari River, about 6 miles from Laticia: pH 6.7, Conductivity 29 uS, Javari River/Amazon River: pH 7.1, Conductivity 58 uS. The tempera-

ture, measured at the various spots, varied between 29 to 31°C. We also took readings within a very small area at several of the lakes and found that the pH values and the Conductivity of the water would not necessarily be the same. On the whole, the variations were very small, but we also came across instances where the differences were fairly great within a small distance of 100 feet or so. Although we all expected certain variations of the pH values and the Conductivity of the waters, we were surprised to find these large differences over such a small area.

It is generally accepted that the rainy season is also the breeding season for many of the South American species of fish and all guidance given in the many text books (see Axelrod: *Breeding Aquarium Fishes* and others) must certainly be looked at and reconsidered. I do admit that it is much easier to raise a brood of youngsters in acidic conditions for obvious reasons, but could it not possibly be the cause of the many failures, breeding the so-called problem fishes by providing them with an environmental condition which goes against nature? Is it not a fact that many a Discus fish pair can be induced to spawn with the Continental practice of providing an artificial down-pour of water which is somewhat colder, harder and less acidic? Is it not a fact that most successful Continental Discus fish breeders of wild stock follow this practice? That tank-raised and Far Eastern fish are somewhat easier to breed and therefore do not fall into the above mentioned category goes without saying. It is certainly not my intention to revolutionise the way we keep or breed these fish in this country but if we want to catch up on our Continental brethren—as T. J. Burden so aptly put it in his article in the *Aquarist and Pondkeeper* last July,—I feel that we certainly ought to make an effort and examine and learn from the conditions in nature and take note what others are doing. Then perhaps we will be able to repeat spawnings at will and not be satisfied with an occasional brood of youngsters.

I have been keeping Discus fish for very many years but my breeding efforts over the last two or three years have been very dismal due to other commitments. I admit to the fact that I have stated in this magazine and other publications that it is absolutely necessary that the fish be kept in as clean an environment as possible if success is to be had and have advocated a clinical set-up. A clinical set-up has undoubtedly certain advantages; it can, for one, be kept clearer; there is nothing in the tank to interfere with the chemistry of the water, etc. but as many of my customers will know, the most stable and successful Discus fish aquarium I have in my establishment is a fully furnished tank. However many problems I seem to get with any of the other Discus fish aquaria, the fully furnished tank (about 3 years now) contains a better conditioned fish and is free from the problem so often associated with a clinical environment.

Today I am convinced that with an aquarium set up with all the technical aids available to the hobbyist, any Discus fish keeper, or for that matter, any other FISH keeper could eliminate most, if not all, problems associated with the hobby. Another matter I would like to raise at this point which will become more apparent later on is the feeding of the Discus fish. Every hobbyist will have heard or read in books or magazines that these fish are finicky feeders and would rather die than accept a food which is not to their liking. This might have been the case several years ago when we just did not know enough about these fish. This refusal of food was probably nothing but a symptom of some internal disorder. Today we know that a healthy Discus fish will eat almost anything; today we also know how to apply medications and the problems of the past are no longer with us, and the Discus fish are in much better condition by the time they reach the hobbyists' tank. But still most hobbyists are very much concerned about the feeding problems of these fish and if they have bought a fish willing to eat anything they seem to be under the impression that they have an exceptional fish and will go out of their way to provide continuous food until "the stomach is nice and round like a balloon."

During our stay at the Amazon we did not see many Discus fish, but all the fish, whether they were in Rafael Wandurraga's aquarium or in the lobby of the hotel at Laticia or in the tanks at Hernan Suarez or Ivan Colorado in Bogota, were all very thin. These fish were caught several days before we saw them, at most one week and were in a condition my customers are certainly not willing to accept: but they came from their NATURAL habitat and were supposed to have had a great deal of food brought down with the high waters. It set us wondering and the point that we possibly look after our Discus fish too well, was brought home to me when I was able to observe at very close range a pair of Discus fish at the pond at the centre square at Laticia.

The pond measured approximately 15 metres by 10 metres and the water was not much deeper than approximately 60 cm. As the pond was fenced in I was unable to take any measurements of the water but was assured that it contained Amazonian water which had to be pumped up from the river. At first glance the water looked much too dirty to contain any fish, and in particular Discus fish, as it was full with Coca Cola bottles, beer cans, Mobil Oil cans, banana peel, lumps of bread, rotten fruits of various kinds, a wooden chair and several pieces of wood from what seemed to be the table to go with the chair, batteries, cigarette packets of different brands and many other articles were either sitting at the bottom or floating on top of the water. One could easily get the impression that this pond was used as the rubbish dump for the community of Laticia. But

this pond contained a great number of fish. To my great surprise I saw a pair of Discus fish being followed by a shoal of about 50 one inch long youngsters. As I was standing very close to the edge I must have been seen by these fish since they all came closer and to the surface of the water. This excitement brought with them two very large Mudskippers who, true to form, loosened all the accumulated sediment in the pond and for several minutes it was not possible to see anything. When all the mud had settled again I could clearly see several piranhas very close to the Discus fish youngsters though not taking the slightest notice of them. There were also a great number of 6 inch long Scissor-Tails which I had never seen before; a lot of young Arawanas, Cichlids like Geophagus and what looked like Jack Dempsey and what must have been several hundreds of a golden Tetra. In fact, it seemed that most fish of the Amazon were represented in this pond.

I do certainly not suggest that we look upon our aquaria as rubbish dumps and fill them up with all the waste materials we can get hold of—but these fish seemed happy, healthy and certainly very much alert. It must mean something. I remember that Mr. K. Frickhinger, the proprietor of Zoomedica Frickhinger, told me several years ago that he thought many hobbyists could reduce the problems they had with their aquaria if they would only not keep them too clean. I did not take too much notice of this statement since at the same time a filter manufacturer was trying to make us believe that it was of the utmost importance to remove every speck of dirt from the aquarium by using one of their filters. As always there are more ways than one to maintain an aquarium.

One night the whole group was taken out by boat and it was our intention to catch our own fish. We were well organised and had all the necessary nets, torches and plastic bags for our catches. This particular night seemed much darker, there was no moon about and hardly any stars visible in the sky. We went to a lake near Laticia where we had spent a previous afternoon trying to catch some fish with a line and hooks. Then, our yield was very small; it was going to be the same on this occasion, and apart from a few Hatchet fish, some small Piranhas and several different Tetras, nothing much was to be had. We saw the lonely Angelfish, and Tetras of different descriptions, but were unable to catch them. We spent about 3 hours on that lake or between the undergrowth of the flooded banks; the noise from the jungle in the stillness of the Amazonian night was sometimes quite frightening but the sensation of the experience was much greater than any fear any of us might have felt during these hours. The lack of fishes was explained by the still very high waters and although we came back almost empty-handed the experience of this one dark night on the Amazon was certainly enough compensation.

THE SCOTTISH AQUARIUM SOCIETY'S GOLDEN JUBILEE

In this Silver Jubilee Year of Her Majesty the Queen, the Scottish Aquarium Society celebrates its Golden Jubilee.

Fifty years ago a few far-seeing aquarists or person interested in keeping live fish in watertight glass aquaria as they were known then, banded together, meeting in each other's houses, attracting others, until they realised that they should form a properly constituted society with a hall as a meeting place. This was the birth of the Scottish Aquarium Society.

Of the original group only one is still alive, Dr. Archibald Young, the President this year, as he was in the Society's Silver Jubilee Year 25 years ago. Others of the original group became respected and well known personalities either in Scotland or in Gt. Britain.

Andrew Wilson of Wilson's Zoo in Glasgow was known all over Scotland as a zoologist and fishkeeper and probably the original retailer of aquarium livestock in Scotland also. But he was perhaps noted for his big game expeditions to stock his zoo in the heart of Glasgow and for his prowess in hypnotising alligators.

However, the Scottish Aquarium Society became well known all over the United Kingdom because of one man, an authority on Goldfish and tropical fish and an authority on designing and producing Aquariums Exhibitions. This was Mr. Strachan Kerr who was for many years the Secretary of the Society. He supported the Goldfish Society of Gt. Britain from its birth, and he became an honorary officebearer. The G.S.G.B. has in its possessions the Strachan Kerr Trophy presented by him.

In the early years of its existence, the Scottish Aquarium Society's shows were modest affairs—specimen wise, by comparison with those of today. Looking at a Show catalogue of 1936, for instance, the biggest section, by far, was the coldwater section with 10 Goldfish classes from common to shubunkin to fantail, veiltail ("Scaled and scaleless") moor, comet, and oranda and lionhead. One class devoted to domesticated fish other than goldfish e.g. Golden carp orfe, rudd, tench. Four classes devoted to others e.g.:

Bitterling, roach, dace, minnow, bream, sunfish, Stickleback, pope, pike perch.

Lastly a section called "Sundry" e.g. a shoal of minnows or sticklebacks.

Marine (native) Aquarium—one John Paterson, a

founder member, who died two years ago, exhibited two marine tidal tanks set up one above the other. Stocked with local marine life. Every so often the water in one tank would drain out into the other, they would remain that way for a period then reverse the procedure demonstrating the ebb and flow of the tide in each tank.

The tropical section in those days was very limited due to the availability—and knowledge of fish. The known species of fish amounted to Lebistes, Heterandria, Girardinus, Gambusia, Platies, Mollies, Swordtails—green and as brilliant as neon tetras (what have we done to Swordtails?) Angel Fish and some other cichlids e.g. acaras Nest builders—gouramies and fighters, paradise fish. Some characins like flame fish, glowlights, Barbs, e.g. rosy, tiger, half banded. Others were zebras, pearl, danio, panchax and that was it.

I have referred to these tropicals by their popular names which was the usual terminology then.

In the years immediately after the war, there was a great upsurge in the hobby, the Scottish had monthly attendances of 150 plus with many travelling considerable distances to attend. As time went on new local societies sprung up all over the country, some died a natural death and others flourished and now, today, the Scottish Aquarium Society is an active member society of the Federation of Scottish Aquarist Societies and the Confederation of United Kingdom Aquarists. It runs its three day show in October each year when it attracts many new aquarists to the hobby and indeed it distributes than to societies in their own locality. It, therefore, plays an important recruiting role in Scotland.

In its 50th birthday year the "Scottish," which can claim to have produced many well known aquarists from Strachan Kerr and indeed Arthur Derhams, to Neville Baines, George Reid, Steve Naismith, Jimmy Goodwin, looks forward to welcoming its many associates in the hobby at its Golden Jubilee Show in the McLellan Galleries, Sauchiehall St., Glasgow, from the 20th to the 22nd October 1977.

The society's meetings are still popular with an average attendance at its monthly meeting of 50.

The Scottish Aquarium Society in its 50th year sends its greetings to its brother societies in the United Kingdom and wishes them success in all their ventures.

K. L. Brown

THE AQUARIST

From a Naturalist's Notebook

by Eric Hardy

FEW TROPICAL fish-breeders are unaware of the speed and ease with which the zebra fish (*Brachydanio rerio*), breeds, eating almost anything and not fussy about the pH or hardness of the water. Living 2 or 3 years on chopped earthworms, *Daphnia*, *Enchytraea*, etc., in water ranging from 60 to 110° F., and breeding at 72-80°, these are all advantages for more than the amateur fish-keeper. They are increasing rapidly its importance in laboratory research, rivalling guppies and goldfish in many fields and exceeding their use in pollution research.

Fish-keepers long ago noticed its sensitivity to changes in the water. It is this which is making it so useful in water-pollution research. Its responses to not only ordinary toxicants or poisons, but a wide range of mutagens, which cause variation, also cancer-producing carcinogens and tumour-producing teratogens put it in a class of its own.

This Cyprinid from India (especially Bengal) and Ceylon is really unlike a zebra, because its stripes are lengthwise, not at right angles to the axis of its body like those of the zebra cichlids. Growing only to 1½ to 2 ins., it is easily accommodated. It has a few faults and laboratory limitations. One is chewing plants, and another its readiness to eat its own eggs. Scattering non-adhesive eggs for 2 or 3 hours as she swims fast through the water, the slightly plumper, slightly bluer (especially on the tail-fin) female, will turn and on her way back eat them where they fall to the bottom, unless they are protected with glass rods or large marbles. She breeds about a week after pairing up. The eggs hatch in 36-48 hours, especially if the breeding tank has a bottom-heater, like a couple of 15 w. pilot lamps in a wooden box. The young are fed on *Infusoria* and a week later on sifted dried egg, etc.

There are some cases where the ethics of the amateur fishkeeper are very different. I notice in a list of recent American theses that a chap gained a Ph.D. at Temple University for studying the biological changes in goldfish exposed to sub-lethal concentrations of nitrotriacetate and lead.

Daphnia the abundant food of Loch Leven's famous race of trout lacking the usual red spots, almost disappeared in recent years, along with 5 species of water-snail and some dragonflies. This was due to water changes, enriched by increased fertilisers draining off local farms and more domestic

sewage from Kinross and Minathort. The trout now feed mainly upon the mud-breeding midges. Many other changes have taken place in the modern ecology of this famous Scottish water. In 1891, two miles of large reedbeds bordered its northeast shore. These no longer exist and in windy weather there is more shore damage by pounding waves. Not many Sassenachs realise there are two loch Levens in Scotland. The other, in the North West, known as Kinloch Leven, is part tidal, bordering Inverness and Argyll, south of Fort William, where I've observed jellyfish and other marine life swimming around the rocks above Ballachulish, at the H.F. centre.

In view of all the literature on common 3-spined sticklebacks in British freshwaters, it is surprising what little work was done on their predators. These were mostly confined to small fishing birds like kingfishers, until four cormorants were shot and scientifically examined after feeding in Loch Bawsinch, near Edinburgh, in response to angler's complaints. These 3 ft.-long, black birds are common visitors to inland waters. One of the specimens surprised everyone by containing 82 three-spined sticklebacks. Another had six sticklebacks and a perch. A third contained one stickleback and a perch. The other had a trout's jaw in its stomach. Cormorants are largely opportunist feeders on the most readily available fish-food in the particular water they visit.

Trawsfynydd reservoir, an enormous power station water 650 ft. high in Merioneth (Gwynedd) was, in 1964, stocked as a trout lake. The other year, someone introduced a few rudd. In its warm peaty waters these bred and flourished until now the water is full of them, varying through their many golden and bronzy varieties, as well as reaching specimen size. Coarse fish are far fewer in Wales than in England, which adds to their interest. They inhabit Bala Lake, Padeswood Lake at Mold (unless destroyed by pollution), Wrexham waters, Llay colliery reservoir, Wynnstay Park lake (Ruabon), etc. Forrest, the natural historian of North Wales, listed a rudd X bream hybrid caught in Bala Lake in 1906; but there is no record of bream in this the largest natural lake in Wales.

Judged by length for weight, red-eyed rudd are the heaviest British freshwater fish. Large fish prefer water-lilies and reed-beds in their haunts.

and they will inhabit slow rivers though mostly pond-fish. We used to catch them with our mother's or sister's hair-nets; but one could never be sure about their natural distribution for anglers so often introduced coarse fish to waters.



The camouflaged stonefish, *Synanceia verrucosa*

Many brightly coloured tropical coral fish are poisonous. This led to the theory that as in wasps, and other red and yellow insect colours, these are warning colours evolved so that predators leave them alone. Exceptions include the most poisonous of all fish, the little Australian stonefish, *Synanceia verrucosa*, so camouflaged that it escapes detection in the Great Barrier Reef, and the duck-billed platypus with its poisonous spur. Biologists in Hawaii Tahiti and Japan recently made a break-through discovery regarding ciguatera fish-poison when tropical fish are eaten. This is present in more than 300 species. In 1749 it was credited with the deaths of 1,500 British naval men invading Mauritius. 2,000 cases of ciguatera poisoning are reported annually in the south Pacific alone.

The primary agent producing ciguatera toxin is a single-celled alga called *Diplopsalis*, which is attached to coral reefs, and eaten by browsing fish or other animals, entering a food chain which finishes up by poisoning predatory fish. The only drug reported successful in the homoepathic treatment of mice to find an antidote is tetrodotoxin, obtained from the poison of the puffer fish. Moray eels, red bass, wrasses, snappers, surgeon-fish and narrow-banded Spanish mackerel have all been blamed for causing ciguatera poisoning, though uninfected fish aren't poisonous. Even turtle-meat can cause similar poisoning.

An antivenene is available for rapid relief from stonefish-poison. As the venom of bony fish is sensitive to heat, a first aid while awaiting medical attention is to wash and immerse the wound in as hot water as can be tolerated. Like the lesser weever erecting its black dorsal fin in our own sandy shores,

the toadfish and zebra fish venom is injected from the dorsal spines, when people step on them. Chameleon-like, the stonefish can change its colour from grey to brownish or greenish, mottled or marbled. One aquariums specimen turned to scarlet, netted with grey, when brought from Thursday Island to the Australian Museum. There are apparently harmless algae in a greenish slime which normally covers living specimens. Usually under a foot in length, stonefish have exceptionally reached 2 ft. They are predatory upon small fish and crustaceans and range from Australia to Polynesia and the western Pacific.

An Aberystwyth lady kindly informed me that her pet land tortoise was obtained in 1939. Not that I am claiming its 39 years or more as a record, for although few garden tortoises live more than 20-30 years there are records of about 100, apart from the longer lived 300 years-old giant Seychelles tortoises. Successive bishops of Peterborough handed on a pet tortoise until it was claimed at death to be 220 years, but their mathematics is doubted. Gilbert White's famous tortoise lived only 25 years, far below the records. The age is calculated roughly by counting the concentric ridges growing annually up the shield. Baur's saddlebacked tortoise has a fairly authentic zoo life of over 100 years.

The closing of Manchester's Belle Vue Zoo last August, though retaining the new leisure centre, was the end of an era of urban menageries. For six years the financial writing had been on the wall, and Blackpool faces similar problems. Founded at Belle Vue House in 1836 by John Jennison, who moved his collection from nearby Stockport where he started a menagerie in 1828, it was some years before it aquired its famous aquarium. Its pre-war aquarium society was the largest in the provinces. A visit by local naturalists in 1892 saw a giant boa constrictor 18 ft. long and weighing 2 cwt., which had not tasted food for 12 months, its last meal being a whole sheep. The Federation of Northern Aquarium Societies began its great autumn assemblies here at the end of the last war, to become the British Aquarists' Festival sponsored by *The Aquarist*.

It is not always realised that natterjack toads occur on the old Lancashire coast north of Southport as well as on the dunes to the south and suburban gardens. After a prolonged spawning season into July this year, they were noticed moving coastwise all down the Lancashire area in August, including in Fleetwood road at Marshside, opposite Hesketh golf-course, a haunt of sand-lizards too. In fact, natterjacks aren't so rare as frogs in these dunes, etc.

I have mentioned before how new species, from freshwater shrimp to bat, were discovered in museums

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KEEPING FISH IN 1952

REFLECTIONS ON THEN AND NOW IN THE AQUARIST'S WORLD

by Bill Simms

TWENTY-FIVE years ago it was even more difficult to indulge one's desire for 'lots' of aquariums than it is now, for although prices then seem extremely low by present-day standards, an economist could soon prove that comparative prices now are cheaper.

For instance: the average weekly wage for manual workers in 1952 was £8.18.6 (£8.92½p in decimal currency), while now the average wage is £66.97. This gives a rise in wages over 25 years of 7½ times. These figures were given me by the relevant government department, so I must accept them—even though I feel sure that I have not had a rise of 750 per cent in that time. However, it does give a comparison to work to in assessing current prices.

In a 1952 aquarium magazine there is an advertisement for angle-iron tanks, 24 in. × 12 in. × 12 in., at 27/6d. each (£1.37p). Similar tanks now could cost £12.50, which is a rise of over nine times, so this sort of tank is now dearer. But there has been the introduction of plastic tanks, which at that same size can be obtained for £6.00 (or more), which is only about 4½ times as dear.

Considering the greater range of tanks: plastic, frameless glass tanks, and stainless steel ones, all of which are easier to maintain and manage than angle-iron ones, it seems that now we have available a better supply at a cheaper price than was available in 1952.

To put that in easily comparable terms: in 1952 a 24 in. × 12 in. × 12 in. tank cost 1/5th of the weekly wage, while in 1977 a tank of the same size costs only 1/9th of the weekly wage—so it is down to nearly half its previous cost.

Heaters and thermostats for tropical tanks (the greatest interest at that time) also show a comparable drop in price. In 1952 some heaters were advertised

at 7/6 each (37½p), and thermostats at 13/6 (67½p). Nowadays a heater is about £1.76, and a thermostat about £2.50. This is a rise of only 4½ times for the heater, and less than 4 times for the thermostat—much less than the 7½ times rise of the weekly wage. So in the matter of prices we are in a better position nowadays—even if it doesn't seem like it when we go to buy appliances.

There are some matters, however, in which we have lost out regardless of price, and the main one of these—to my way of thinking—is in the quality and availability of plants for tropical aquariums. During the period around 1952 there was a greater concentration on furnishing a tank with plants than is shown now, and it was far easier to do it. The aquatic magazines of that time carried plenty of advertisements offering lots of plants, and one I have in front of me now names six varieties of *cryptocoryne* among a host of other tropical plants. Other advertisements show this emphasis on healthy, well-rooted plants in abundant supply, and many *cryptocorynes* were only 2/- each (10p), with the cheaper plants at 1/- (5p).

A further sign of this greater interest in plants in 1952 is shown by an article in one journal of that time which is typical. It deals in great detail with the oxygen content of various waters as shown by the experiments of Dr. C. M. Breder, Jr., of the American Museum of Natural History. Put briefly the results show that in any well-planted aquarium the oxygen content in bright light far exceeds that at night, that using artificial aeration only during the night helps to level out the difference, and that a poorly planted aquarium has a continuously lower level of oxygen content—even with constant aeration.

Illustrations of aquariums in the magazines of this

THE AQUARIST

period show just how well planted they were. Most of them were so dense with plant life that the background glass could never be seen, and I remember that at that time there were few background scenes available—if any. Time and again the articles on plants and planting stressed that when a tank was properly planted three quarters of the fish present should be hidden by foliage—foraging for food.

Whether bought from an aquarist shop or purchased by post, the plants supplied were far superior to those obtainable today, and as an example I have referred to some notes I made at that time when drawing a single stem of *Cabomba*: 'the fronds stood out 2 ins. from the stem, and were 1 inch apart.' Browsing through the 'letters to the Editor' of that time I found that the Gravesend A.S. investigated and confirmed a claim for a stem of *Cabomba caroliniana* that was 13 ft. 11 ins. long. It was grown by Mr. C. Sutton, and the fronds were 2½ ins. across.

There is a sound economic reason for this change of plant quality, of course. To produce water plants nowadays to the quality of those obtainable in 1952 would cost so very much more that the prices would rocket far beyond the 7½ times increase of wages. There are many factors that have risen more steeply, and these, plus the extra wages paid to assistants, mean that the price of plants that used to cost about 1/- (5p) would now be about 75p each. Consequently, in an attempt to keep the price down, growers plant them closer, give less nutrients, and crop them when younger—or give up plant production as unprofitable. Undoubtedly, in the matter of aquarium plants, we are not so well served as they were in 1952.

At that time there was a greater emphasis on home-made tanks and covers. In one magazine of that period there are details for the construction of a decorative wooden aquarium over 3 ft. long, and the illustrations show it as a handsome piece of furniture. Such aquariums would be extremely long-lived, and I would be interested to know if any are still in service. Easily made light canopies in aluminium and wood are also described for use on the angle-iron tanks in general use.

When it comes to the actual fish used we are very much better off now, for there are many more species

available, and a great deal more is known about them. Amateurs all over the world have bred many more kinds, and have passed on their knowledge to the rest of us, so that now fish are handled more expertly and at less comparative cost.

At the top of tropical fish diseases in 1952 was White Spot, and it is not much different now. Even though a great deal more is known about the disease, and better remedies are available, lots of aquarists find it difficult to eliminate. In June 1952 an article was published recommending Mepacrine hydrochloride as a good cure, in preference to the quinine then used extensively. Mepacrine is the little yellow tablet that those of us old enough to have served overseas during the last war will recognise as the one we had to take instead of quinine to prevent Malaria. The details of how to use it were clear and concise, and appear to have been effective. Perhaps they did as well then as we do now with a greater range of remedies.

Tropical marine aquariums had not acquired a following in 1952 (there was not a single reference to them throughout the year in one popular aquarist magazine) but cold marine aquariums were often installed by enthusiasts. At that time, of course, plastic or all glass tanks were not available (except for old battery cases) and so the angle iron of the framed tanks had to be well protected from sea water by such things as bitumastic paint. Wooden-framed aquariums were often used for marine water.

Nowadays we can transport sea creatures in plastic bags and containers, whereas they had to use tins. However, they coped with this, and used damp seaweed for transport instead of water. I have tried this method often, and found that most sea creatures from the beach travel better this way—it is more like beach conditions.

I have had great fun searching through the 1952 magazines for facts relevant to this article, and it has become more and more noticeable that we, nowadays, find our hobby much easier on our pocket (in comparison with our earnings, of course), and with the exception of plants, everything is in better supply. I wonder what it will be like in the year 2002?

FROM A NATURALIST'S NOTEBOOK continued from page 255

confused under old labels. It happened this year when two new Trichoptera (caddis-flies) were added to the 192 British species. They were *Hydroptila martini* from Berkshire and *H. valesciaca* from Scotland and Ashbourne in Derbyshire, both previously confused with *H. occulta*. By direct fieldwork a new ovoviparous frog, *Eleutherodactylus jasperi* (giving birth to hatched young) has been discovered recently in Puerto Rico and a new burrowing frog, *Symapturanus rabus* in the Colombian rain-forest of South

America, a new species and genus of gecko, *Anarbylus switaki* from Mexican Baja California, and a new Saharan genus in *Garzoniella longipes* from Fezzan in Lybia; a new lizard *Diploglossus sarcanoi* from Hispaniola, and among new snakes: a pit-viper *Bothrops hesperis* from western Mexico, and a variety of the common adder, *Vipera berus soanai* from the French Pyrennes, plus two new varieties of a blind-snake from Mexican Baja, California: *Leptotyphlops humilis levitoni* and *L.h. lindsayi*.

HELLBENDERS

by Andrew Allen

THE CRYPTOBRANCHIDAE are a family of very big, very ugly salamanders. They reach their extreme of bulk, if not of ugliness, in the Japanese and Chinese Giant Salamanders, *Megalobatrachus japonicus* and *M. davidianus*, the former growing to more than five feet in length, and both prized as delicacies in the Far East. Both species may be viewed in European zoos, but neither is likely to come the way of the average vivarium keeper.

The North American Hellbender, *Cryptobranchus alleganiensis*, is a giant salamander on a somewhat more homely scale, and is more accessible to the field worker or vivarium keeper.

With lengths of up to thirty inches (fifteen to twenty for the average adult), the Hellbender is still among the giants of the Amphibian class. And it shares the grotesque ugliness of all its family: flattened head, flaccid lateral folds of skin, and mock-aged wrinkles. The basic colour is grey or muddy brown, with scarcely discernible darker patches. The extreme sliminess of its skin makes this a difficult animal to handle. Hellbenders can be distinguished from the rather similar mudpuppies of the genus *Necturus* by the absence of external gills in the adult.

Hellbenders carry a deserved reputation for ill-temper, and the bite of a large adult is distinctly painful. But the belief that their bite is poisonous, widely held by American fishermen and kids, is quite fallacious.

Their home is in fast-flowing streams and ditches, in which the water is well oxygenated and there are abundant rocks, logs or tangles of submerged vegetation beneath which to hide. Specimens may usually be captured by gently displacing rocks in shallow, running water, and trapping the salamanders in a large dip-net. As they are thoroughly nocturnal, Hellbenders are rarely seen in the wild, but frequently take the bait of early-morning fishermen.

Doubtless the distribution patterns of the Hellbender are dictated by the drainage patterns of suitable streams and the possibilities of moving cross-country from one river system to another; that is, by factors familiar to the aquarist but less familiar to the herpe-

tologist who usually deals with animals that are more mobile on land than the Hellbender. Certainly its distribution is patchy, and restricted to a chunk of north-eastern USA from the Susquehanna river drainage down to Illinois, Missouri, and the extreme north of Alabama, Georgia and Mississippi. A sub-species, *C.a.bishopi*, is disjoint from the main species, occupying part of the Black and White river systems of Missouri and Arkansas.

Hellbenders are catholic in diet, feeding on aquatic worms, crayfish, fish eggs, smaller urodeles, and decaying carcasses: almost any small or medium sized aquatic animal. In captivity they readily take earthworms, offal and raw or tinned dog meats.

Egg-laying in fast-flowing waters always poses quite interesting evolutionary problems. The eggs of the Hellbender are laid in long chains, enclosed in a gelatinous case. The female presses this gelatinous case against submerged rocks or logs, and through a chemical reaction with the water the case first adheres to the surface and then hardens into a strong "hold-fast." Chains of such eggs are often seen dancing in the water, firmly rooted to the substrate at one end.

Each egg is richly endowed with yolk and the larvae hatch after ten to twelve weeks, a comparatively long period among the Amphibia. In consequence of this long, well-fed development, the larvae are large at the time of hatching and thus escape the catastrophic predation that decimates the smaller larvae of other newts and frogs. The young are lighter in ground colour than their parents with more distinct dark spots. Until a length of four to six inches they retain external gills and may only be distinguished with difficulty from other large urodele larvae. Their life is spent rooting with their blunt, shovel-like heads in sand or mud, disturbing freshwater enchytraeids or similar prey.

Because its head is so broad, and the eyes are set on either side of the head, the Hellbender is unable simultaneously to focus both eyes on the same object, and is thus unable to employ normal binocular vision. However, in view of its nocturnal habits this is not a

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ROYALTY OF THE REEF

by Martyn Haywood

ASK ALMOST any marine aquarist which he thinks are the most beautiful and desirable coral fishes and he is almost certain to reply, the Angelfishes.

The Angels, of the sub-family Pomacanthinae, together with the butterflyfishes, Cheatodontinae, make up the family Cheatodontidae. And while the Angels boast an equal, if not superior, range of colours to the Butterflies they are without doubt generally much easier to maintain in the average home marine aquarium.

Angelfish are distinguished from their close cousins by the possession of a strong and very sharp spine on each gill cover. They are only too well aware of its qualities as a weapon and will use it in either attack or defence and have been known to do considerable injury to both their tankmates and owners. The Pomacanthinae are much thicker in the body and proportionally longer so giving the justified impression of being much tougher fish than the Butterflies. Besides the gill spine the Angels will also use their equally sharp dorsal spines to ward off attackers.

For simplicity's sake the Angelfish could be further divided into two groups, the *Centropyge* species, commonly called Dwarf Angels, and the rest. The larger species are widely recognised as the kings and

queens of the reef and this is reflected in their various common names—Emperor Angel, Regal Angel, Majestic Angel.

Dwarf Angels

The *Centropyge* group does not as a rule boast such impressive common names, although the Cherub Angel, *C. argi*, has perhaps achieved an even more exalted rank. It is, however, with these lesser members of the royalty of the reef and in particular the rarer species that I wish to deal here.

For the aquarist with a 35 gallon or larger tank, wishing to keep a fairly wide variety of fish combining many different colours, then the dwarf angels are possibly his best choice. There is an ever increasing variety of *Centropyge* species appearing on the market as the more out-of-the-way reefs are visited by collectors.

Unfortunately, the laws of supply and demand apply as much to marine fishes as to anything else. In Britain today there is a steadily growing band of experienced marine aquarists who, having tried their hands at the commoner species, are snapping up the rarer species as soon as they appear. These are elusive in the wild, found in very deep water and are therefore time-consuming to bring to the surface due to de-compression problems. Considering these factors the high prices charged for such fish as *C. loriculus*, the vivid scarlet Flame Angel, do not seem so excessive. Imagine how much a loaf of bread would cost if each one took four hours to produce and then had to be air-freighted half-way around the world.

Rarities

Despite prices of maybe £20-£40 a fish, the rarities quickly disappear from the dealers' tanks. Possibly because of this it often seems there are marine hobbyists who do not realise there are dwarf angels other than the common Coral Beauty, *C. bispinosus*, and the Oriole Angel, *C. bicolor*. These two species are among the cheapest and most commonly available, have frequently been written about and so need no more consideration here.

To start at the pinnacle, the most commonly desired but least attained angelfish has to be the Flame Angel.

Rainbow Angelfish (*Centropyge eiblii*)



Queen Angelfish (*Holacanthus ciliaris*)

Superlatives are the order of the day here in everything except the matter of size for the fish only achieves about four inches in my experience. This stunning fish is basically a vivid scarlet, usually with four or more dark splashes down the flanks and dark margins to the dorsal and anal fins. Anyone who has seen one of these little charmers cannot help but have been struck by its beauty.

To crib from *Exotic Marine Fishes* by Axelrod and Emmens, it appears there may be another "species"—*C. flammeus*—which is similarly coloured but it is not



known whether this is a case of sexual dimorphism or a true species.

This species is widely, but very locally, distributed throughout the central Pacific but the vast majority of specimens come from Hawaii where it is apparently found in very deep water. Most captured specimens go to the affluent American or West German markets but a few reach this country from time to time.

These fish are generally well behaved in the aquarium but as all the Cheatodontidae will occasionally fight it is perhaps advisable to keep your



Regal Angelfish (*Pygoplites diacanthus*)

Flame Angel separate from other Pomacanthine. These fish are altogether too rare, expensive and irreplaceable to risk losing through avoidable aggression.

Another extremely desirable dwarf angel and one this time which is entirely confined to the Hawaiian group of islands, is the Russet Angel, *C. potteri*. This very attractive fish has a network of rusty-red, near vertical, stripes on a green-blue background. The pattern covers the entire body and all the fins except the pectorals and pelvic fins which are, respectively, yellow and orange.

Unfortunately, like all Hawaiian fishes these days, *C. potteri* is an expensive fish when compared with the majority of the *Centropyge* species. I remember, some three years ago, seeing nine or ten specimens of this very pretty species in one Peterborough retailer's tanks. They cost upwards of £12 then so I hate to think how much they would command now. Although dear, these fish are very hardy and have long been popular with American hobbyists who are a lot nearer the source of supply.

They can generally be recommended as a good community fish but occasionally a bad tempered specimen turns up which will tolerate neither other dwarf angels nor, indeed, some of the butterflyfishes. It is also worth giving a word of caution here—if you intend keeping a *C. potteri* with a Coral Beauty it usually pays to have the latter at least half an inch bigger than its tank-mate if it is not to be bullied to death. Although apparently dissimilar in colouring, the Russet seems to recognise something of itself in the Coral Beauty and the result is the same fighting that could be expected from keeping two *C. potteri* together.

Lemonpeel Angel

A third central Pacific dwarf angel which is always in demand, but which again is only infrequently available is the Lemonpeel, *C. flavissimus*. In the Philippines this species is replaced by one almost as attractive, *C. heraldi*. Both are basically yellow fishes, possibly two of the yellowest fishes in the oceans. However, in *C. flavissimus* there is a blue band around the eye and a blue edging to the gill-plates, the dorsal and anal fins. In particularly small specimens when in the peak of condition there is often a blue ocellaris (eye-spot) on the flank.

There is no trace of blue whatsoever in *C. heraldi*. Rather a grey mottling patterns the face. It can further be distinguished from the Lemonpeel in that its dorsal and anal fins are usually sharply pointed. When in preservative *C. heraldi* turns a golden-red colour and so is called the Golden Angel by Axelrod and Emmens but it is usually this species which is available when Lemonpeels are advertised.

Both these fish can be heartily recommended for the dwarf angels community tank, as both feed readily and are hardy. Indeed, one may even keep a number

of small Lemonpeels (*C. flavissimus*) together in the same aquarium.

The dwarf angels are steadily proving themselves to be among the most reliable fishes for the home aquaria and as more and more people realise this so the demand increases and now I even know of people who collect them, much as one might collect stamps: "Is it an angel, if so I'll have it."

Flameback Angels

One of the major targets of these collectors over the past year are those species which are becoming known as the "Acanthops group." It would be more illustrative if they were known as the "Fireback or Flameback angels." The three species involved, *C. acanthops*, *C. aurantonotus* and *C. fisheri*, are all characterised by deep purple body colouring with a vivid red or orange streak down the back.

C. fisheri is an extremely rare, deep-water species which again is confined to Hawaii and is only very rarely seen in this country. It is one of the smallest of the dwarf angels, barely reaching three inches at maturity, and so would make an ideal centre piece in a smaller tank. Although normally found in the depths it quickly adjusts to aquarium life and takes the usual range of frozen and dried foods.

Most of the "*C. fisheri*" seen in this country these days are, in fact, either *C. acanthops*, the African Flameback, or *C. aurantonotus*, the Caribbean Fireback. Due to the apparently eternal political upheavals along the East African coast *C. acanthops* is becoming increasingly difficult to obtain and ever more expensive. Nonetheless this gorgeous fish is well worth waiting for.

The entire head is a bright orange red which extends in a wide stripe down the back and into the dorsal fin. The tail is a slightly less intense orange. The eye is rimmed in delicate sky blue and this colour trims the edges of the dorsal and anal fins. Although one of the smaller species this fish will not stand for any bullying, returning aggression with the like, and will very quickly find a niche in even a well-established tank.

Discounting *C. fisheri*, the only species the African Flameback could be confused with is its Caribbean relative. However, the two are very easily distinguished. In *C. aurantonotus* the tail is of the same solid purple blue as the body while the tail of *C. acanthops* is coloured. In the African fish the dorsal stripe is slightly redder while in the Caribbean fish numerous small spikes on the gill plates are outlined in dark blue.

Aurantonotus is the largest of the Acanthops-group, growing to at least four inches, and seems likely to be the most readily available. It appears to be reasonably abundant off Barbados and in the southern Caribbean. Although they are expensive, as are all Caribbean fish, at least they should be

available for those with the money to buy. As they get larger so the orange stripe spreads but unfortunately their tempers also get shorter. However, this is a minor drawback to the true *Centropyge* aficionado.

Cherub Angel

The only other Caribbean dwarf angel that I am aware of is the very popular Cherub Angel, *C. argi*. This little fellow, which only reaches about three inches at maturity, has a dark blue body with a yellowish mask extending from just above the eyes, down to encompass the gill plates and ending just behind the root of the pelvic fins. When very small the yellow area is considerably less. All the fins are dark blue and crisply edged with a lighter shade of the same colour. These pretty little fish have two reputations. One is for being "as tough as old boots." The other is for being aggressive. I can certainly support the first, and rate them as highly as the Coral Beauty as the next step up for beginners from damsels and clowns. I know of one person whose *C. argi* became something of a terror but I have never found this to be the case.

One of the recent newcomers on to the scene is a very pretty, reddish fish called the Rusty Angel, *C. ferrugatus*. This fish is well distributed down the west Pacific coast from Japan to Taiwan and the Philippines but nowhere is it particularly common. At the moment this fish still has a certain novelty value in America and Germany where it commands high prices. This is slowly wearing off and the flow of Rusty Angels to Britain is increasing.

When small, only recently imported or in poor condition, the large part of the body is of a fawn-grey colour with only the lower rear half showing the rusty-red for which the fish is named. All the body, except the head region, is liberally flecked with deep chocolate brown markings which get smaller towards the anal fin. The dorsal and anal fins are edged with the light blue which is such a common feature in the *Centropyge* species.

This description may not send you rushing for your cheque-book but a view of a two to three inch specimen in full colour would almost certainly do so. Gone is any sign of the murky grey-brown to be replaced by a fiery rust-red which reaches a peak of intensity on the belly.

As if this were not sufficient this species is also one of the most peaceful of Angels and has a particular liking for a certain British produced marine flake food. It may well be that this fish becomes the "poor man's Flame Angel" as its price is rarely more than a third of that for a good-sized *C. loriculus*.

Another newcomer, this time from Indonesia, is the small angel being sold either as the Midnight Angel or the Pacific Cherub. The fish is basically deep blue with the usual fin trimming and has a lighter

area around the head. Although not as colourful as the true Cherub, it is cheaper and the light area becomes yellower as the fish grows. It is just as easy to keep as *C. argi*, which in fact is the name given it by the shippers.

Geniacanthus Angels

While on the subject of recent introductions this is perhaps the place to introduce the *Geniacanthus* group of angels. This is a little studied group of dwarf angels, several of which, unfortunately, grow rather large. Few of these have yet been seen in Britain but the commonest, *G. lamark*, reaches at least six inches long.

Although this fish, which develops an attractive lyretail, has a certain grace its rather retiring habits and comparatively dull colouring will almost certainly ensure it remains a fish for the enthusiast only. The body is silvery grey over which run black stripes and dotted lines from the face to the tail. Although the fish feeds well it is easily bullied and much prefers a peaceful life to that to be found in the average angelfish community.

Two other *Geniacanthus* species have recently appeared on the market, both coming from the Philippines. I have been unable to find scientific descriptions of either species, although one may possibly be *G. watanabei*, and it may even be that one is the juvenile of the other. The two fish have almost totally dissimilar colour patterns but I have never seen the larger, believed *G. watanabei*, smaller than four inches long. Similarly I have only seen the smaller species in sizes up to three inches.

This smaller fish is basically silver in body colour but it boasts a vivid golden back. The typical *Geniacanthus* lyretail is emphasised by two one quarter inch wide intensely black bars.

The larger species, generally sold under the name Zebra *Geniacanthus*, bears the most elegant and strongly developed lyretail that I have seen among angelfishes, the points extending an inch or more beyond the rest of the tail. The body is silvery blue with a series of twelve or more darker stripes running vertically across the body. The fish has a general blueish cast about it and other colours flash across it as it catches the light.

My slight suspicion regarding the standing of these fish as two different species arose when a large, five to six inches, *G. watanabei* began to fade and lose its vertical stripes. Rather than look merely a washed-out specimen, a yellow cast spread down its back and two heavy, dark bars appeared in the tail.

Whatever the true standing of these unusual angels both are very attractive fish despite the fact they do not boast the gaudy colours of the *Centropyge* species.

Unfortunately they are unlikely ever to rival their close cousins in popularity. They are apparently

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POND FILTRATION

by Hilda Allen

THE WIDE-SPREAD use and benefits of water-filtration are too well known for me to expound any further and certainly most tropical fresh-water and marine fish-keepers recognize its value. There is nothing very revolutionary about the idea of filtering pond water if we choose to keep Koi in miniature environments such as garden ponds. Attention must be paid to the conditioning of what is usually a very small volume of water compared to the fish that are totally dependent upon its quality, and this is achieved by Filtration.

The principles are the same as in aquaria where a suitable filtering medium is provided in which, with time, useful bacteria will develop.

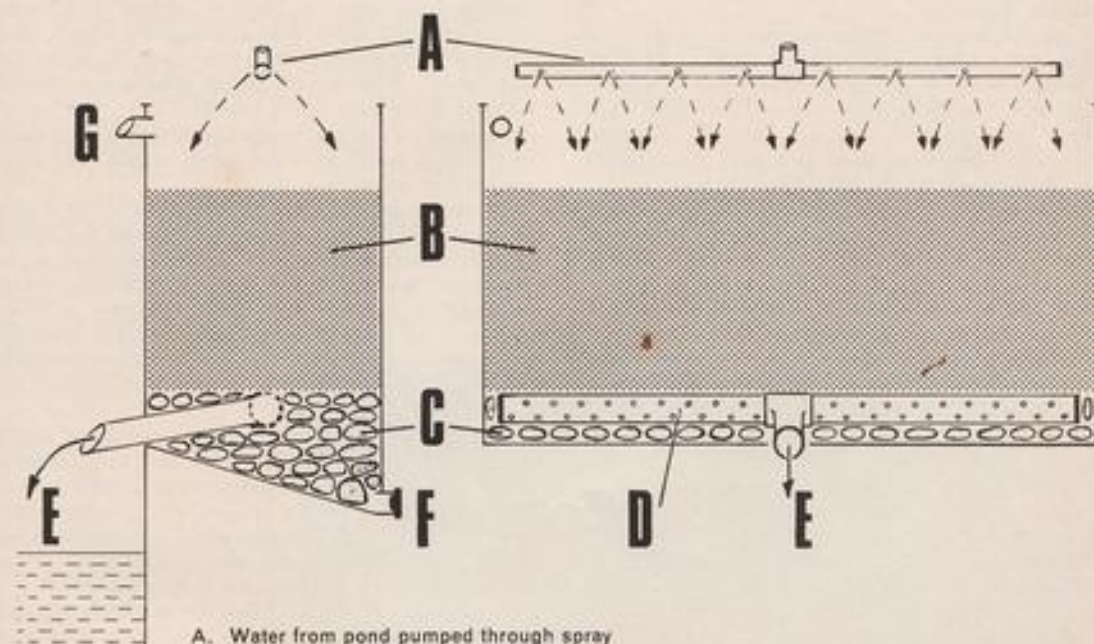
For Koi—ponds, a bottom drain or drains (as illustrated in the June issue) is the most effective way of disposing of the more solid waste matter. An in-pool under-gravel Filter (also shown in June)

will cope very efficiently if it is made large enough for the size of the pond and the number and size of the fish.

It is absolutely essential that any filter, whether internal or external, should be made to equal at least one-quarter of the pond's surface area and one third would be better.

An under-gravel filter within the pond would always be my own first choice but I realise that for a variety of reasons this is not always possible and then an outside filter should be considered.

There are many types of outside filters in use; some are very complicated with settling chambers and several compartments holding filtering materials of different sizes. A simple arrangement as used successfully by some Koi-keepers and within the reach of most D.I.Y. enthusiasts is illustrated.



- A. Water from pond pumped through spray bar to wet all surface area of filter bed.
- B. Filter bed of $\frac{3}{4}$ -inch screened gravel or crushed stone.
- C. Large stones or broken bricks in which mulm can settle, and to be regularly drained off via plug(s) at lowest point of chamber.

- D. Perforated pipe with $\frac{1}{4}$ -inch holes, capped at both ends, and with a tee-piece for water return to pond.
- E. Water return to pond.
- F. Drain plug(s).
- G. Overflow pipe.

The filter box can be built with either bricks or concrete blocks and the inside finished with a cement/sand screed mixed with a waterproofing additive. The bottom of the box should slope towards the drain plug(s) to facilitate removal of the settled sludge. The recommended depth of gravel forming the filter bed is not less than eighteen inches and the diameter of the perforated pipe should not be less than a minimum of two inches but can be up to three or four inches dependent upon the overall size of the system. It is essential to have a space of at least six inches above the filter-bed and to provide an overflow pipe in the event that the filter becomes blocked. This is a possibility, especially in the early stages of maturing a filter with very dirty water. It is important that the soiled water and muck is re-

gularly drained from the settling area but only experience can decide how often.

The filter must be kept in continuous operation to maintain the biological action but, if not used for any length of time, then the whole filter bed should be thoroughly flushed through and run to waste before returning water to the pond.

When making anything for Koi do think **BIG** because what may appear more than adequate at the beginning may well be quite inadequate in a year or two's time. Complaints that filters do not work are usually due to the fact that they are not of a sufficiently large size for the job they are expected to do. It is best to look ahead to when the Koi have grown and when their numbers have been added to by their enthusiastic owners.

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rare in the wild or obtainable only from deep waters or out-of-the-way collecting areas for the exporters charge a high price for them. This results in a comparatively drab fish costing perhaps twice as much as many of the brightly coloured *Centropyge* species.

Black for Contrast

As many freshwater aquarists appreciate, a splash of intense, deep black, usually in the form of Mollies, can make a world of difference to the look of a tank. So it is with marine tanks as well and the usual black addition here is the Domino Damsel, *Dascyllus trimaculatus*. However, there is a solid black dwarf angel which would fill the bill admirably.

Centropyge nox is fairly common throughout the Indo-Pacific but it is very rarely imported as there is currently a very limited demand for the fish. This is rather sad as it is an excellent aquarium fish and would make a good contrast against the vivid colours sported by other members of the family.

The only other dwarf angel that *C. nox* could possibly be confused with is *C. tibicen*, a very common fish from the Indo-Pacific. The basic body colour is black but it boasts a white blotch midway down the body and a wide yellow trim to the edge of the anal fin. While this is no: one of the most attractive of the family its quiet beauty should merit a lot more attention than it presently receives.

Another frequently disregarded species with the same good habits as *C. tibicen*, is the Pearly Scaled Angel, *C. vroliki*. This is generally the cheapest of the angels, a fact directly related to its subdued colours. The anterior two-thirds of the body is silver-grey while the rear half is brown-black. The fins sport the usual blue trim. The eyes and root of the pectoral fins are orange and there is a dark mark at the upper edge of the gill-plates.

If this description has not fired many imaginations I

cannot truthfully say I am surprised. However, unlike Fords, where you could have your car in any colour provided it was black, there is a super *de luxe* version of *C. vroliki* called the Rainbow Angel, *C. eiblii*.

The Rainbow Angel's basic colouring is almost identical to that of the Pearly-Scaled although the division from silver to black is crisper. The icing on the cake is a series of thin orange-red stripes, each edged with blue-grey, which run vertically across the silver area. What was the dullest angel is transformed into one of the most subtly beautiful.

Hopefully I will have wetted a few people's appetites to try their hands with the dwarf angels. If so let me hand on a few tips.

Obviously one must try to give them as big a tank as possible but it is also equally important to provide an environment with plenty of cracks and crevices into which the fish can flee if need be. Bleached finger or branched coral or well perforated pieces of living rock will do the job admirably. It often surprises beginners to find that if fish are given many hiding places they will tend to stay in view and also that the opposite applies.

When it comes to feeding, most of the dwarf angels are only too obliging and apart from eating anything offered will also keep soft algae under control including the various *Caulerpa* species. Very occasionally one comes across a specimen which will not feed, no matter what delicacies are offered. Because of this it is good policy to ask to see it feed before buying.

Regarding water quality these fish are fairly obliging where temperature is concerned, anywhere between 74F and 80F sufficing. They prefer the S.G. to be on the low side, about 1.020-1.022 and the pH between 8.1 and 8.3. Provided the water is kept within these parameters, is charcoal filtered and at least 25 per cent is changed each three months then the dwarf angels should give you as much pleasure as they have me.

THE AQUARIST

A SURVEY OF THE *Julidochromis* GENUS

Written & Illustrated by Jørgen Hansen & Pamela Stewart

THE *Julidochromis* genus from Lake Tanganyika caught on quickly as aquarium fish as they are handsome and relatively small and do not touch plants. Until the date of writing, February, 1977, we have encountered nine different species which have at some point been classified as belonging to this genus:

- (1) *J. davidi*—mentioned in a survey in T.F.H.
- (2) *J. dickfeldi*—W. Staeck, 1975, breeding described.
- (3) "*J. macrolepis*"—old name for *Telmatochromis temporalis*.
- (4) "*J. malagarassi*"—also described as *Haplochromis malagarassi* and later as *Orthochromis malagarassi*.
- (5) *J. marlieri*—Poll, 1956, breeding described.
- (6) *J. ornatus*—Boulenger, 1898, breeding described.
- (7a) *J. regani*—Poll, 1942, breeding described.
- (7b) *J. regani affinis*—mentioned in a survey.
- (8) *J. transcriptus*—H. Matthes, 1959.

If one excludes those no longer regarded as belonging to the *Julidochromis* genus and those about which

no information is available, then one is left with a list of five:

- (1) *J. dickfeldi*, W. Staeck, 1975.
- (2) *J. marlieri*, Poll, 1956.
- (3) *J. ornatus*, Boulenger, 1898.
- (4) *J. regani*, Poll, 1942.
- (5) *J. transcriptus*, H. Matthes, 1959.

It is reckoned that *Julidochromis* along with *Lamprologus* and *Telmatochromis* have developed from a *Haplochromis*-like descendant. Of these three genera *Telmatochromis* is thought to be the most primitive.

Lake Tanganyika, to which the *Julidochromis* genus is endemic, is the largest of the East African Rift Valley Lakes. It is about 650 km. long and covers an area of about 34,000 sq. km. Its greatest depth is 1,470 m. and its bottom lies more than 650 m. below sea level. This makes it the second deepest lake in the world after Lake Baikal in Central Siberia. It is moreover the third richest in fish species after Lakes Malawi and Victoria. The water transparency is from 3.3 to 22 metres, its surface temperature 27 C., and its pH value of from 8.6 to 9.2.



Julidochromis dickfeldi



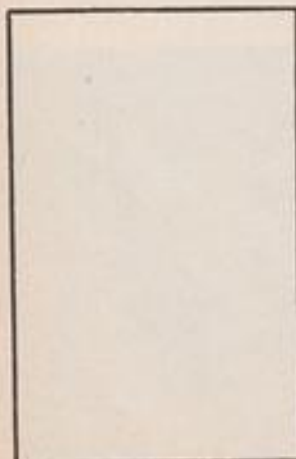
J. marlieri

The *Julidochromis* genus inhabits rocky areas often consisting of a large number of boulders lying helter-skelter on top of one another and forming innumerable dark caves and tunnels. The rock surfaces are overgrown with a centimetre-thick layer of algae—"Aufwuchs"—which together with its content of various crustacea provides food for the fish inhabiting these areas. *Julidochromis* mostly prefer depths of from 1-5 metres, although *J. transcriptus* can be found at a depth of 15 metres. This species is also found beside clumps of stones adjoining sandy areas. They all keep close to the bottom in the proximity of their chosen cave or crack in the rock. In the aquarium one will often observe how they

swim with belly turned towards the rock surface even if this means that they have to swim upside down.

As these fish can at times be rough towards each other, a large tank with many hideouts is necessary. Another good reason for providing a spacious tank can be found in their propagatory behaviour. The eggs are spawned on the roof of a cave and both parents guard eggs and young. As one brood quickly succeeds the other, one can well experience 3-4 broods of different sizes darting in and out of the cave, at the same time as the parents care for their most recent spawning. The young are banished from the cave for good only after attaining sexual maturity.

Feeding should be varied. We have found the



J. ornatus



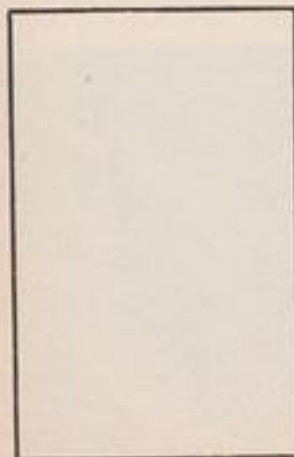
J. marlieri

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J. ornatus

reported from *J. marlieri* is 365.

Julidochromis ornatus—Boulenger, 1898.

This species is more aggressive than *J. marlieri*. It resembles in appearance *Pseudotropheus auratus* from Lake Malawi. The basic colouring is yellow, with three dark brown to black stripes running along the upper part of the body. The uppermost of these runs along the lower part of the dorsal.

The dorsal is edged exteriorly with an orange band, within which lies a blue band of the same breadth (1 mm.). The anal fin is edged with dark brown. The caudal fin is yellow and rounded; it is edged exteriorly with a brown band, with a blue band within. At the base of the caudal fin is a large round, dark brown or black spot. The anterior ventral fin rays are prolonged, and these reach the beginning of the anal fin. Nocturnal colouring is dark brown with dark stripes.

The female's ovipositor is about 2 mm, long with a diameter of from $\frac{1}{2}$ -1 mm. The largest number of eggs reported is 118.

Technical data:

- (1) Two incomplete lateral lines.
- (2) Teeth conical, the outer very large.
- (3) 4-6 canines in each jaw.
- (4) Body depth goes 4-4 $\frac{1}{2}$ times into total length.
- (5) Head length goes 3 $\frac{1}{2}$ -3 $\frac{3}{4}$ times into total length.
- (6) Head double as long as broad and upper profile convex.
- (7) Snout 1 $\frac{1}{2}$ times as long as eye.
- (8) Eye's diameter goes 4 $\frac{1}{2}$ -5 times into length of head and 1 $\frac{1}{2}$ times into interorbital width (distance between eyes).
- (9) Pectoral fin length about $\frac{2}{3}$ times length of head.

Julidochromis regani—Poll, 1942.

The basic colouring is yellow with four longitudinal dark brown to black stripes. The uppermost of these runs along the lower part of the dorsal and ends together with the dorsal. The lowest stripe runs from the corner of the mouth to the base of the tail. This stripe is sometimes more weakly drawn than the others. At the base of the tail is an elongated dark brown/black spot. A 5-6 mm. long bluish-green iridescent band runs under the eye. The two uppermost stripes from each side meet at the brow forming a beautiful pattern.

The dorsal fin is edged exteriorly with a narrow (1 mm.) black band, beside which lies a pale blue band of the same breadth, thereafter a broader brown stripe and lastly a yellow stripe. The caudal fin is similarly coloured but with an additional alternate yellow and brown pattern. The anal fin is edged with black and has beautiful light blue markings. The ventrals are light blue, the pectorals yellow.

The upper profile of the head is almost straight and the straight horizontal mouth is thick-lipped. The jaws are of equal size.

Technical data:

- (1) Scales small and ctenoid.
- (2) Row of conical teeth in each jaw, some teeth clearly larger than the others.
- (3) 6 canines in upper jaw, 4 in lower jaw.
- (4) Body depth goes 4 $\frac{1}{2}$ times into body length excluding caudal fin.
- (5) Head length goes 3 $\frac{1}{2}$ times into body length excluding caudal fin.
- (6) Snout same length as breadth.
- (7) Diameter of eye goes 5 times into length of head and 1 $\frac{1}{2}$ times into interorbital width.

Julidochromis transcriptus—H. Matthes, 1959.

This species is a little plumper than *J. ornatus*. The basic colouring is almost black, with 3-5 whitish perpendicular bands on the side of the body. The dorsal and caudal fins are black edge with white and exteriorly with black again. The caudal fin is rounded. White spots are to be found along the base of these fins, and are sometimes present on the caudal itself and on the soft part of the dorsal.

There is a white marbling on top of the head, and a mother-of-pearl-like line or a series of such spots running behind the eye. The pectoral fins are orange, the ventrals black. The anal fin is black with white spots in the rear part.

J. transcriptus is known only from the northern part of Lake Tanganyika and is generally regarded as being a seldom species.

Technical data:

- (1) Two incomplete lateral lines.
- (2) Lower jaw shorter than upper and goes 3.95-4.5 times into length of head.
- (3) Very small conical teeth found in straight row in each jaw.
- (4) 5-7 usually 6 inequally-sized canines at front of upper jaw. 3-5 usually 4 canines in lower jaw. They all have brownish points.
- (5) Body depth goes 3.75 times into total length. Body is 0.75-0.9 times as broad as high.
- (6) Head length goes 2.95-3.3 times into total length.
- (7) Head 1.7-2 times as long as broad. Upper profile convex.
- (8) Snout 1.1-1.6 times as long as diameter of eye and its length goes 2.6-3.15 times into length of head.
- (9) Diameter of eye goes 3.4-4.2 times into length of head and 0.75-1.15 times into interorbital width.
- (10) Ctenoid scales.
- (11) Slightly developed anal papilla.

		Dorsal fin	Anal fin	Max. length	Scales on lateral line	
1.	<i>J. dickfeldi</i> W. Staeck, 1975	—	—	100 mm.	—	Basic colouring pale yellowish-brown to light violet. Two black longitudinal stripes along upper part of body. Nocturnal colouring bluish almost black.
2.	<i>J. marlieri</i> Poll, 1956	—	—	140 mm.	—	Basic colouring dark brown, almost black with yellowish-white markings. 3 rows of yellowish-white spots along body. Colouring of dorsal fin from exterior: brown-white-brown. Light/dark markings. Old males develop hump on the head.
3.	<i>J. ornatus</i> Boulenger, 1898	XXII-XXIV 5	VIII-IX 4-6	85 mm.	45-50	Basic colouring yellow. Three dark brown/black longitudinal stripes. Colouring of dorsal fin from exterior: orange-blue-yellow. Black spot on base of tail. Nocturnal colouring dark brown with black longitudinal stripes.
4.	<i>J. regani</i> Poll, 1942	XXIII, 7	VI, 6	100 mm.	36	Basic colouring yellow. 4 longitudinal dark brown/black stripes. Colouring of dorsal fin from exterior: black-light blue-brown-yellow. Dark brown/black oblong patch on base of tail.
5.	<i>J. transcriptus</i> H. Matthes, 1959	XXII-XXIV 5-7	VII-IX 4-5	62 mm.	31-34	Basic colouring dark, almost black. Belly lighter. 3-5 whitish perpendicular bands on side of body. Colouring of dorsal fin from exterior: black-white-black.

HELLBENDERS continued from page 299

practical debility and the salamander is able to hunt prey by employing a fine sense of smell and delicately tactile finger-tips.

Hellbenders should live for many years in captivity. I am not aware of longevity records for the species but as *M. japonicus* lives to beyond fifty years, and as there are recorded ages of twenty to thirty years for mudpuppies (*Necturus sp.*) and sirens (*Siren sp.*) of similar size and biology, I would strongly bet on thirty years as a likely lifetime for a Hellbender. Given a large aquarium with well filtered and aerated water, the Hellbender is a complacent and resilient animal that is unlikely to cause problems and is already the subject of a large vivarium literature in the U.S. It is easy to feed and practically noiseless, but due to its

large size and indiscriminate appetite can scarcely be rated an ideal candidate for the community vivarium.

The nocturnal life and sluggish habits of the Hellbender detract from its interest as a vivarium animal while its drab ugliness renders it inappropriate to the more stylish of living rooms! As a confirmed rooter and spoiler, it has no place in the aesthetic aquarium decorated with delicate and rare plants. But such a harmony of ugliness has its own appeal—even the "ugliest" of animals are beautiful in their adaptive correspondence between form and function—and the Hellbender is engagingly reminiscent of some ancestral Amphibian crawling out of the primeval ooze, or a weird invention crawling out of the mind of a rather twisted science fiction author.

Echinodorus cordifolius

Written & Illustrated by Jørgen Hansen & Pamela Stewart

Echinodorus cordifolius is common in the aquarium trade as it is always sold as a young plant of not more than 20 cm. in length. However, quite a few aquarists are surprised to discover after a period of time that there is room for only the one plant in the tank and that this eventually strives with all its might to emerge from the tank.

It is one of the really large sword plants for really large tanks, where it can grow even in the presence of the most aggressive cichlids, on account of the strong network of roots which cover the whole tank bottom, and which makes it very difficult for cichlids to dig. The area immediately surrounding the plant may in some cases need to be protected by means of flat stones, but one need not fear that the petioles will be bitten over, as they are exceedingly thick and sturdy.

The plant was described by Grisebach under its present name as early as 1857, but is often referred to under synonyms such as *Echinodorus radicans*, *Sagittaria radicans* or *Alisma cordifolium*. It is found in Mexico and Southern, Central and Eastern U.S.A. with the exception of Florida.

It can grow either as a water plant completely submerged or else as a swamp plant with the root and the lower parts of the petioles submerged while the leaves and inflorescence are above water.

In the submerged form the pentagonal petioles are from 5-15 cm. in length and the heart-shaped (*cordifolius*—heart shaped) light-green leaves attain a length of 20 cm. and a breadth of 10 cm. With up to 20 leaves of this size there will not be much space left in the tank for other plants.



E. cordifolius as a submerged aquatic.



E. cordifolius with leaves & flower stem above water.



Close-up of withering flower and 2 flower buds

Below: The developed fruits of *E. Cordifolius*.



Young plants on the flower stem of *Echinodorus cordifolius*

It is essential to change the tank water frequently and otherwise check algae growth, as even the very slightest layer of algae on the leaves will attract floating impurities with the result that in no time the beautiful pale green shade of the leaves will have disappeared under a thick layer of algae and muck. This layer both hinders respiration and deprives the plant of the light necessary for photosynthesis. The plant will thus finally wane away to nothing if the leaves are not cleaned and if a complete change of water is not provided.

If the plant is provided with adequate light and otherwise permitted to stand in peace and quiet for at least a year, it will produce leaves with petioles of up to 2 cm. in thickness and 75 cm. in length and which will extend over the water surface.

The leaf possesses a sturdy centre vein and on both sides of this from 2-4 lesser veins. All originate at the beginning of the leaf and end at the tip. The petioles, which form a rosette, originate from a short rounded root-stalk.

October, 1977

Leaf development

We kept a record of the rapidity of development of the leaves in the swamp stage of *Echinodorus cordifolius*, and noted that each petiole grew at the rate of 10 cm. per day such that the completely unfolded leaf, 18 cm. long by 13 cm. broad, hovered 50 cm. above the tank bottom after the course of a week. New leaves appeared at intervals of from 9 to 21 days. The intensity of light to which the plant was exposed was constant, as daylight did not have any significant influence on light intensity.

Inflorescence

After a couple of months we notice a thinner stalk than those bearing the new leaves: this stalk did not originate from the centre of the plant as did the petioles, but from the side of the petiole rosette. We hoped that this was a flower stem and were no disappointed. 20 days later the inflorescence and

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THE SELF-SUPPORTING FISH HOUSE

by Pete Watson

NOT SO MANY years ago the relatively cheap importation of tropical fish from the Far East and the Americas restricted the breeding of tropical fish for profit, in the comparatively cold climate of this country, to the larger organisations. However, the present economic situation, and in particular its effect on air freight costs, has changed the picture somewhat and opened up the field of profitable tropical fish breeding to the smaller fish house owner. It does not follow that a hobbyist can now expect to reap a fortune, but it does suggest that the organised hobbyist now has the opportunity to become self-supporting, and if sufficiently disciplined show a small profit. Charles Lamb was, I assume, talking of writing for profit when he said 'Literature is a bad crutch but a very good walking stick'. He could, if he were alive today, apply the same philosophy to the breeding of tropical fish.

A fish house need not be run on the rigid lines of a small business to become self-supporting. Petfish can still be kept, and attempts can still be made to breed the 'difficult' fish, but nevertheless a serious approach should be adopted. Fish houses that are well organised will experience success, those that are run on more random lines will force their owner to dig into their pockets to balance the account.

In the following article the subjects of outlay, running costs, possible incomes, etc., are discussed only with the intention of giving a hobbyist with no previous experience of fish houses some idea of what to expect on the financial side. While endeavouring to remain as accurate as possible figures and prices quoted are not intended to be 'spot-on' and are often 'rounded off' to aid understanding. I have also assumed that all manual work will be carried out by the hobbyist and thus neglected the cost of labour.

Outlay

Taking the bad news first, and costing the purchase and construction of an imaginary 12 ft. x 6 ft. x 6 ft. fish house, we start at the base. To support the proposed weight of water and tanks the base should be at least 6 inches thick, with the floor area at 72 square feet, this gives a 36 cubic ft. (approximately 1 cubic metre) volume of concrete. The price of 1 cubic metre of ready-mixed cement from a local supplier is quoted at £26.33 inclusive of VAT and delivery. If the do-it-yourself method is adopted and sand, shingle and cement are purchased separately the cost can be reduced to around £15. For the base then I shall estimate £20. A drain (with mud trap) should be fitted into the base, and be connected through suitable pipework to a drainage area. The cost of these items are difficult to assess, as much depends on the material used and the pipe run length, but the drain and associated pipework I will estimate at £12.

The Shed

Next comes the shed, and this again is rather difficult to assess. On checking with a local retailer for a shed of our size requirement, I found that price varies considerably with quality. The range of quotation was from £110 for the 'economy shed' to over £200 for the best quality in stock, with two possibilities in between. Against this I searched the local papers for second-hand sheds, and apart from discovering that second-hand sheds are few and far between, there must obviously be a question mark against their suitability. Of the two sheds that I found offered for sale, one was advertised as '8 ft. x 6 ft. garden shed, in need of repair, £25', the other was just advertised as 'Garden Shed for sale £65'. Here again it is apparent that for the

sake of this exercise an arbitrary figure will have to be set, and I shall assume that a new shed is to be purchased for a price of £150.

Insulation

Moving on to the insulating and lining of the shed, the area to be considered comprises two side walls each at 72 square feet, two end walls (door inclusive) each at 42 square feet, and two roof sections each at 48 square feet giving, if my arithmetic is correct, some 324 square feet that will require insulating and lining. I understand that the fibre-glass insulating material used in house lofts and similar, is now standardised to 80 mm. (approximately 3 inches) thick, which just so happens to be the ideal thickness for fish house use. However, sufficient material to cover the 324 square feet will cost in the region of £10. The shed has then to be lined out, and if 6 ft. x 4 ft. cement/asbestos sheets are used, even allowing for the skylights and door area, 13 sheets would probably be required. At £2.25 per sheet this amounts to £29.25. Cheaper lining materials such as hardboard could be used, but most wood-fibre based lining sheets are generally unsuitable in a fish house.

Electrics

At this juncture one would probably consider the fish house electrics. These usually consist of separately fused lighting and power circuits. Lighting need only comprise two 5 ft. fluorescent tubes, as opposed to incandescent bulbs, and although the initial cost is greater the tube lighting has the advantage of lower running costs, better light distribution, and a longer life expectancy than bulbs. The power circuit outlet points would normally be kept to the minimum number required for essential electrical equipment. A main fuse, distribution and switch box (termed consumer unit in the trade) should also be used so that any electrical faults that might develop in the fish house will not affect the home supply. For the fish house electrics I will estimate £20.

Air Supplies and Heating

Following the electrics we must consider the air supply and associated equipment. Again this is a subject that is much too involved to discuss here, and an estimate will yet again be made. To supply a fish house containing up to 50 tanks with an adequate volume of air one requires several small diaphragm pumps, or a single compressor, or blower, plus the pipework, valves, etc., that are necessary to distribute the air. For this I will estimate a cost of £50.

A fish house of the size that we are discussing would normally be space-heated and so we must not forget to include in our costing the price of a heater. In this case it would be a gas or paraffin burner,

or some form of electrical heater. The running costs of various heaters will be covered later so for the moment I shall think only of the cost of a heater, which I will put at £25.

Tank Framework

We come now to the tanks and their support framework, and I assume that both will be home made to suit individual requirements. I indicated earlier that our imaginary fish house could contain up to 50 tanks of various sizes, which if the price of sealant is included, could work out to around £2.50 per tank. This would indicate a total cost for tanks of about £125. To arrive at a figure for the cost of the support framework I shall assume that galvanised Dexion, or something similar, is to be used. The reasons for using galvanised Dexion as opposed to wooden framework, or angle iron, have already been discussed in a previous article. However, from a few quick calculations of the various layouts that could be used to accommodate around 50 tanks, I estimate that somewhere around 500 ft. of Dexion will be required. At approximately £33 per 100 ft. this will set you back some £165.

Sundries

Up to this point we have covered most, if not all the main expenses incurred in setting up a fish house from scratch, but to give a more realistic idea of the cost we must add just a bit more for sundry items such as screws, nails, wood preservatives, paint and so on. With the cost of things as they are at present, £20 for sundries should not be unrealistic.

The estimated total cost of setting up just a small 12 ft. x 6 ft. x 6 ft. fish house is then as follows:

	£
Base	20-00
Drains, etc.	12-00
Shed	150-00
Insulation	10-00
Lining sheets	30-00
Electrics	20-00
Air supply	50-00
Heater	25-00
Tanks	125-00
Support frame	165-00
Sundries	20-00
	<hr/>
	£627-00

Frightening, isn't it? Over £600 to set up a small 50 tank fish house! Even now we have not included the cost of such items as power filters, gravel, and various other bits and pieces that will make the day-to-day running easier.

The cost would not, however, be required in one lump sum. For instance, the shed could be purchased on a planned payment basis (H.P. if you like)

over a period of one, or even two years. This would reduce the initial outlay to under the £500 mark. The tanks and support framework will obviously take time to construct, and will require a progressive outlay rather than a lump sum. In fact, the whole fish house would be built-up gradually over a period of say 3 to 6 months, so what would really be required is an outlay of around £24 per week for six months, or if the complete setting-up process is prolonged, £12 per week for 12 months. This now implies that by the second half of the first year the fish house should be in a position to start feeding back, through fish sales, some of its costs. It will not meet all costs at this early stage, but if things are going well it should start to pull its weight.

Running Costs

Continuing with the bad news, we next discuss daily running costs, and the first thing that comes to mind is the heating costs. These will probably comprise the greater part of the running costs, especially in the winter months. The size of the heating bill will depend very much on (a) how much natural sunlight can be utilised, (b) how effective the fish house insulation is, (c) how self-contained the fish house is, that is to say how many times will the door have to be opened and closed, and (d) how much water the fish house contains, as water retains heat longer than air.

As most fish houses will operate on a space-heating basis, as opposed to individual tank heating, much will also depend on the form of heating used. Although electricity is generally considered to be one of the more expensive forms of heating, savings can be made by using a heater that is thermostatically controlled. The thermostat will of course sense the air temperature in the fish house, not the water temperature. A 1 kilowatt, thermostatically controlled, convection heater should be sufficient to heat our imaginary fish house, in fact I am sure it will be, because I have used such a heater in a fish house of similar size. Without trying to estimate the time that the heater was actually switched on (by the thermostat) and calculating the number of electrical units consumed and their cost, I shall put the cost of electrically heating a fish house at an average of £2 per week for the whole year. Obviously an average has to be quoted as heating costs are much greater in the winter months. This means that (again on average) an electricity bill would increase by about £26 per quarter.

Other forms of heating, such as gas, paraffin and possibly an extension to the home central heating system, are less easily controlled, and because of this may work out dearer in the long run. For instance, I use paraffin heaters at the moment, but rely heavily on my wife while I am at work to turn off the heater should it become sunny, and relight

it again should the weather become inclement. With this arrangement I find that by using paraffin heaters I can reduce the heating costs by around two-thirds to half of what it would be for electrical heating.

I cannot really comment on any form of gas heating because of no personal experience of this form of heating. Although I understand from those who have, and do, use this fuel that the running costs are comparable with electrical heating. Another method of space-heating a fish house is to install radiators and connect them to your existing central heating system. That is, of course, assuming that it has the spare capacity to handle them, and that the fish house is not too remote from the house. However, although this form of space-heating will bear comparison with the previously mentioned heating arrangements, it is usually only used in fish houses of a larger size than the one we are considering.

Electrical costs

Next we must consider what extra day-to-day electrical costs there might be for such things as lights, power filters, air blowers, etc. For instance if a blower is used to provide the fish house air supply it would probably be driven by a $\frac{1}{4}$ horse power electrical motor. This would be required to run 24 hours a day, seven days a week. To estimate the running costs of this blower for one week we must calculate as follows:

1 horse power = 746 watts.

Therefore $\frac{1}{4}$ horse power = $\frac{746}{4} = 186.5$ watts.

Wattage consumed per day = 186.5×24 hrs. = 4,476 watt hours.

Wattage consumed per week = $4,476 \times 7 = 31,332$ watt hours.

Now 1,000 watts = 1 kilowatt and 1 kilowatt hour = 1 electrical unit. Thus in one week we will have consumed 31.332 (say 31 $\frac{1}{2}$) units of electricity, and at the present cost of approximately 2 $\frac{1}{2}$ p per unit it will cost us $31\frac{1}{2} \times 2\frac{1}{2}p = 70.875p$, say 71 pence per week. We can now see that a $\frac{1}{4}$ h.p. electrical motor running for 24 hours a day, seven days a week is going to cost around 70 pence per week to run. If the motor is $\frac{1}{2}$ h.p. the cost will be double, and so on. Add to this the cost of lighting, power filters and perhaps the odd heater in special high temperature tanks, and the electricity bill for accessories will amount to around £1 per week.

Food

Next comes the cost of food. Despite the fact that hobbyists will endeavour to produce and collect as wide a variety of foods as possible, flake foods will undoubtedly form the bulk of the diet, and this must be bought. Bulk-buying will obviously work out cheaper than buying the smaller quantities readily available at retail outlets, but one should

bear in mind that the food will take some weeks to use and may deteriorate if suitable storage conditions are not provided. In addition to flake foods such items as liquid fry food, fine powdered fry food, *tubifex*, and brine shrimp eggs will all feature in the feeding routine at one time or another. Cereal foods for white worm and micro worm cultures will also have to be purchased if they cannot be found in the home. When these items are considered over a period, the total weekly expenditure on food could amount to as much as £1.50.

Oxygen

Other items that might not come so readily to mind, but still come under the heading of running costs, have yet to be considered. For instance, if fish are sent any distance to a wholesaler, or similar, then oxygen will almost certainly have to be used in the bags in which the fish are to be sent. This would normally mean that a suitable size oxygen bottle would have to be hired from the local depot. If the cost of a couple of refills is taken into account the hire charge for any oxygen bottle should be around 50p per week.

Freight Costs

If fish are sent by rail it will involve freight costs. These costs cannot really be assessed on a weekly basis and must, in the first instance, be worked out in terms of cost per fish. Naturally the freight cost will depend directly on the size of the box and the fish-to-water volume ratio. (The water content is determined by the fish, and the amount of water they require, rather than how much it will cost freight-wise.) Without going into detail I will suggest from experience that it costs around 1p per fish to send fish in quantity by rail. Therefore a box containing 500 fish, with the correct fish/water balance, should cost around £2.50. It follows then that one has only to add up the freight costs per year, or estimate the output of fish per week to a wholesaler, to arrive at the freight costs per week. At a guess, mainly to arrive at a figure, I will estimate freight costs at 50p per week. Car running costs should, I suppose, be estimated for fish that are delivered to retailers, but because of the problems in estimating these costs I shall stick with the figure of 50p per week for freight costs.

Breeding Stock

The purchase of breeding stock and fish to grow on for future breeding requirements has also to be considered. One's own fry can be grown on for future breeding fish, but for the sake of variety, and to limit the amount of in-breeding, fish will have to be bought from other sources. In addition to fish there are all the little items that tend to get overlooked, such as plastic bags, elastic bands, filter

wool, carbon, peat, and so on. For these items, which I shall call sundries, I will estimate a cost of 50p per week.

Total Running Costs

The total estimated weekly running costs are then:

	£
Heating	2.00
Electrical accessories	1.00
Food	1.50
Oxygen	50
Freight	50
Sundries	50
	<hr/>
	£6.00

We have now established that a fish house of the dimensions 12 ft. x 6 ft. x 6 ft., containing around 50 tanks, will cost in the order of £600 to set-up and around £6 per week to run. An organised hobbyist may well be able to operate within these figures, but remember the converse will also apply.

Possible Incomes

We can now look on the bright side, and discuss what income we might expect from our fish house. Unfortunately there are really only two sources of income, fish and plants. And unless one is going to specialise in plants, they are usually only considered as a bonus to the main output which is, of course, the fish.

If we neglect for the moment the initial outlay and consider only the running costs, which we put at £6 per week, one is tempted to think that it only requires the sale of 60 fish at 10p each to balance the account. This is true, but one must give the implications of the 'per week' part much more thought. The average growth time for most fish to reach a saleable size is 3 to 4 months, and for the sake of discussion I will set it at 14 weeks. Thus to meet our break-even requirement of 60 fish per week we will need 60 x 14 fish (at least) at any given time to ensure that we meet our quota. This implies a stock of 840 fish, in various stages of growth. Unfortunately one cannot hope to get 60 perfect fish each week, and a factor must be allowed for runts, mutations, and losses. I would estimate that to meet the 60 fish per week output one requires a growing-on stock of at least 1,000 fish. At a density of 100 fish per tank this will require the services of 10 growing-on tanks.

In an article in the July, 1977 edition of this magazine I suggested that to keep eight growing-on tanks full one would require the back-up of one breeding tank and one stock/community tank. If we now apply this to the imaginary fish house that we are at present considering, we can say that we have 40 growing-on tanks, 5 breeding tanks and 5 stock tanks

in our 50 tank fish house. Considering only the growing-on tanks we can now take the hypothesis a stage further, and suggest that in 40 growing-on tanks we hold 4,000 fish. In the previous paragraph I suggested that one required a stock of 1,000 fish for an output of 60 fish per week, thus it follows that with a stock of 4,000 fish one could expect an output of 240 fish per week. If these fish can be made to realise 10p each then we would have a theoretical income of £24 per week. Subtract the £6 per week estimated running costs, and neglect the time spent in the fish house, and an £18 per week profit margin is suggested.

It should be remembered, however, that although the figures quoted are averages and approximations, I have in the main assumed ideal fish house conditions. Any detrimental factors such as fry over-crowding, inadequate insulation, fish that will not spawn when required, etc., will obviously have the effect of reducing the profit margin.

Fish Sales

When should we sell our fish? As soon as they attain the recognisable saleable size, or wait until they are more fully grown in the hope that they will fetch a better price? These are questions that countless hobbyists must have asked themselves, and like so many of the questions posed by this hobby they have no straight answer. The advantage in selling fish as soon as they attain the correct size (which varies from buyer to buyer) is that they have only to be looked after and fed for a period of about 14 weeks. The ideal situation in this instance is to be able to tell all your fish as they reach the desired size, for a quick cash return. Against this there is the alternative of growing fish on to a much larger size before selling them. This method has its hazards. The number of fish contained in one tank must be reduced to allow them sufficient room to grow, which means that there is a greater number of tanks now tied up with fish that are growing-on. There is also the cost of feeding, and the possibility that through some misfortune you may lose them before you are ready to sell them.

As usual, the best method is a compromise. It should be possible to sell around 90% of the fish as they attain the desired size, and retain the remainder until they are adult fish. From these future breeding stock can be selected, and then those surplus to requirements can be sold. However, it may be difficult to set a realistic price for fish that are not fully grown. A fish need not be fully grown to be sexually mature, and it is this aspect that we as hobbyists will probably be more interested in, thus when it comes to selling surplus fish, that may be sexually mature, but not yet fully grown it could be found that some buyers (both retail and wholesale) appear to recognise only the two size extremes. For

instance, a fish that may fetch 10p at first size and £1 when fully grown, should in theory fetch around 50p when half grown. For some reason it does not always work that way, and if one is not careful it is easy to show a loss on fish that are sold at a half-grown size.

Outlets

Where do we sell our fish? Here again we have but two choices, the retailer and the wholesaler. If we consider the retail outlet we must first acquaint ourselves with a few facts. (i) The retailer will only expect to pay about the same as he would pay a wholesaler for the same fish. Most retailers will, however, offer a little more for home bred fish if they are confident that they will survive in their tanks. (ii) The price that the retailer is likely to offer for your fish will be one-third to half the price that the same fish would be sold at by him. Only in exceptional circumstances will you receive more than half the selling price. (iii) Unless it is a large business a retailer will usually only take 30 to 50 fish of one type at a time. (iv) If a retailer buys, say, 30 fish of one type, then 3 weeks later asks for 30 more, he will in general still expect to pay the same price, regardless of the facts that the fish may be from the same batch and you have grown them on that little bit more. If these basic facts can be accepted then there should be no problems in selling fish to retailers and the big advantage with this method of disposal of fish is that it is usually a cash transaction.

If sufficient quantity of fish are produced to interest a wholesaler, then this may prove a better outlet in the long run. Less money will be received per fish but the fish will be disposed of in larger quantities which will free the growing-on tanks that much sooner for further batches of fry. For an idea of what might be expected from a wholesaler, a few wholesale lists should be consulted. Find out what the wholesale price is of the fish that you are offering, and then halve it to arrive at the price you can expect to be paid for your fish. For instance, if Rosy Barbs are marked up at 15p each then you might expect to receive from that wholesaler about 7½p for fish of the same size. You will be wasting your time and the wholesaler's time if you approach him with just a handful of fish. A wholesaler will in general expect to talk in hundreds which can be supplied on a fairly regular basis.

We all have the tendency to look at the retail price of a fish and compare it with the price that we might be paid for the same fish, and this is a source of discontent for many hobbyists. What must be remembered, however, is that we have just assessed our fish house overheads at £6 per week. At what would we assess the overheads per week of a wholesale or retail business with staff wages, rent, rates and massive heating bills?

Which Fish to Breed

A further important point that will have a bearing on whether the fish house will be self-supporting or not, is the type of fish that are bred. Some of the large cichlids are hardy, easily bred and require very little effort from the hobbyist to grow them on. It is all too easy to find a situation where the tanks in the fish house are full with hundreds of cichlid fry. A situation that may be most suitable from the fish house running point of view, but may present quite a different picture when it comes to selling the fish. There are very few wholesalers, and even less retailers, that will show interest in 400 Convict Cichlids. On the other hand few wholesalers would turn away Angel fish. It is a matter of popularity and the old supply and demand business. It would probably take a wholesaler months to sell the 400 Convicts, but he might sell the Angels within a week.

To achieve a self-supporting condition the fish that have been bred must be easily sold, and thus it follows for this to happen the fish must be popular and in fairly constant demand. Popular fish, that can be bred in a fish house, do not in general command a high price but they can provide a means of meeting the weekly overheads. Once these commitments

have been met there is then scope for trying the 'difficult fish', line breeding, or what ever takes your fancy.

If we now consider all the points that have been discussed, it becomes fairly apparent that even if the prospective income is stretched a bit, and the overheads are reduced to an absolute minimum, there are no great fortunes to be had from breeding fish on the scale that we are considering. It is also apparent that it would be somewhat risky to run a fish house of the size we have considered, purely as a money making venture. There must be many other sources of income that would pay more, be less demanding on time, and involve less work. Thus it comes back to the fact that fish houses of the type we have been discussing are kept by hobbyists, not mini businessmen.

From what has been discussed it is, I hope, also apparent that although one's main interests may be in keeping and breeding fish, there is every opportunity for a fish house to pay its own way. There are, after all, very few hobbyists who can afford to splash out £600 on setting up a fish house, then continue to splash out around £6 per week thereafter just for the pleasure of keeping a few fish more than the next bloke.

Echinodorus cordifolius continued from page 313

stem measured over a metre in length and the first white flowers were just about to appear.

The first circle of flowers was situated at a height of 60 cm. on the triangular flower-stem. Six further such circles were situated along the stem at intervals of from 10-20 cm. At each circle were attached three narrow leaves about 3 cm. in length, at the foot of each of which two 2-5 cm. long thin stalks successively appeared. Each of these stalks bore a round, green flower bud which later burst out, the eldest nearest the root first. There were thus, to begin with, three flowers in each circle. Moreover, at the base of the flower-stem of each of these flowers sat an even smaller flower-stem and bud; when the first set of flowers along the whole main flower-stem withered, these small buds began to develop, the eldest first, as before.

Small green leaves appeared at some of the flower circles on the main stem, signifying that young plants were about to form there. When we placed part of the stem under water, plants also formed at those flower circles where they had not previously formed. Flower buds did not develop under water. Small plants on the flower-stem above water-level developed in the course of a month to plants 20 cm. in length with very small traces of roots. When these plants have produced from 4-5 leaves, they may be plucked carefully from the stem and planted in about 5 cm. depth of clean gravel.

Each flower contains three green sepals of about 5 mm. in length. Each sepal has the form of one-third of a hollow ball. Within the sepals sit three almost heart-shaped white petals measuring about 10 mm. each way. Within the petals are from 12 to 20 stamens with yellow anthers. In the centre of the flower one can see many green stigmas closely packed together.

Each flower lasts 24 hours only before the white petals wither and curl together. We tried to fertilise some of the flowers artificially by transferring pollen with the aid of some cotton wool screwed around the end of a match, but this proved ineffective. The flowers were fertilised only at the tip of the inflorescence, which was accidentally dipped into the tank above that in which the plant grew. When the plant produced a second inflorescence about two months later, we consequently attempted to fertilise each flower by dripping water into its centre. The number of fertilised flowers was greater than with the first inflorescence but was still not satisfactory.

When these flowers develop seed, a number of small green nuts can be seen sitting closely together on the floral receptacle. Later the nuts, which are triangular, turn brown and one can then collect them and store them for later use.

There are 30 known species of *Echinodorus* in all, one from Asia, one from Africa, two from Europe, and, including *E. cordifolius*, 26 from America.

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News from AQUARISTS' SOCIETIES

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

RESULTS of the Yorkshire Aquarists Festival held in August were as follows: Prize winning Tableau: 1, York A.D.A.S. (York Minster); 2, Bridlington A.D. (Ship Wreck); 3, Workshop A.Z.S. (Shooting Gallery); 4, Chesterfield A.D. (Silver Jubilee Crown); 5, Castleford A.D. (Bingo Stall). Best in Show: Mr. and Mrs. Scarle (Goole). Fish of Fishes: 1, D. Harris (Mexborough); 2, Mr. and Mrs. Vernon (Retford); 3, M. Jordan (Bridlington). Society with most points: 1, Northumbrian, 39; 2, Stanley, 29; 3, Retford, 27. Show results: Society Furnished Aquarium: 1, Northumbrian; 2, Stanley; 3, Sheaf Valley. Furnished Aquarium (Individual): 1, E. Snaith (Northumbrian); 2, V. Lee (Chesterfield); 3, Mr. and Mrs. Roberts (Doncaster). Aquascape (Individual Entry): 1, N. Cook, Novelty (Individual Entry); 1, K. Lancashire (Doncaster); 2, M. Butler (Skegness); 3, Mrs. C. Chester (Retford). Guppies: 1, Mr. and Mrs. Chester (Retford); 2, C. Robinson (Stanley); 3, J. Robertson (Northumbrian). Platies: 1, J. Robertson (Northumbrian); 2, Mr. and Mrs. Scarle (Goole); 3, M. Symonds (Immingham). Mollies: 1, A. Hodgson (Mexborough); 2, L. Hattersley (Sheaf Valley); 3, B. Jackson (Doncaster). Swordtails: 1, M. Jordan (Bridlington); 2, Mr. and Mrs. Fletcher (Doncaster); 3, Mr. and Mrs. Sidebottom (Sheffield). A.O.V. Livebearers: 1, Mr. and Mrs. Chester (Retford); 2, R. Neworthy (Northumbrian); 3, P. Griffiths (Mexborough). Small Barbs: 1, Mr. and Mrs. Scott (Sheffield); 2, C. Carrick (Castleford); 3, S. Haper (York). Large Barbs: 1, A. Cook (Retford); 2, Mr. and Mrs. Shipley (Goole); 3, W. E. Wainwright (Workshop). Small Characins: 1, Mr. and Mrs. Hill (Scunthorpe Museum); 2, Mr. and Mrs. Chester (Retford); 3, K. Fletcher (Chesterfield). Large Characins: 1, Mr. and Mrs. Price (Castleford); 2, Mr. and Mrs. Chester (Retford); 3, A. Cook (Retford). Rainbow: 1, A. Howgate (Stanley); 2, Mr. and Mrs. Stanton (Sheffield); 3, V. Davison (Northumbrian). Danios: 1, Miss A. Chester (Retford); 2, T. Holmes (Mexborough); 3, Mr. and Mrs. Honnor (Doncaster). Minnows: 1, D. Harris (Mexborough); 2, Mr. and Mrs. Honnor (Doncaster); 3, Mr. and Mrs. Blades (Bassetlaw). Toothcarps (Top Spawners): 1, A. Howgate (Stanley); 2, Mr. and Mrs. Fletcher (Doncaster); 3, N. Lynch (Stanley). Toothcarps (Bottom Spawners): 1, N. Lynch (Stanley); 2, D. Greenwood (Immingham); 3, Mr. and Mrs. Blades (Bassetlaw). Siamese Fighters: 1, D. Russel (Stanley); 2, R. Atherton (Northumbrian); 3, A. Cook (Retford). Siamese Fighters (Multicolour): 1, Mr. and Mrs. Scott (Bassetlaw); 2, M. Jordan (Bridlington); 3, Mr. and Mrs. P. Turner (Thorne). Small Anabantids: 1, M. Wainwright (Workshop); 2, Mr. and Mrs. Jones (Dearn); 3, K. Hutton (Goole). Large Anabantids: 1, R. Neworthy (Northumbrian); 2, Mr. and Mrs. Marsh (Dearn); 3, Mr. and Mrs. J. Hall (Dearn). Dwarf Cichlids: 1, A. Bebbington (Northumbrian); 2, Mr. and Mrs. Hooley (Bassetlaw); 3, C. Carrick (Castleford). Rift Valley Cichlids: 1 and 2, M. Wainwright (Workshop); 3, Mr. and Mrs. Collier (Goole). Angels: 1, R. Neworthy (Northumbrian); 2, J. Taylor (Chesterfield); 3, Mr. and Mrs. Mangles (Retford). A.O.V. Cichlids: 1, Mr. and Mrs. Scarle (Goole); 2, A. Bebbington (Northumbrian); 3, Mr. and Mrs. Shipley (Goole). Corydoras: 1, R. Riley (Immingham); 2, N. Gow (Scunthorpe Museum); 3, B.

Bladen (Darfield). A.O.V. Catfish: 1, D. Harris (Mexborough); 2, R. Neworthy (Northumbrian); 3, Mr. and Mrs. Price (Castleford). Botias and Loaches: 1, J. Irwin (Stanley); 2, C. Wright (Airborough); 3, Mr. and Mrs. Scott (Sheffield). Sharks: 1, T. Scott (Castleford); 2, J. Irwin (Stanley); 3, M. Wainwright (Workshop). Foxes: 1, J. Robertson (Northumbrian); 2, A. Lenthal (Chesterfield); 3, Mr. and Mrs. Flint (Doncaster). Pairs (Livebearers): 1 and 3, J. Abbott (Airborough); 2, V. Davison (Northumbrian). Pairs (Egg-layers): 1, Mr. and Mrs. Vernon (Retford); 2, E. Hemmingway (Dewsbury); 3, Mr. and Mrs. Stanton (Sheffield). Breeders (Livebearers A-B): 1, J. Robertson (Northumbrian); 2, V. Davison (Northumbrian); 3, Miss J. Cavill (Doncaster). Breeders (Livebearers C-D): 1, 2 and 3, J. Abbott (Airborough). Breeders (Egg-layers A-B): 1, B. Banks (Thorne); 2, Mr. and Mrs. Collier (Goole); 3, A. Howgate (Stanley). Breeders (Egg-layers C-D): 1, A. Howgate (Stanley); 2, Mr. and Mrs. Banks (Thorne); 3, A. Bebbington (Northumbrian). A.V. Female (Livebearer): 1, J. Abbott (Airborough); 2, Mr. and Mrs. Blades (Bassetlaw); 3, T. Kilvington (Doncaster). A.V. Female (Egg-layer): 1, Mr. and Mrs. Scarle (Goole); 2, Mr. and Mrs. Collier (Goole); 3, T. Kilvington (Doncaster). A.O.V. Tropical: 1, H. Lake (Stanley); 2, E. Simpson (Workshop); 3, Mr. and Mrs. Chester (Retford). Tropical Marines: 1, N. Gow (Scunthorpe Museum); 2, Mr. and Mrs. Baker (Doncaster); 3, Mr. and Mrs. Atkinson (Dearn). Common Goldfish and Comets: 1 and 2, E. Ackroyd (Airborough); 3, Mr. and Mrs. Burrows (Dearn). Shubunkins, Bristols and Londons: 1, Mr. and Mrs. Hutton (Goole); 2, Mr. and Mrs. Blades (Bassetlaw); 3, Mr. and Mrs. K. Woods (Bridlington). Fancy Goldfish: 1, W. E. Wainwright (Workshop); 2, Mr. and Mrs. Wainwright (Workshop); 3, Mr. and Mrs. T. Simpson (Dearn). Breeders Coldwater: 1, M. Wainwright (Workshop). A.O.V. Coldwater: 1 and 2, Mr. and Mrs. K. Woods (Bridlington); 3, D. Harris (Mexborough). Aquarium Plants: 1, Mr. and Mrs. Fletcher (Doncaster); 2 and 3, T. Kilvington (Doncaster). Amphibians: 1, Pete and Sylvia (Bridlington).

THERE were the usual two meetings in July held by the **Portsmouth A.S.**. The first one was devoted to a "noughts and crosses" quiz conducted by Mr. Sultwell and Mr. Hunt which was enjoyed by all despite the fact that it was prepared in a hurry because of the absence of the guest speaker for the evening. All the questions were "off the cuff" as it were and occasionally the answers were mildly disputed but the question-masters had their way though not without some light-hearted banter and a few good laughs.

The second meeting was taken up with the preparation of the forthcoming exhibition which was held in August. On the same evening there was a table show which was judged by Mr. Barkham of Peterfield. The results were as follows:—Toothcarps: 1 and 2, E. Binstead, Corydoras: 1 and 3, E. Binstead; 2, P. Smithers; 4, S. Crabtree, A.O.S. Catfish: 1, P. Smithers; 2, E. Binstead, Loaches: 1, W. Ryder; 2, 3 and 4, E. Binstead, A.O.S. Tropical: 1 and 2, E. Binstead; 3, D. Fosse, Best Fish: E. Binstead (Melanistius catfish).

SHOW results from **Presell T.F.S.** were as

follow: Livebearers: 1 and 3, P. A. Busby; 2, D. Perkins; 4, B. Locke. Egg-layers: 1, R. A. J. Thomas; 2, L. Lewis; 3, D. Perkins; 4, P. A. Busby. Characins: 1, R. Mayhew; 2, B. Locke; 3, P. A. Busby; 4, R. Purdus. The society would like to thank Mr. C. Harding and Mr. C. Turner for coming down for the show. They would like also to thank all the members of the C.N.A.A. who came to Millford Haven in August for the C.N.A.A. show.

AT their August meeting members of the **Longridge and District A.S.** thoroughly enjoyed a slide lecture by Dr. David Ford of Aquarian Fishfood on "The Birth of Aquarian." He gave a unique insight into the years of research and hard work that had gone into the development of this popular range of aquarium foods. These present were also treated to a preview of a new lecture when Dr. Ford showed the slides he had taken on his trips to America and Hong Kong.

In the table show Mr. and Mrs. Holden made certain of their final position at the top of the Society's Show League. With just one leg left to go they cannot now be caught. Results: Livebearer (Pairs): 1 and 3, Mr. and Mrs. Holden; 2, Mr. and Mrs. B. Durham. Egg-layers (Pairs): 1, Mr. and Mrs. Durham; 2, Mr. and Mrs. Holden; 3, R. Clint. Breeders (Egg-layers—Hard): 1, D. Matthews. Breeders (Egg-layers—Easy): 1, D. Matthews. Breeders (Livebearers): 1, Mr. and Mrs. Holden. Best in Show was a pair of Yellow Wagtail Sweet-tails belonging to Mr. and Mrs. Holden. Show League Top Five: 1, R. and S. Holden, 91 pts; 2, B. and B. Durham, 73 pts; 3, J. Marsh, 28 pts; 4, A. and E. Lyons, 19 pts; 5, N. Bland, 12 pts.

OVER 600 people visited the **Yorkshire Koi Society's** First National Open Koi Show which was held in August. A superb Taiho Sanke about 23 in. long belonging to F. Ayres, the Society chairman, won the title of British Grand Champion. The Grand Champion Award was a beautiful Hasami porcelain dish presented to the Society by Dr. Takeo Kuroki, chairman of Zen Nippon Airinkai, as a token of the continuing friendship between the two Societies. Accompanying the dish was a certificate of merit handwritten in Japanese characters.

Other awards were: Adachi Trophy for Best Kohaku to G. W. Atkins; Atkins Trophy for Best Sanke to G. Claxton; Ayres Cup for Best Showa to D. Palmer; Tamaki Yagyou Trophy for Best Bekko to F. J. Ayres; Fishlake Water Gardens Trophy for Best Utsuri to F. J. Ayres; Wayside Water Gardens Trophy for Best Ogish/Matsuba to F. J. Ayres; Wensleydale Trophy for Best Harasake to R. Brothwell; Wharfedale Trophy for Best Shusui to G. W. Atkins; Airedale Trophy for Best Hikari Mono to R. Jacques; Kingston Koi Co. Trophy for Best Gin Rin to S. Bent; Nidderdale Trophy for Best Kawari Mono to A. Claxton and the Yorkshire Cup for Best Home Bred Koi to G. W. Atkins. The awards were presented by the chief judge, Miss Valerie Frost.

THE chairman of the **Mid-Sussex A.S.**, Mr. N. Short opened the August meeting with the good news that £29 had been raised for club funds from the sale of waste paper collected in the previous month. It was confirmed that the Children's Christmas Party will be held on 10th December, but a venue still had to be found.

During the evening time was passed in discussing a Social Evening for the entire family and in listening to a talk by Mr. J. Burtles on Native Marines. The talk was a run up to a visit to Saltdean in August to

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discover the various forms of marine life on Britain's South East Coast. The visit will possibly result in some members setting up Nature Marine Aquaria to observe the life-style of this form of life. Further details of the Society may be obtained from the Secretary, Mr. B. Klade, Sandown, Bolney Road, Amstye, (H. Heath 53747).

THE results of the Long Eaton A.S. Open Show held in August were as follows:—Small Barbs: 1, Mr. and Mrs. Blades (Bassetlaw); 2, Mr. and Mrs. Darbey (Dudley); 3, A. Smart (Alfreton). Large Barbs: 1, P. Clay (Queen of the Midlands); 2, M. Mabbutt (Long Eaton). Small Characins: 1, Mr. and Mrs. Darbey (Dudley); 2, Mr. Lane (Derby Regent); 3, S.M.I.N. Short (Nuneaton). Large Characins: 1 and 3, P. Simpkins (Long Eaton); 2, G. Howe (Loughborough). Angels: 1, J. Taylor (Cherterfield); 2, I. M. Turton (Private). Dwarf Cichlids: 1, D. Hutchinson (Kidderminster); 2, T. Upton (Wednesbury); 3, Mr. and Mrs. Williams (Dudley). Rift Valley: 1 and 2, F. and S. Whitehouse (Osley); 3, I. Fuller (Cannock). Large Cichlids: 1, T. Upton (Wednesbury); 2, T. Hage (Private); 3, Mr. and Mrs. Lake (South Humber-side). Fighters: 1, Mr. and Mrs. Blades (Bassetlaw); 2, E. F. Swan (Rugeley); 3, D. Hutchinson (Kidderminster). Small Anabantids: 1 and 3, G. Taylor (Loughborough); 2, Mr. and Mrs. Lake (South Humber-side). Tropical Catfish: 1, Mr. and Mrs. Darbey (Dudley); 2 and 3, T. Upton (Wednesbury). Corydoras and Brochis: 1 and 3, Mr. and Mrs. Williams (Dudley); 2, S.M.I.N. Short (Nuneaton). Looches and Botias: 1, S.M.I.N. Short (Nuneaton); 2, I. Fuller (Cannock); 3, Mr. and Mrs. Lake (South Humber-side). Sharks and Foxes: 1, B. J. Chapman (Long Eaton); 2, T. Hay (Hucknall and Bulwell); 3, Mr. Lowe (Private). Rasboras: 1, T. Hay (Hucknall and Bulwell); 2, Mr. and Mrs. Lake (South Humber-side); 3, S.M.I.N. Short (Nuneaton). Minnows and Danios: 1, Mr. and Mrs. Blades (Bassetlaw); 2, D. Hutchinson (Kidderminster); 3, S.M.I.N. Short (Nuneaton). Egglayer (Pairs): 1, D. Lester (Wednesbury); 2, S.M.I.N. Short (Nuneaton); 3, F. and S. Whitehouse (Osley). Livebearer (Pairs): 1 and 2, S.M.I.N. Short (Nuneaton); 3, E. Rudd (Queen of the Midlands). Guppies (Male and Female): 1, R. Jones (Long Eaton); 2, I. Fuller (Cannock); 3, S.M.I.N. Short (Nuneaton). Swordtails: 1, D. Lambert (Queen of the Midlands); 2, D. Hutchinson (Kidderminster); 3, E. Rudd (Queen of the Midlands). Platies: 1, Mr. and Mrs. Blades (Bassetlaw); 2, A. Draper (Alfreton); 3, S. Rowe (Loughborough). Mollys: 1, F. and S. Whitehouse (Osley); 2, E. F. Swan (Rugeley); 3, D. Hutchinson (Kidderminster). A.O.V. Livebearers: 1, S.M.I.N. Short (Nuneaton); 2, S. Rowe (Loughborough); 3, Mr. and Mrs. Kirk (South Humber-side). Goldfish: 1, N. Richardson (Loughborough); 2, K. J. Appleton (Norwich); 3, Miss G. Smallen (Long Eaton). Shubunkins and Fancy Goldfish: 1, D. Hutchinson (Kidderminster); 2, K. J. Appleton (Norwich); 3, G. Howe (Loughborough). A.O.V. Coldwater: 1, Mr. and Mrs. Blades (Bassetlaw); 2, S.M.I.N. Short (Nuneaton); 3, E. Rudd (Queen of the Midlands). Egglayer (Breeder): 1 and 3, D. Lester (Wednesbury); 2, P. Simpkins (Long Eaton). Livebearers (Breeder): 1, S.M.I.N. Short (Nuneaton); 2, A. Smart (Alfreton); 3, Mrs. Allan (Long Eaton). A.O.V. Tropical: 1, A. Frisby (Hull); 2, F. and S. Whitehouse (Osley); 3, T. Upton (Wednesbury). Best Fish in Show: Mr. and Mrs. Darbey of Dudley with a Small Characin (*Nannostomus Eques*).

THERE were 429 entries for the Grimsby and Cleethorpes A.S. open show in August. The society with most points was Grimsby and Cleethorpes A.S. with 79 pts. and the "Society" trophy winner was Castleford A.S. with 45 pts. Results: Guppies: 1, Mr. and Mrs. Scott (Bassetlaw); 2, Mr. and Mrs. J. Riley (Castleford); 3, Mr. and Mrs. Davies (Doncaster). Swordtails: 1, J. Harrison (Grimsby and Cleethorpes); 2, Mr. and Mrs. Lake (South Humber-side); 3, Mr. and Mrs. Roberts (Doncaster). Mollys: 1, Mr. and Mrs. Petty (Castleford); 2, S. Harrison (Grimsby and Cleethorpes); 3, J. Bolderson (Grimsby and Cleethorpes). Platies: 1 and 2, J. Hasdon (Grimsby and Cleethorpes); 3, Mr. and Mrs. Petty (Castleford). A.O.V. Livebearer: 1, Mr. and Mrs. J. Riley (Castleford); 2, Mr. and Mrs. E. Kirk (South Humber-side); 3, K. Prendergast (Boston). Small Barbs: 1, R. Riley (Immingham); 2, Mr. and Mrs. Blades (Bassetlaw); 3, Mrs. B. Bee (Grimsby and Cleethorpes). Large Barbs: 1, Mr. and Mrs. Roberts (Doncaster); 2, R. Key (Hull); 3, Mr. and Mrs. Newstead (Scunthorpe and District). Small Cichlids: 1 and 3, Mr. and Mrs. Richardson (Scunthorpe); 2, Mr. and Mrs. Lake (South Humber-side). Large Characins: 1, A. Pizzott (Grimsby and Cleethorpes); 2 and 3, Mrs. B. Bee (Grimsby and Cleethorpes). Dwarf Cichlids: 1, T. Stansfield (Castleford); 2, Mr. and Mrs. J. Riley (Castleford); 3, Mrs. B. Bee (Grimsby and Cleethorpes). Large Cichlids: 1, Mrs. B. Bee (Grimsby and Cleethorpes); 2, Mr. and Mrs. Hopkinson (Darfield); 3, Master J. Chywick (Castleford). Angels: 1, Mr. and Mrs. J. Chadwick (Castleford); 2, A. Piggott (Grimsby and Cleethorpes); 3, A. Frisby (Hull). Rift Valley Cichlids: 1, N. Gow (Scunthorpe Museum); 2, A. Frisby (Hull); 3, Mr. Summerscales (Northfleton). Corydoras and Brochis: 1, N. Gow (Scunthorpe Museum); 2, Mr. and Mrs. J. Riley (Castleford); 3, R. Riley (Immingham). A.O.V. Catfish: 1 and Best Fish in Show Mrs. R. Bagley (Grimsby and Cleethorpes); 2, A. Piggott (Grimsby and Cleethorpes); 3, D. and W. Jordan (South Humber-side). Looches and Botias: 1, Mr. and Mrs. Daines (Doncaster); 2, Mr. and Mrs. J. Riley (Castleford); 3, Miss I. Cavill (Doncaster). Sharks and Foxes: 1, W. Blundell (Doncaster); 2, A. Piggott (Grimsby and Cleethorpes); 3, R. Riley (Immingham). Small Anabantids: 1, Mr. and Mrs. W. Newton (South Humber-side); 2, Mr. and Mrs. Lake (South Humber-side); 3, Mr. and Mrs. Daines (Doncaster). Somese Fighters: 1, Mrs. B. Bee (Grimsby and Cleethorpes); 2, D. Barrett (Thorn); 3, Mr. and Mrs. J. Riley (Castleford). A.O.V. Anabantid: 1, Mr. and Mrs. Plasson (Immingham); 2, Mrs. B. Bee (Grimsby and Cleethorpes); 3, T. Tidwell (Grimsby and Cleethorpes). Goldfish and Comets: 1 and 2, L. Waller (Rotherham); 3, Master D. J. Cavill (Doncaster). Shubunkin and Fancy Goldfish: 1, Mr. and Mrs. Hopkinson (Darfield); 2, L. Waller (Rotherham); 3, Mr. and Mrs. Tidwell (Grimsby and Cleethorpes). A.O.V. Coldwater: 1, D. and W. Jordan (South Humber-side); 2, Mr. and Mrs. J. Riley (Castleford); 3, Master M. Lake (South Humber-side). Killies: 1, D. Greenwood (Immingham); 2 and 3, Mrs. B. Bee (Grimsby and Cleethorpes). Danios and Minnows: 1, Mr. and Mrs. Lake (South Humber-side); 2, A. Piggott (Grimsby and Cleethorpes); 3, Mr. and Mrs. E. Kirk (South Humber-side). Rasboras: 1 and 3, Mr. and Mrs. Vernon (Retford); 2, A. Piggott (Grimsby and Cleethorpes). A.O.V. Tropical: 1, A. Frisby (Hull); 2, G. White (Scunthorpe and District); 3, W. Blundell (Doncaster). A.V. Marines: 1, N. Gow (Scunthorpe Museum); 2, Mr. and Mrs. Jenkins (Sheffield). Pair Egglayers: 1, Mr. and Mrs. Lake (South Humber-side); 2, Mr. and Mrs. Bradley (Retford); 3, Mrs. B. Bee (Grimsby and Cleethorpes). Pair Livebearers: 1, K. Prendergast (Boston); 2, Mr. and Mrs. Hopkinson (Darfield); 3, Mr. and Mrs. J. Riley (Castleford). Novice: 1, R. Key (Hull); 2, Mrs. J. Bate (Grimsby and Cleethorpes); 3, W. D. Mallinson (Immingham). Breeders Egglayers (A-B): 1 and 2, B. Banks (Thorn); 3, T. Sands (Boston). Breeders Egglayers (C-D): 1, Mr. and Mrs. Petty (Castleford); 2, A. Piggott (Grimsby and Cleethorpes). Breeders Livebearers (A-B): 1, A. Pizzott (Grimsby and

Cleethorpes); 2, Mr. and Mrs. Daines (Doncaster); 3, Mr. and Mrs. Hopkinson (Darfield). Breeders Livebearers (C-D): 1, W. Blundell (Doncaster); 2, Mr. and Mrs. Hopkinson (Darfield); 3, Miss T. Hopkinson (Darfield); 2, Miss L. Petty (Castleford); 3, M. Turner (Thorn).

AT the annual open show of Tottenham and District A.S., entries were slightly down on previous years. Of particular interest was an entry from Canada from Mr. A. Heels who has holidaymaking. Details were as follows:—Special Awards: F.B.A.S. Ted Jessop Memorial Trophy: M. Fowler (T.D.A.S.); George Bunde Men Rose Bowl for Best Barb: D. Phillips (T.D.A.S.); Lansbury Cup for Best Fish: S. Hedges (B.G.A.S.); Seven Sisters Trophy for Best Cichlid: M. Netherell (Riverside); Triangle Cup for Best Breeder: T. Cam: W. R. Dale (B.G.A.S.); Beta Cup for Best Characin: W. R. Dale (B.G.A.S.); G. E. Finnell Voucher: A. Lawman (G.S.G.B.); Class Aa-d: 1, G. Boyall (T.D.A.S.); Class Aa-f: 1, I. Phillips (T.D.A.S.); Class Ua and Uv: 1, F. Pinder; 2, F. R. Wilson; 3, Jason Bangs. Class Uc and Ud: 1, K. Nutt (T.D.A.S.); 2, R. Eldon (T.D.A.S.); 3, H. Bence. Class W: 1, S. Hedges (B.G.A.S.); 2, J. Brown (B.G.A.S.); 3, F. Pinder. Class Xu and Y: 1, F. Pinder; 2, R. Eldon (T.D.A.S.); 3, D. Nutt (T.D.A.S.); Class Xv: 1 and 3, A. Lawman (G.S.G.B.); 2, D. Nutt (T.D.A.S.); Class Z: 1, K. Nutt (T.D.A.S.); 2 and 3, D. Nutt (T.D.A.S.); Class B: 1 and 2, D. Phillips (T.D.A.S.); 3, M. Netherell (Riverside); Class C: 1 and 3, W. R. Dale (B.G.A.S.); 2, M. Netherell (Riverside); Class D: 1, M. Netherell (Riverside); 2, K. Holt; 3, G. Boyall (T.D.A.S.); Class Db: 1, M. Fowler (T.D.A.S.); 2, J. Phillips (T.D.A.S.); 3, G. Boyall (T.D.A.S.); Class E: 1, M. Netherell (Riverside); 2, W. R. Dale (B.G.A.S.); 3, S. S. Asota (W.D.A.S.); Class F: 1, J. Connolly (B.G.A.S.); 2, B. Crookford (W.D.A.S.); 3, A. Gregory (T.D.A.S.); Class H: 1, 2 and 3, M. Netherell (Riverside); Class J: 1 and 3, W. R. Dale (B.G.A.S.); 2, B. Crookford (W.D.A.S.); Class K: 1, D. Phillips (T.D.A.S.); 2, M. Netherell (Riverside); 3, J. Connolly (B.G.A.S.); Class M: 1 and 3, M. Netherell (Riverside); 2, W. R. Dale (B.G.A.S.); Class O: 1, 2 and 3, M. Netherell (Riverside); Class Q: 1 and 3, A. Gregory (T.D.A.S.); 3, J. Connolly (B.G.A.S.); Class R: 1 and 2, D. Valverde (Chingford); 3, A. Clarke (T.D.A.S.); Class S: 1, M. Netherell (Riverside); 2, M. Fowler (T.D.A.S.); 3, A. Gregory (T.D.A.S.); Class Xb-m: 1, M. Netherell (Riverside); 2, D. Valverde (Chingford); 3, D. Phillips (T.D.A.S.); Class Xc: 1 and 3, W. R. Dale (B.G.A.S.); 2, D. Valverde (Chingford); Class Z: 1 and 2, D. Valverde (Chingford); 3, G. Boyall (T.D.A.S.); Class G: 1, K. Holt; 2, B. Crookford (W.D.A.S.); 3, G. Boyall (T.D.A.S.). The club held meetings at 703 High Road, Tottenham, on the second and fourth Thursday in the month. Visitors and prospective new members are sure of a warm welcome.

MEMBERS and guests at the August meeting of the King's Lynn A.S. were given a talk and slide show by Mr. I. Sellick of the British Cichlid Association about the behaviour and evolution of South American Cichlids. Results of the Cichlid bench show were:—Rift Valley: 1, M. Laws; 2, R. Warner; 3 and 4, T. Joyce. Others: 1, M. Laws; 2 and 3, R. Warner; 4, T. Joyce. M. Laws was awarded the monthly trophy for most points. Anyone interested in fish is very welcome to come along to meetings held 7.45 p.m. at the North Star public house, North Lynn, King's Lynn or contact club secretary Mrs. S. George, 29 Peppers Green, King's Lynn. Tel: 671610.

THE first meeting in July of the Walthamstow and District A.S. was the Annual Auction where surplus fish and plants, etc. were sold to boost club funds. At the second meeting members and guests listened to a lecture given by Mr. F. Vickers of the East London A.S. on Discus. New members are always welcome.

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SOME first class lectures have been enjoyed by the **Catfish Association of Great Britain** at recent meetings. These have included the identification of catfishes for showing purposes, breeding successes with *Hemlosterium thoracatum* and general information items on blind cave fishes and corydoras. All lectures were supported with some excellent slides.

Anyone interested in joining would be welcome to come along to one of the meetings at St. Saviours Church Hall, Cobbold Road, London W.12, or should write to the secretary, Mr. A. Haley, 19 Maclean Road, S123. The next meeting will be on Monday, 14th November.

THERE were 582 entries at the **Scarborough and District A.S.** open show in July and the Best Fish in Show was a *Pimeleodella pictus* owned by H. Thorpe of Doncaster. Other results were:—Guppy: 1, Mr. and Mrs. Daines (Doncaster); 2, Mr. and Mrs. Riley (Castleford); 3, J. and S. Greenwood (Swillington). Molly: 1, Mr. and Mrs. Ellicker (Scarborough); 2, B. Jackson (Doncaster); 3, Mr. and Mrs. D. Willey (Scarborough). Swordtail: 1, M. Jordan (Bridlington); 2, Mr. and Mrs. B. Roberts (Doncaster); 3, Mr. and Mrs. Millington (Sheffield). Platy: 1, A. and P. Barker (York and District); 2, I. F. Hawdon (Grimsby and Cleethorpe); 3, D. and W. Jordan (South Humberside). A.O.V. Livebearer: 1, B. Jackson (Doncaster); 2, W. Blundell (Doncaster); 3, J. Duffell (Redcar). Small Characin: 1, Mr. and Mrs. Millington (Sheffield); 2, Mr. and Mrs. D. Willey (Scarborough); 3, G. Flinton (Scarborough). Large Characin: 1, E. Kilvington (Doncaster); 2, B. Jackson (Doncaster); 3, R. Hulbert (Scarborough). Small Barbs: 1, M. Jordan (Bridlington); 2, P. Camfield (Castleford); 3, D. and D. Forbes (Whitby). Large Barbs: 1, M. Jordan (Bridlington); 2, Mr. and Mrs. B. Roberts (Doncaster); 3, I. Taylor (Bridlington). Rasboras, Danio and Minnow: 1 and 2, A. Piggott (Grimsby and Cleethorpe); 3, Mr. and Mrs. R. Lake (South Humberside). E.L.T.C.: 1 and 3, A. Clayton (Immingham); 2, Mr. and Mrs. J. Fletcher (Doncaster). Angels: A. and P. Barker (York and District); 2, G. Martimer (Bridlington); 3, Mr. and Mrs. J. Chadwick (Castleford). Dwarf Cichlid: 1, Mrs. B. Bee (Grimsby and Cleethorpe); 2, Mr. and Mrs. S. Copley (Doncaster); 3, B. Jackson (Doncaster). Large Cichlid: 1, S. Hay (Hartlepool); 2, Master R. Smith (York and District); 3, Mrs. B. Bee (Grimsby and Cleethorpe). Rift Valley Cichlid: 1, I. Taylor (Bridlington); 2, M. Price (Castleford); 3, H. Garthwaite (Hartlepool). Small Anabantid: 1, Mr. and Mrs. E. Milne (Doncaster); 2, A. Clayton (Immingham); 3, Mrs. B. Bee (Grimsby and Cleethorpe). Large Anabantid: 1, W. Blundell (Doncaster); 2, A. and P. Barker (York and District); 3, M. Jordan (Bridlington). Fighters: 1, R. Turner (Thorne); 2, Mr. and Mrs. B. Roberts (Doncaster); 3, J. and S. Greenwood (Swillington). Corydoras and Brochis: 1, Mr. and Mrs. J. Riley (Castleford); 2, T. Smith (Bridlington); 3, C. Carrick (Castleford). A.O.V. Catfish: 1, H. Thorpe (Doncaster); 2, D. and W. Jordan (South Humberside); 3, C. Carrick (Castleford). Loaches and Bettas: 1, P. Camfield (Castleford); 2, Mr. and Mrs. R. Lake (South Humberside); 3, Mr. and Mrs. J. Riley (Castleford). Sharks and Foxes: 1, T. Sanderson (Thorne); 2, H. Thorpe (Doncaster); 3, G. Flinton (Scarborough). A.O.V. Tropical: 1, Mr. and Mrs. D. Caldwell (Scunthorpe Museum); 2, Pete and Sylvia (Bridlington); 3, Mr. and Mrs. Copley (Doncaster). Breeders Livebearers (A-B): 1, Mr. and Mrs. Millington (Sheffield); 2, Mr. and Mrs. F. Richardson (Scarborough); 3, M. Jordan (Bridlington). Breeders Livebearers (C-D): 1, S. Harrison (Grimsby and Cleethorpe). Breeders Egglayers (A-B): 1 and 2, A. Banks (Thorne); 3, M. Jordan (Bridlington). Breeders Egglayers (C-D): 1, A. Banks (Thorne); 2, A. Piggott (Grimsby and Cleethorpe); 3, Mr. and Mrs. J. Chadwick (Castleford). Pairs (Livebearers): 1, Mr. and Mrs. J. Riley (Castleford); 2, Master J. Millington (Sheffield); 3, W. Blundell (Doncaster). Pairs (Egglayers):

1, Mr. and Mrs. S. Copley (Doncaster); 2, Mr. and Mrs. R. Lake (South Humberside); 3, C. Carrick (Castleford). Female Egglayers: 1, Mr. and Mrs. F. Richardson (Scarborough); 2, A. Clayton (Immingham); 3, W. Sowerby (Scarborough). Female Livebearers: 1, Mr. and Mrs. Millington (Sheffield); 2, W. Blundell (Doncaster); 3, Mr. and Mrs. L. Daines (Doncaster). Goldfish and Comets: 1, Master R. Taylor (Scarborough). Fancy Goldfish: 1, and 3, A. and T. Walker (Hull); 2, K. and M. Wood (Bridlington). A.O.V. Coldwater: 1, Pete and Sylvia (Bridlington); 2, K. and M. Wood (Bridlington); 3, Mr. and Mrs. J. Riley (Castleford). Junior Any Variety: 1, Master J. Millington (Sheffield); 2, Masters D. and W. Jordan (South Humberside); 3, Master C. Hay (Hartlepool).

EIGHT societies were present at the third assembly of 1977 of the **Cymru National Aquarist Association**. These were Aberdare, Blaenau Gwent, Cardiff, Llanswit Major, Merthyr Tydfil, Port Talbot, Prescilli and Swansea. The chairman opened the meeting with wishing Mr. A. Payne a speedy recovery after his recent illness and by thanking Mr. J. Taylor for his services. He is resigning through ill health. The main subject of the evening was that through lack of progress the 1977 C.N.A.A. Show will be cancelled this year and the next show will be in 1978.

MEMBERS of the **Goldfish Society of Great Britain** heard Mr. A. Lursarf at the July meeting tell about the experience gained over the past four years, breeding and raising Calico Pearl Scales. He said that after he had decided to keep only Calico Pearl Scales, he had built up his strain of fish using imported stock that was over finned with bad body shapes. But with careful selection and crossing, he now had the basis of a good strain. The opinion from the members on the baby Pearl Scales that he brought along, was good with the fish showing good colouration and pearling. Mr. A. Lawman projected some slides that he had taken at the Ichiban Rancho Society first show held last October at the home of three president Mr. J. Davison.

The table show for Twin Tailed Goldfish bred in 1976 was well supported with over thirty entries. Class winners were as follows:—Veiltails: J. Linnale. Oranda: A. Lawman. Pearl Scales: A. Lursarf. Globe Eyes: Mrs. M. Dudley.

THERE was a good entry for the **Fancy Guppy N. West Lanes, Manchester Section Open Show**, and from Austria and Germany there were 32 entries. The details are as follows: Best in Show: H. Baldwin. Best Male: H. Baldwin. Best Female: Dr. Tritta. Best Juniors: C. Parkinson. Class results: Delta: 1, H. Baldwin; 2, G. Tisham; 3, Mr. Strachbein. L.D.V.: 1, B. Morris. S.D.V.: 1, J. C. Hutchings; 2, B. Morris. Topsword: 1, D. Summers. Bottomsword: 1 and 3, I. Matthews; 2, K. Liedl. Doubleword: 1, J. Collinze; 2, M. Kahler; 3, J. Hutchings. Colour Male: 1, B. Morris; 2, H. Baldwin. Coter Male: 1, M. Kahler. Dove Tail: 1, I. Matthews. Lyre Tail: 1 and 2, J. Hutchings; 3, Mr. Iestrabek. Natural Tail: 1, Dr. Tritta; 2 and 3, J. Hutchings. Colour Female: 1, B. Morris. Breeders (Males): 1, D. Summers. Breeders (Females): 1, J. Hutchings. Junior (Male): 1 and 3, C. Parkinson; 2, M. Doyle. Junior (Female): 1, Miss K. Matthews. Ladies: 1, Mrs. Oldcorn; 2, Mrs. Pittes.

AT the July meeting of the **Nailsea and District A.S.** Mr. M. Ellick gave a short talk on the difference between saltwater and freshwater fish. The election of the show committee for the 1978 open show was held; show manager, W. Holland; show secretary, P. Fitchett; 2 Woodlands Road, Nailsea. A table show was also held, the results of which were:—Danio and Rasboras: Open: 1, B. Billinger; 2 and 3, D. Kenwood. Novice: 1 and 3, B. Billinger; 2, C. Beeser. A.O.V. Labyrinth: Open: 1, P. Williams; 2, P. Fitchett; 3, M. Bywater. Novice: 1 and 3, J. Williams; 2, B. Billinger.

RESULTS for Romford and Becontree A.S.

Open Show held in July were as follows:—Class Ad: 1, T. Waller (East London); 2 and 3, F. Victory (Romford and Becontree); 4, Miss M. Lambert (Romford and Becontree). Class B: 1, 2 and 4, G. Steptowe (Romford and Becontree); 3, J. Carney (Romford and Becontree). Class C: 1, D. Dale (Bethnal Green); 2, T. Woolley (Saracens); 3 and 4, D. Byfield (Romford and Becontree). Class D: 1, D. Byfield (Romford and Becontree); 2, G. Steptowe (Romford and Becontree); 3, P. Lambert (Romford and Becontree); 4, R. Jones (Romford and Becontree). Class E: 1, R. Davis (S.L.A.D.A.S.); 2 and 4, S. Melbourne (Romford and Becontree); 3, D. Byfield (Romford and Becontree). Class F: 1, J. Risk (Romford and Becontree); 2 and 3, T. Allen (Romford and Becontree); 4, D. Byfield (Romford and Becontree). Class G: 1, T. Woolley (Saracens); 2, P. Lambert (Romford and Becontree); 3 and 4, R. Jones (Romford and Becontree). Class H: 1, T. Woolley (Saracens); 2 and 3, R. Jones (Romford and Becontree); 4, E. Ward (Romford and Becontree). Class I: 1, 3 and 4, D. Byfield (Romford and Becontree); 2, R. Argent (East London). Class K: 1, E. Ward (Romford and Becontree); 2, D. Byfield (Romford and Becontree); 3 and 4, G. Steptowe (Romford and Becontree). Class L: 1, J. Carney (Romford and Becontree); 2, A. Noronha (Orpington); 3 and 4, P. Hines (Romford and Becontree). Class M: 1, D. Byfield (Romford and Becontree); 2, J. Carney (Romford and Becontree); 3 and 4, J. Risk (Romford and Becontree). Class N: 1 and 2, T. Woolley (Saracens); 3, H. Crookford (Walthamstow); 4, D. Byfield (Romford and Becontree). Class O: 1 and 3, A. Noronha (Orpington); 2, T. Allen (Romford and Becontree); 4, T. Woolley (Saracens). Class O: 1, T. Woolley (Saracens); 2, P. Doe (Ilford); 3 and 4, J. Carney (Romford and Becontree). Class P: 1, J. Carney (Romford and Becontree); 2, T. Woolley (Saracens); 3, E. Ward (Romford and Becontree); 4, A. Noronha (Orpington). Class Q: 1, E. Ward (Romford and Becontree); 2, G. Crosby (Ilford); 3, G. Steptowe (Romford and Becontree); 4, P. Lambert (Romford and Becontree). Class R: 1, D. Byfield (Romford and Becontree); 2 and 3, A. Noronha (Orpington); 4, G. Crosby (Ilford). Class S: 1 and 4, J. Carney (Romford and Becontree); 2, T. Woolley (Saracens); 3, P. Doe (Ilford). Class T: 1, 2 and 3, A. Noronha (Orpington); 4, D. Byfield (Romford and Becontree). Class U: 1, Mrs. S. Hedges (Bethnal Green); 2, R. Woolley (Saracens). Class W: 1, Mrs. S. Hedges (Bethnal Green) (Best in Show); 2, J. Brown (Bethnal Green). Class X: 1 and 2, R. Argent (East London); 3, G. Steptowe (Romford and Becontree). Class Y: 1, 3 and 4, A. Noronha (Orpington); 2, T. Waller (East London). Class Z: 1, Mrs. S. Hedges (Bethnal Green); 2, G. Steptowe (Romford and Becontree); 3, D. Dale (Bethnal Green); 4, D. Byfield (Romford and Becontree). Junior Tropical: 1, Master R. Woolley (Saracens); 2, Master K. Lambert (Romford and Becontree); 3, Master K. Argent (East London); 4, Master A. Waller (East London). Junior Coldwater: 1, Miss T. Vincent (Independent); 2, Miss K. Jones (Romford and Becontree); 3, Miss C. Staines (Independent); 4, Master A. Waller (East London). Club Points: Romford and Becontree 140; Orpington 38; Saracens 36; East London 35; Bethnal Green 21; Ilford 12; S.L.A.D.A.S. 4; Walthamstow 2.

THERE were 464 entries benched at **South East London A.S.** Second Open Show in July and the Best Fish in Show award went to M. Dore of Reading for a *Nannostomus eques*. Results: Class BA: 1 and 2, G. Greenhalf (Beckevesth); 3, G. Owen (Orpington); 4,

 **A TABLET
A DAY, SENDS
WHITE SPOT AWAY**
Hillside Aquatics London N12

1. M. Edwards (Thames). Class B: 1. Mr. and Mrs. C. Brook (S.E.L.A.S.); 2. D. P. Ingle (Chingford); 3. J. M. Edwards (Thames); 4. Mrs. A. Greenhalf (Bexleyheath). Class CA: 1. and 2. A. J. Feast (Tonbridge); 3. Mr. Valverde (Chingford); 4. T. Woolley (Saracens). Class CB: 1. M. Dore (Reading); 2. and 3. Mrs. V. A. Feast (Tonbridge); 4. J. Walker (S.E.L.A.S.). Class C: 1. and 4. T. Woolley (Saracens); 2. Mr. Hughes (Rochampton); 3. Mrs. M. Netherell (Riverside). Class DA: 1. 2. and 3. C. and D. Finnis (Strood). Class DB: 1. Mr. and Mrs. C. Brook (S.E.L.A.S.); 2. and 3. R. C. Smith (Southend); 4. T. Johnson (Folkestone). Class DC: 1. T. Johnson (Folkestone); 2. T. A. King (North Kent); 3. T. Woolley (Saracens); 4. B. Barford (Saracens). Class D: 1. Mrs. M. Netherell (Riverside); 2. T. Ramshaw (Brighton); 3. Mr. Payne (S.E.L.A.S.); 4. Mr. and Mrs. C. Curtis (North Wilt). Class EA: 1. D. North (Corringham); 2. T. Woolley (Saracens); 3. A. Bradnam (Tonbridge); 4. T. Ramshaw (Brighton). Class E: 1. C. and D. Finnis (Strood); 2. Mrs. M. Netherell (Riverside); 3. Mr. and Mrs. C. Brook (S.E.L.A.S.); 4. T. Ramshaw (Brighton). Class F: 1. Mr. and Mrs. C. Pannell (Hastings); 2. D. Cheswright (Southend); 3. C. Cheswright (Southend); 4. I. P. Hooper (Folkestone). Class G: 1. Mrs. M. Netherell (Riverside); 2. Mr. and Mrs. C. Brook (S.E.L.A.S.); 3. T. Woolley (Saracens); 4. G. Greenhalf (Bexleyheath). Class H: 1. Mrs. M. Netherell (Riverside); 2. T. Woolley (Saracens); 3. C. and D. Finnis (Strood); 4. W. R. Dale (Bethnal Green). Class I: 1. J. M. Edwards (Thames); 2. Mrs. D. Winder (East Dulwich); 3. Mrs. A. Greenhalf (Bexleyheath); 4. D. P. Ingle (Chingford). Class K: 1. and 3. B. Barford (Saracens); 2. Mrs. A. Greenhalf (Bexleyheath); 4. T. Ramshaw (Brighton). Class L: 1. A. J. Feast (Tonbridge); 2. Mrs. P. Hunter (North Kent); 3. D. Winder (East Dulwich); 4. S. Jeffery (S.E.L.A.S.). Class MA: 1. T. Ramshaw (Brighton); 2. Mrs. M. Netherell (Riverside); 3. J. Walker (S.E.L.A.S.); 4. Mr. and Mrs. C. Pannell (Hastings). Class M: 1. Mrs. M. Netherell (Riverside); 2. G. Greenhalf (Bexleyheath); 3. Mrs. D. Winder (East Dulwich); 4. A. J. Feast (Tonbridge). Class NB-M: 1. T. Ramshaw (Brighton); 2. A. E. Noronha (Orpington); 3. Mr. and Mrs. C. Brook (S.E.L.A.S.); 4. J. Walker (S.E.L.A.S.). Class NO-T: 1. 2. and 3. A. E. Noronha (Orpington); 4. D. Winder (East Dulwich). Class O: 1. and 2. D. North (Corringham); 3. N. Raven (Bexleyheath); 4. C. and D. Finnis (Strood). Class P: 1. and 2. C. and D. Finnis (Strood); 3. T. Woolley (Saracens); 4. D. North (Corringham). Class Q: 1. A. Bradnam (Tonbridge); 2. A. C. Smith (Southend); 3. C. and D. Finnis (Strood); 4. R. Collier (North Wilt). Class R: 1. 2. and 3. C. and D. Finnis (Strood); 4. T. Amos (Bexleyheath). Class S: 1. T. Ramshaw (Brighton); 2. Mrs. P. Edwards (Thames); 3. C. and D. Finnis (Strood); 4. R. and J. Bridle (Brighton). Class T: 1. 2. and 3. A. E. Noronha (Orpington); 4. D. M. Cheswright (Southend). Class U: 1. D. M. Cheswright (Southend); 2. Mrs. S. Hedges (Bethnal Green); 3. B. Fry (Bexleyheath); 4. R. C. Smith (Southend). Class V: 1. Mr. Hughes (Rochampton); 2. B. Fry (Bexleyheath); 3. M. Traynor (Folkestone); 4. T. J. Aquith (S.E.L.A.S.). Class W: 1. Mrs. S. Hedges (Bethnal Green); 2. and 3. B. Barford (Saracens); 4. Mr. Hughes (Rochampton). Class XB-M: 1. Mr. Argent (E.L.A.P.); 2. Mr. Roger (Independent); 3. C. Hunter (North Kent); 4. G. Owen (Orpington). Class XO-T: 1. 2. 3. and 4. A. E. Noronha (Orpington). Class Z: 1. D. Shea (Chingford); 2. Judith Owen (Orpington); 3. D. M. Cheswright (Southend); 4. Mrs. S. Hedges (Bethnal Green). S.E.L.A.S. would like to thank everyone who attended for their help and support for making the show a success. The open show for next year, 1978, will be on 16th July.

THE open show results of the **Stretford and District A.S.** held in August were as follows: Guppies: 1. Mr. and Mrs. Greenhall (Leigh); 2. J. Marsh (Longridge); 3. Mr. and Mrs. Dawson (Heywood). Platies: 1. and 3. Mr. and Mrs. Durham (Longridge); 2. E. Jones

(Leigh). Molliés: 1. and 3. S. Hornby (Leigh); 2. J. Ambrose (Atlantis). A.O.V. Livebearers: 1. 2. and 3. Mr. and Mrs. Durham (Longridge). Swordtails: 1. J. Doody (Darwen); 2. Mr. and Mrs. Holden (Longridge); 3. D. Trent (Stretford). Large Cichlids: 1. G. Douglas (Darwen); 2. P. Taylor (Atlantis); 3. S. Andrews (Stretford). Small Cichlids: 1. J. Haley (Darwen); 2. N. Stevenson (Osram); 3. P. Oldcorn (Blackburn). Angels: 1. P. Durnam (Longridge); 2. N. Stevenson (Osram); 3. L. Evans (Stretford). Rift Valley: 1. R. Boardman (Leigh); 2. A. Cardwell (Darwen); 3. W. Brannon (Independent). Large Anabantids: 1. Mr. and Mrs. McCarthy (St. Helens); 2. B. Davies (Stretford); 3. I. and Mrs. Lyons (Longridge). Small Anabantids: 1. R. O'Connell (Osram); 2. Mr. and Mrs. McCarthy (St. Helens); 3. E. Jones (Leigh). Fighters: 1. and 3. R. Clay (Longridge); 2. R. O'Connell (Osram). Large Characins: 1. N. Stevenson (Osram); 2. A. Sweet (Darwen); 3. P. Taylor (Atlantis). Small Characins: 1. N. Stevenson (Osram); 2. J. Haley (Darwen); 3. E. Jones (Leigh). Large Barbs: 1. J. and H. Price (Stretford); 2. P. Oldcorn (Blackburn); 3. S. Hornby (Leigh). Small Barbs: 1. N. Stevenson (Osram); 2. K. Boardman (Leigh); 3. J. Doody (Darwen). Rasboras: 1. and 2. A. Sweet (Darwen); 3. E. Parkinson (Longridge). Danios: 1. Mr. and Mrs. Lyons (Longridge); 2. and 3. I. Brown (Stretford). A.O.V. Tropical: 1. J. and H. Price (Stretford); 2. J. Marsh (Longridge); 3. Mr. and Mrs. Greenhall (Leigh). Labors and Sharks: 1. Mr. and Mrs. Dawson (Heywood). Flying Foxes: 1. Mr. and Mrs. Dawson (Heywood); 2. K. O'Connell (Osram); 3. I. Brown (Stretford). Corydoras and Brochis: 1. and 2. P. Taylor (Atlantis); 3. I. Brown (Stretford). Loaches: 1. J. Gonzalez (Leigh); 2. R. Prescott (Atlantis); 3. J. Ambrose (Atlantis). A.O.V. Catfish: 1. Mr. and Mrs. McCarthy (St. Helens); 2. R. O'Connell (Osram); 3. P. Taylor (Atlantis). Pairs (Egglayers): 1. and 3. Mr. and Mrs. McCarthy (St. Helens); 2. W. Brannon (Independent). Pairs (Livebearers): 1. Mr. and Mrs. Greenhall (Leigh); 2. Mr. and Mrs. Holden (Longridge); 3. Mr. and Mrs. Holden (Longridge). Breeders Egglayers (1-5): 1. E. Jones (Leigh); 2. S. Andrews (Stretford). Breeders Egglayers (6-10): 1. E. Jones (Leigh); 2. J. Noone (Leigh); 3. A. Carrer (Stretford). Breeders Egglayers (11-15): 1. and 3. J. Noone (Leigh); 2. B. Jones (Leigh). Breeders Livebearers C and D: 1. Mr. and Mrs. Holden (Longridge); 2. Mr. and Mrs. Greenhall (Leigh); 3. Mr. and Mrs. (Longridge). Juniors: 1. and 3. P. Taylor (Atlantis); 2. E. Parkinson (Longridge). Killies: 1. and 3. J. Noone (Leigh); 2. K. O'Connell (Osram). Ladies: 1. and 2. P. Taylor (Atlantis); 3. S. Andrews (Stretford). Marine Tropical: 1. I. Canon (Longridge); 2. S. Hornby (Leigh); 3. P. Harris (Oldham). Common Goldfish and Comets: 1. J. Garside (Stretford). A.O.V. Fancy Goldwater: 1. L. Evans (Stretford); 2. P. Taylor (Atlantis); 3. S. Andrews (Stretford). A.O.V. European Goldwater: 1. J. Ambrose (Atlantis). Muni Jars: 1. 2. and 3. N. Stevenson (Osram). Best Fish in Show: Mr. and Mrs. B. Dawson (Heywood) (Tricolour shark).

THE Livebearer only open show staged by **Basingstoke A.S.** attracted aquarists from many parts of England including a group from South Shields A.S. down for the weekend, and a carload of Newcastle G. and L.S. members on a day trip. The exhibits totalled 270 and included many unusual species with the majority being of a high quality.

The class winners were: Guppy (O): 1. P. Baker (Basingstoke); 2. F. Cripps (Newbury); 3. S. Spicer (Southend). Guppy (O): 1. 2. and 3. W. Croxford (F.G.B.S.). Guppy (P): 1. 2. and 3. C. and D. Finnis (Strood). Swords (O): 1. K. Rayner (Newbury); 2. R. Canning (Newbury); 3. M. Strance (Basingstoke). Swords (Q): 1. C. and D. Finnis (Strood); 2. D. Cruickshank (Ealing); 3. S. Pitcher (Salisbury). Platy (R): 1. D. Cruickshank (Ealing); 2. and 3. C. and D. Finnis (Strood). Platy (B): 1. B. Sayers (Brighton); 2. and 3. C. and D. Finnis (Strood). Molliés (S): 1. and 2. J. Smith (Brighton); 3. G. Liddle (South

Shields). Molliés (Sb): 1. R. Canning (Newbury); 2. D. Cruickshank (Ealing); 3. A. Chaplin (Basingstoke). Brachyrrhaphis (T): 1. T. Fraser (Basingstoke); 2. and 3. A. Noronha (Orpington). Belonesox (Tb): 1. T. Fraser (Basingstoke); 2. W. West (Salisbury); 3. A. Noronha (Orpington). Gambusia (Tc): 1. D. Cruickshank (Ealing); 2. D. and J. Renton (Newcastle); 3. A. Noronha (Orpington). Gooder (Td): 1. D. Cheswright (Southend); 2. D. and J. Renton (Newcastle); 3. T. Driver (Norwich). Heterandria (Te): 1. and 2. A. Noronha (Orpington); 3. K. Dryden (Croydon). Phallochthys (Tf): 1. M. Strance (Basingstoke); 2. J. Jackson (Basingstoke); 3. A. Noronha (Orpington). Limia (Tg): 1. and 2. T. Fraser (Basingstoke); 3. D. Cheswright (Southend). Priapella (Th): 1. and 2. A. Noronha (Orpington); 3. C. Howe (Newbury). X. Milleri (Tj): 1. and 2. M. Mansbridge (Southampton); 3. A. Weare (Southampton). Pairs (Ns): 1. R. Houghton (Brighton); 2. A. Noronha (Orpington); 3. F. May (Basingstoke). Pairs (No): 1. and 2. A. Noronha (Orpington); 3. D. Cheswright (Southend). Breeders (Xo): 1. F. Cripps (Newbury); 2. R. Paine (Basingstoke); 3. F. May (Basingstoke). Breeders (Xt): 1. and 2. A. Noronha (Orpington); 3. D. Cheswright (Southend). The Furnished Aquarium was won by Mrs. G. Rushbrooke (Reading). A. Noronha won both the Individual and Society Highest Points trophies. J. Smith of Brighton won the F.B.A.S. Championship Trophy, and T. Fraser won Best Fish in Show awards, including the Aquarist Gold Pin.

Recently Basingstoke A.S. had talks with slides by L. Harris of the B.I.S. on Our Native Fishes and by A. Harnsworth on the subject of Loch Ness Animals. Both meetings were well attended and the talks were of great interest to the members.

OBITUARY

Members of the **Hounslow and District A.S.** and fellow aquarists from other societies in the London area, heard with regret the news of the death of Mr. Hubert Pratt on Friday, 26th August. Known to his many friends as Bert he was a founder member of the Hounslow A.S. and a popular follower of the fishkeeping hobby and his 27 years' experience of keeping and showing fish benefited many newcomers to the hobby with his sound advice and practical help. His services to the Society will be greatly missed as he held various positions on the committee from chairman to P.R.O. and for many years held the position of show secretary, this duty taking him to many shows run by other societies around Southern England, where he became good friends with fellow aquarists. He will be sadly missed by all who knew and respected him.

AQUARIST CALENDAR

1st October: The Ichiban Ranchu Society National Ranchu Open Show, Seymour Hall, Seymour Place, Westminster, S.A.E. for schedule to Mr. F. Hilton, 5 Woolmers Mead, Pleshey (Show Secretary) or ring for details Bishops Stortford 870395. There will be six classes, with engraved cups for 1st, 2nd and 3rd, plus Award Cards and Specials.

2nd October: Iboracum A.S. Open Show at Nunthorpe Grammar School, Scarcroft Road, York. Benching 10 a.m.-2 p.m.

2nd October: David Brown A.S. First Open Show, to be held at Paddock Village Hall Church Street, Paddock, Nr. Huddersfield. There will be 32 classes, in 12 sections. For further details send S.A.E. to A. G. Copp, 41 Keldregate, Bradley, Huddersfield, West Yorkshire.

2nd October: Ealing and District A.S. Open Show. Venue to be announced.

2nd October: Newbury and District A.S. Open Show to be held at the Corn Exchange, Newbury, Berkshire. Show Secretary, Mrs. Shirley Canning, 6 South End, Cold Ash, Newbury, Berkshire. Tel: Thatcham (0635) 64254.

8th October: Goldfish Society Great Britain Open Show to be held at Raynes Park, Wimbledon. Show schedules available from Mr. G. Herring, 94 Penwith Road, London S.W.18.

9th October: A.A. Jones and Shipman Aquarist and Pond Society's Second Open Show. 5p entry, trade stands, exhibitions etc. Schedules will be available from M. D. Brambridge, c/o A.A. Jones and Shipman Ltd., Narborough Road South, Leicester in July.

9th October: Hartlepool A.S. Open Show: Longcar Hall, Seaton Carew, Hartlepool. Details from Show Secretary, A. West, 30 Wharton Tce, Hartlepool.

9th October: Morecambe Bay A.S. Open Show, to be held at the Lower Ashton Hall, Town Hall, Lancaster.

15th October: East London Aquarist & Pondkeepers Association Annual Open Breeders Show, at Ripple Road School, Ripple Road, Barking, Essex. Schedules available from T. Waller, 1 Scarsholt Road, Barking, Essex.

16th October: North Wilts A.S. First Open Show to be held at the Mechanic's Institute, Emslyn Square Swindon Wilts. Schedules from Q. Curtis, 80 Beech Avenue, Pinhurst, Swindon Wilts. Tel: Swindon 32920.

16th October: South Leeds A.S. Open Show, to be held at Hunslet Boys Club, Hillidge Road, Leeds 10. Booking 12.00-2.00 p.m. Schedules from Mr. A. Autwick, 151 Throstle Road, Middleton, Leeds LS10 4HH.

20th, 21st, 22nd October: Scottish Aquarium Society "Golden Jubilee Show" to be held at McLellan Galleries, Sauchiehall Street, Glasgow. Schedules available from W. Hamilton, 18 Dunne Street, Paisley, Renfrewshire.

22nd 23rd October: British Aquarists' Festival Belle Vue Zoological Gardens, Manchester.

23rd October: Torbay A.S. Open Show at the Torbay Chalet Hotel, Marldon, Paignton. Details from J. Davis, 23 Haldon Road, Torquay.

23rd October: Huddersfield T.P.S. **29th-30th October:** The Aquarium Show, Horticultural Hall, Victoria SW1. Show schedules from Derek Lambourne, 7 Wheeler Court, Plough Road, SW11 2AX. Tel: 01-223 2630.

30th October: Doncaster and District A.S. Open Show at Carcroft Welfare Hall, Chestnut Avenue, Carcroft Nr. Doncaster Yorks. Details from Show Secretary, Mr. K. Lancashire, 20 Symes Gardens, Cantley, Doncaster.

6th November: Halifax A.S. Open Show at the Forest Cottage Community Centre Cousin Lane, Illingworth, Halifax. Schedules sent only on request. S.A.E. to: D. Shields "Cobblestones" Gainest, King Cross, Halifax, HX2 7DT, or Ring for details Halifax, 60116.

6th November: Blackburn Aquarist Waterlife Society Open Show. Venue at a later date. Secretary, Mrs. Jean Wolstenholme, 39 George Street, Great Harwood, nr. Blackburn BB6 7JE.

13th November: Bradford and District A.S. Open Show at Textile Hall, Westgate, Bradford. Details are available from the show secretary, J. Cornforth, 15 Weymouth Avenue, Allerton, Bradford. Telephone: Bradford 493165.

19th November: Goldfish Society of Great Britain, General Meeting, 2.30 p.m., Small Hall, Conway Hall, Red Lion Square, Holborn, London, WC2.

20th November: Northallerton and District A.S. first Open Show to be held at the Community Centre, Northallerton. Schedules available later.

20th November: Northallerton & District A.S. First Open Show at Community Centre, Bullamore Road, Northallerton. Send s.a.e. for schedule to: Mr. B. Hood, 3 Castle Hills, Northallerton, N. Yorks DL7 4TP.

20th November: Association of Southern Aquarist Societies Convention at Mallin Road Community Centre, Portsmouth, starting at 11 a.m. Talks by the Cichlid Society and Characin Study Group. Price 25p. Tickets from G. A. Edwards, 4 Hilbert Way, Bournemouth BH10 4EL. S.A.E. please.

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