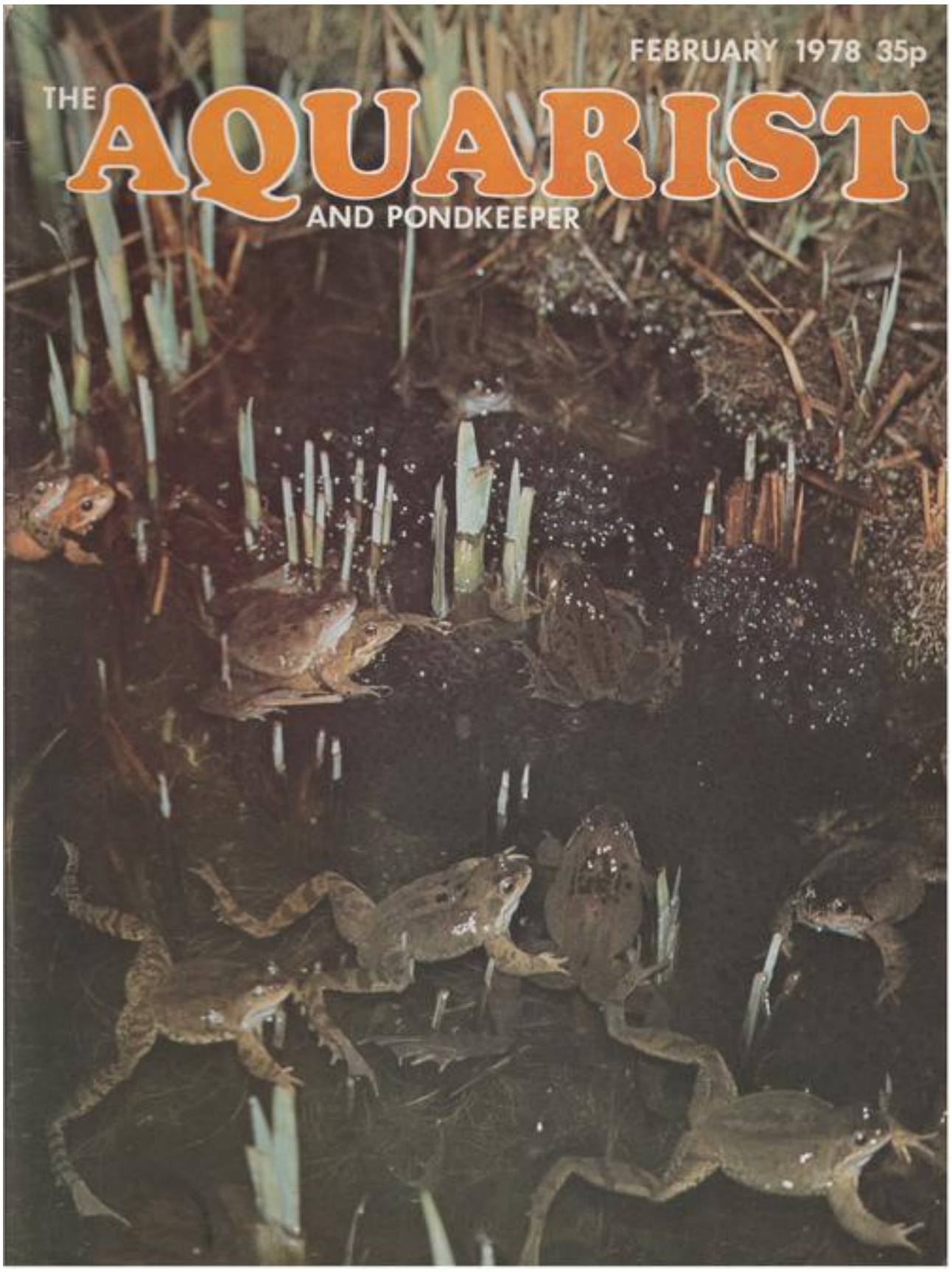
FEBRUARY 1978 35p

THE AQUARIST AND PONDKEEPER



THE AQUARIST AND PONDKEEPER

The Aquatic Magazine with the Largest Circulation in Great Britain

Published Monthly 35p

Contents

Printed by Buckley Press
The Butts, Half Acre,
Brentford, Middlesex.
Telephone: 01-568 8441

Subscription Rates:
The Aquarist will be sent by post for one year to any address for £6·00. Airmail quoted on request.

MSS, or prints unaccompanied by a stamped addressed envelope cannot be returned and no responsibility is accepted for contributions submitted.

Founded 1924
as "The Amateur Aquarist"
Vol. XLII No. 11, 1978

Editor: Laurence E. Perkins
Advertisement Manager:
J. E. Young

Our Cover:
Common Frogs and their Spawn in a Garden Pond.

LOW TEMPERATURE WARNING SYSTEM FOR AQUARIA

Written & Illustrated by C. N. Melton

Introduction

The failure of a heater or thermostat and the consequent fall of tank temperature can lead to serious losses unless detected in sufficient time to permit effective remedial action.

Fortunately, water temperature indoors usually falls very slowly, but it is this feature in itself which prevents a ready indication of a heating failure and, of course, the situation is made worse should the failure occur overnight. It would, therefore, seem worthwhile to consider the provision of some form of warning device to give both audible and visual indication of low temperature, especially in view of the present day cost of fish which seems to be rising at the same rate as most other things.

There does not seem to be any reasonably priced equipment of this type available on the market at present and the following suggestions are, therefore, presented for consideration and comment. In each case approximate costs, for materials only, have been included based on retail prices ruling at October 1977.

1. Using standard bi-metal thermostat

It would seem to be feasible to employ a thermostat of this type adjusted to close at low setting (say, 71°F), and arranged to switch on a small indicator lamp and buzzer. These items could be mounted on a small case large enough to accommodate a small battery (about 3 volts) or preferably a small mains power unit. The estimated cost for such a system is £5·45 if battery operated or £7·75 for mains operation.

Disadvantages of this system are that this type of thermostat usually requires a fairly wide range of temperature over which to operate, and if of the immersion type is rather difficult to adjust accurately. The external type of thermostat would obviate some of the difficulty but the cost would be rather higher, e.g. £8·25 for battery operation and £10·55 for mains operation.

In either case, however, it is usually necessary to wait some considerable time before the effect of any adjusted thermostat is stabilised.

2. Electronic system

This system makes use of a thermistor whose electrical resistance varies in accordance with its temperature.

The thermistor operates in conjunction with a small control unit whose general appearance is as shown in Fig. 1.

This unit comprises the following items:—

5 fixed resistors
1 adjustable potentiometer
1 operational amplifier
1 transistor for switching on or off a small indicator lamp and buzzer.

A mains power unit similar to that illustrated in Fig. 2 is essential as there is a small continuous current drain. The control unit and power unit could be accommodated in a small case, the indicator lamp and buzzer being mounted on the cover. The thermistor is, of course, external to the case and connected by a short twin lead to the terminals as shown in Fig. 1, being either enclosed in a small capsule for immersion in the aquarium or attached externally to the glass where it seems to operate quite effectively.

Setting up the equipment can be done quite easily when room temperature is around 71°F by suspending the thermistor in the atmosphere for a few minutes and adjusting the control unit potentiometer to the point that just causes the indicator lamp to light. The thermistor is then attached to the tank which, if at normal temperature of around 75°F will cause the lamp to extinguish within a very short time. Alternatively the setting can be made by attaching the thermistor to a large glass jar of water heated to the required temperature.

This system responds quite rapidly to temperature changes and since none of the parts needs to be immersed, adjustments can be made quite easily when

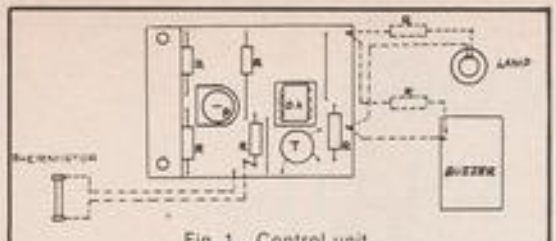


Fig. 1 Control unit.

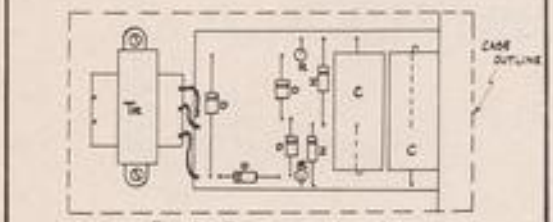


Fig. 2 Power supply unit.

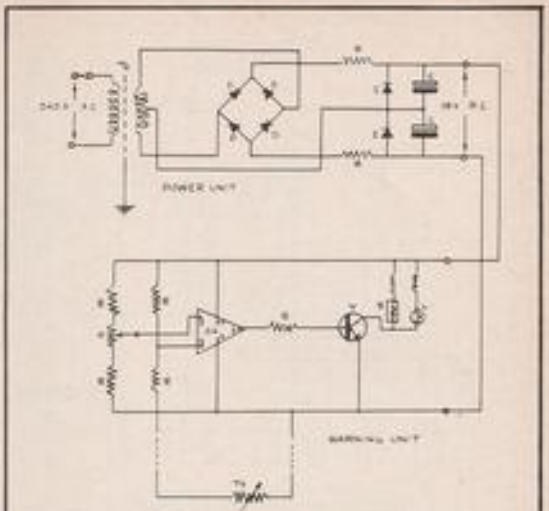


Fig. 3 Circuit diagram.

required. Its operation can be easily checked at any time by temporarily detaching the thermistor from the aquarium when room temperature is around 70° F when the indicator lamp (and buzzer) will operate quite quickly.

The estimated cost for the complete assembly including the power unit is £6·40.

A circuit diagram for the complete assembly is shown in Fig. 3.

3. Electronic control for several tanks

The greater proportion of the cost for the electronic assembly is for the mains power unit. Although this is about the smallest type which can be easily constructed, it is, nevertheless capable of providing sufficient power for operation of about 10 control units, so that if up to this number of tanks were to be fitted up it would be necessary to provide only one power unit plus a control unit for each tank. This would considerably cheapen the cost per tank but it would, of course, involve some additional wiring since each control unit would require a connection to the power unit.

4. Centralised control

The electronic system is fairly flexible and could readily be adapted to provide a low temperature warning system for a large number of tanks, as used in retail premises for example with connection diagram as shown in Fig. 4.

A control unit is required for each tank, but of a simpler type than that previously described as the transistor circuitry is omitted and the output terminal of the operational amplifier left open. All of the control units are grouped together at a convenient central location.

A selector unit, which also contains a power supply unit of adequate capacity is mounted adjacent to the control unit assembly. This selector unit comprises a circular contact plate having a contact for each tank and up to 60 contacts can be arranged on a plate 6 in. × 6 in. square. Each contact is connected to the output terminal of a control unit, and a rotating contact arm, driven by a small electric motor passes over the contacts connecting each one in turn to a switching transistor which operates a small relay of the changeover type and a buzzer.

Each tank is fitted with a thermistor, one terminal of which is connected to a common negative wire from the power unit, and the other thermistor terminal is wired back separately to its control unit at the central position.

Under normal conditions, i.e. when all tank temperatures are around the normal 75° F, no signals are received from the control units and the relay remains in the "open" position which completes the motor circuit causing the selector contact arm to rotate continuously.

If temperature falls on any tank its control unit produces a signal at the output, this signal being picked up by the selector arm when it reaches the appropriate contact and passed to the transistor, causing the relay and buzzer to operate. The operation of the relay causes a neon indicator to light up and also stops the motor so that the selector arm indicates the faulty tank, the contacts being numbered to correspond to the tanks.

These conditions will persist until action is taken to clear the faulty tank.

Additional refinements are three small manually

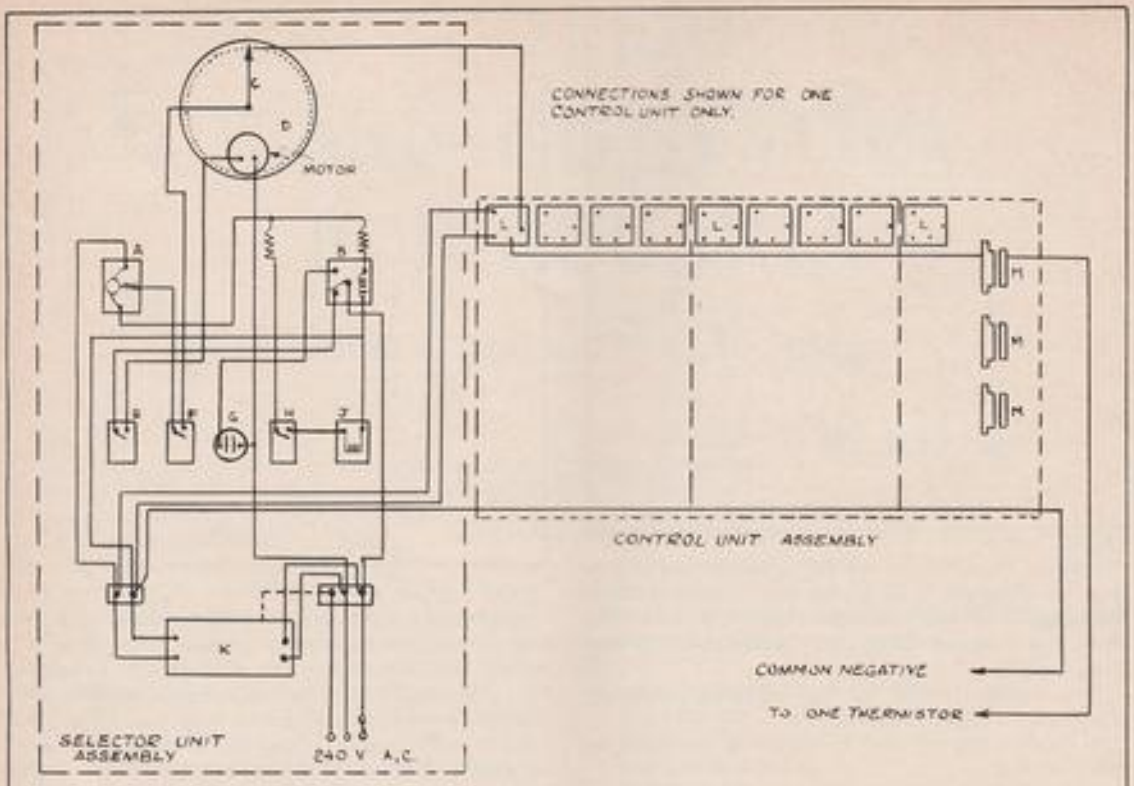


Fig. 4 Connection diagram—centralised system.

operated switches on the selector unit panel for the following purposes:—

(a) One in the buzzer circuit so that this can be silenced.
(b) One in the motor circuit to stop this at any selected position for adjustments.
(c) One in the selector arm circuit by means of which a faulty tank can be temporarily by-passed if required.

The following constructional points may be of interest:—

(a) The contact plate and rotating arm can be made from ordinary copper laminate board.
(b) The driving motor is a small geared unit of the type used in electric clocks and electricity consumption is very small. In the prototype the speed of rotation is six revolutions per hour, i.e. each tank is checked once every 10 minutes.
(c) Operating voltage is quite low at 18 volts D.C. and circulating current is also very small so that wiring cables can be of minimum capacity.

With regard to the cost of materials for this system, for a reasonably compact layout of 60 tanks this is estimated at £90 inclusive of wiring cables. The cost for smaller installations would be proportionately less.

Conclusion

The systems mentioned above are described in outline form only and it is realised that more detail would be required to enable full construction to be undertaken. This detail is, of course, available.

The estimated costs are for materials only, at retail prices, and no reference has been made to labour costs as all items are suitable for amateur construction, particularly in the case of the units for single tanks.

With a large installation, perhaps in commercial premises, labour costs might enter considerably into the picture and it would be necessary to take these, and possibly also bulk buying discounts into consideration in any cost-benefit investigation.

However, the article is presented in the hope that it may provide some interest to aquarists in general and any comment or discussion would be welcome.

FROM FOOD TO FILTRATION

A D.I.Y. CARTRIDGE MULTI-FILTER

by D. Morgan

THE FILTER may be constructed quite easily from any clear plastic food container (as used for many freeze-dried foods, etc.). The container should be clear so that the condition of the filter material can be seen at a glance.

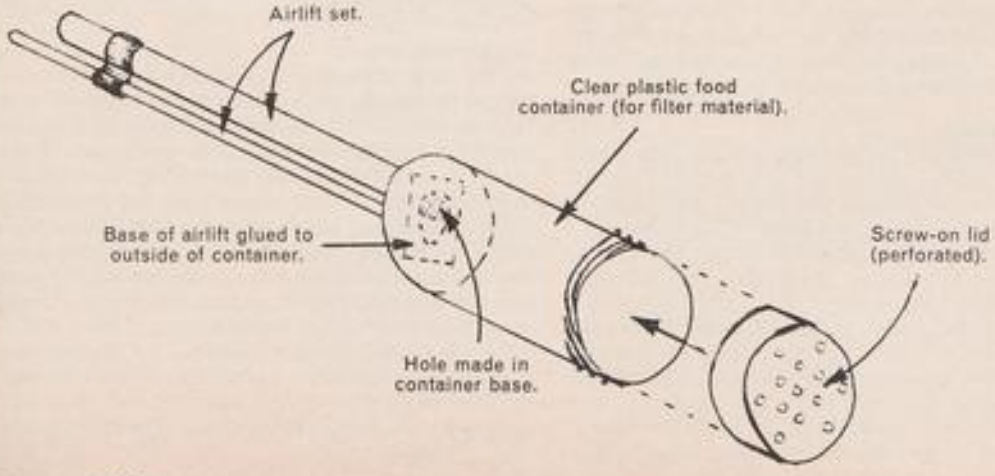
A number of holes are first made in the screw-cap (this is best done with a hot implement, such as a steel knitting needle), to allow passage for the water. A larger hole is then made in the base of the container, to align with the main airlift tube position. The airlift is then glued in place, as shown in the diagram, using ordinary polystyrene cement (as sold for plastic model-kits).

Note:—Airlift sets may be purchased in the form of U/G filter spares. Alternatively, at a slightly higher cost, an L-shaped airlift may be used. The filter compartment will then be horizontal in use.

The advantage of using an L-shaped airlift will be seen, when it is realised that additional containers may be added to give a multi-filter arrangement. Since the containers flare-out slightly at their open end, the base of a second container makes a good push-fit.

Thus by perforating the base of the second container, and fitting it into the mouth of the first (the lid then going on the second container), and so on, a series of compartments can be built up to hold the filter materials of your choice; e.g. peat, activated charcoal, etc. Be careful, however, when fitting additional containers that they are not forced too far into the mouths of the preceding ones, or damage will result.

I have found this filter very effective in use, and in its single form it is ideal for use in small quarantine tanks, etc., as it takes up very little room.



Ancistrus lineatus

NOTES ON A SUCCESSFUL SPAWNING OF THIS BRISTLE-NOSE CATFISH

by Don Martin

How many aquarists have seen an aquatic self-propelled pea shell? Well, perhaps I could be taken to task under the Trades Descriptions Act for my definition of a self-propelled pea shell, but there can hardly be a more unusual or amusing sight for the hobbyist than an empty pea shell being propelled along just above the gravel by a ¾ inch long Bristle Nose Ancistrus fry. These fry appear to love the soft inner part of a garden pea, and some end up head and shoulders inside the shell grazing out every last piece. The minute they are startled, or another fry tries to jostle his way in, away they go, tail frantically wagging, blindly moving to a spot two or three inches away, and looking for all the world like the pea's answer to the jumping bean.

Should you be wondering where the fry came from, then I suppose I should state at this stage that I have been fortunate enough to breed and rear them, and that this article is basically an account of that happening. However, before I start I would like to stress that the observations I have made in this article are those of an experienced aquarist with a strong leaning towards the practical side, and whilst I recognise the need for Latin names, detailed water analysis, etc., I have no natural bent for this side of the hobby. I therefore make no apologies for the following information being compiled from my practical observations, and what the media now term as "gut feeling," rather than from simulated laboratory experiments.

Nomenclature

My first observations (or lack of) concern the correct name for the fish. As you will have noticed I identify them as *Ancistrus lineatus*, and whilst I generalise and call them Bristle Nose cats, most fellow hobbyists I come into contact with generalise further and wrongly call them Plecostomus. However, for my own satisfaction, and for the sake of the purists that may read this article, I have scanned the text books, and although I am not 100% certain, I have decided that the fish I have spawned are *A. lineatus*. My attempts at identification have been made with the fish in their home tank environment, and at no time have I attempted to remove the fish for better identification. I was always pretty certain that I had a pair, and bearing in mind that the fish are basically nocturnal, my main objective was to disturb the fish as little as possible in the hope that they might eventually spawn. All unnecessary netting and disturbance was therefore taboo.

That this policy contributed in some way to the successful spawning I have no doubt, and although it is perhaps a little early at the moment, I shall be able to have my identification confirmed, or otherwise, when the fry reach a suitable size. Meanwhile I still have no intention of removing the parent fish from the tank whilst they are in the spawning mood.

The parent fish are kept in a 33 in. × 17 in. × 11 in. (838 mm × 432 mm × 280 mm) tank which has a thick layer of gravel on the bottom and is in my fish house. The gravel houses quite a large colony of Malayan Burrowing snails and supports one or two small growths of *Cryptocoryne haerteliana*. A sandstone rock, under which the fish subsequently spawned, is positioned towards the front of the tank, and a smaller piece of artificial rock leans against one side of the tank to form a cave. The water in the tank is "aged" but originates from the local water mains, which in this part of Norfolk consistently produce water with a pH of 7·1 to 7·2 and a hardness of some 20 degrees dH.

Aquarium set-up

The tank is heated by a separate heater and thermostat arrangement, set to maintain the temperature at around 80°F (27°C) and is filtered by a small internal box-filter, employing just filter wool and carbon. From time to time, usually when I feel the water is in need of a "polish," I connect a portable power filter with the tank, and remove it either when I am satisfied with the results, or I feel that the need is greater elsewhere. For all my tanks in the fish house I adopt a fairly disciplined water change routine, and change two buckets (about four imperial gallons) every 10 days. There is a small growth of Riccia and Duckweed on the water surface and the tank receives in the main, natural daylight via a skylight in the fish house roof, although a 60 watt strip light is occasionally used in the evenings.

For most of the time the fish keep themselves to themselves, and being nocturnal in habit, they move about the tank very little during the daylight hours. The male, the one with the bristles on his nose, is slightly larger than the female and roughly 5 inches (127 mm) from the tip of his nose to the tip of his tail. He always resides under the sandstone rock, which by common consent seems to be his territory. Excluding the spawning period, I have never seen the female in this area. The female has (so far as I am aware) no bristles on her nose, and can usually be found in the cave formed by the artificial rock, albeit she is more of a roamer than her mate. Their only tank mates were a pair of Celebes Rainbow fish.

Feeding

The fish are fed on a basic diet of flake food, manufactured by the British company with the excellent advisory service, and mashed garden peas. I use tinned garden peas in preference to "Mushy Peas" because I found that "Mushy Peas" had a tendency to pollute the water. Recently, with the idea of producing a bit more plant and algae growth on which the fish could graze, I used some liquid plant food in the tank. The plant food is manufactured by the same company as the flake food I mentioned earlier, and it was just after the introduction of this plant food, and long before it could have any effect on plant growth, that the fish spawned for the first time.

On the evening preceding the first spawning I had a couple of visitors in the fish house, and as we chatted we noticed that the "plecostomus" as we were calling them, were much more active than usual. I commented that it was probably due to the water change that I had given them earlier that day, whilst my friends jokingly pulled my leg to the effect that the fish were getting ready to spawn. Anyhow the event, such as it was, provided a few minutes diversion and was soon forgotten, until the next morning that is, when as I was feeding round I noticed the cluster of eggs under the sandstone. At first I did not recognise them for what they were, for the eggs were amber in colour and about ¼ in. (3 mm.) in diameter, much larger than I expected they would be. In addition to this they were hung on the underside of the rock in a cluster and in my experience it is somewhat unusual for eggs to be "heaped" in this manner.

My mind returned to the previous evening, and in addition to thinking he who laughs, etc., it dawned on me that the female had at that time been in the male's territory under the sandstone. To remove the parents or not, that was the immediate decision, and seeing that the male seemed to be "sitting" on the eggs not unlike a broody hen, I decided to leave the parents in the tank and trust that nature would take its course. It was a worrying decision. I did, however, remove the pair of Celebes Rainbows without a second thought.

Spawning notes

As I had seen no written account of the spawning of these fish I then decided to take notes and photographs of all subsequent developments and rather than enlarge upon my notes I will reproduce the data just as I compiled it:

Date eggs laid: 10/8/77
Water temperature: 81°F
Water condition: pH 6·8, hardness 20 dH
Colour of eggs: Amber.
Site: Under sandstone rock, in heap, male guarding, female separate.
Photograph: Eggs and parent photographed at 10 pm.
Sunday 14/8/77: Eggs hatched and fry wriggling, like Angel fry, but have very large yoke sacs. Male still guarding.
Tuesday 16/8/77: Still hanging and wriggling but changed in colour from amber to brown.
At 9 pm on evening of 16/8/77: Observed five fry to leave spawning sight and go to back of tank. Fry are about size of newly dropped Black Mollies.
Thursday 18/8/77: Estimate 100 fry grazing on gravel around spawning area. When disturbed all cluster under male parent. Fry given mashed peas and powdered fry food.
Thursday 25/8/77: Fry dispersed all over tank, no longer flock to parent when disturbed. First five to leave site doing well and are larger than rest. Photographs taken.
Thursday 8/9/77: 115 fry about ¾ in. (19 mm.) average length, caught and moved to separate tank to grow on. Parents left in tank.

As you can see from the notes, all went well, and the decision to leave the parent fish with the eggs and subsequent fry, proved the correct one. However, to the data I scribbled down at the time on reflection I would add the following:

Reflections

(i) At no time did I observe the female help with the brooding or the guarding. This was carried out solely by the male.
(ii) I observed no dead eggs.
(iii) My concern that the Malayan burrowing snails might attack the eggs proved groundless.
(iv) The fry, to date, do not appear to be nocturnal, they feed constantly, both by day and by night.
(v) I have not, to the best of my knowledge, lost any fry.
(vi) Although I often watched the development of the eggs and the fry in semi-darkness and into the late hours, the fact that the fish are by habit nocturnal might imply that much may have gone on in the tank without my knowing, whilst I was tucked up in bed.

Continued on page 481

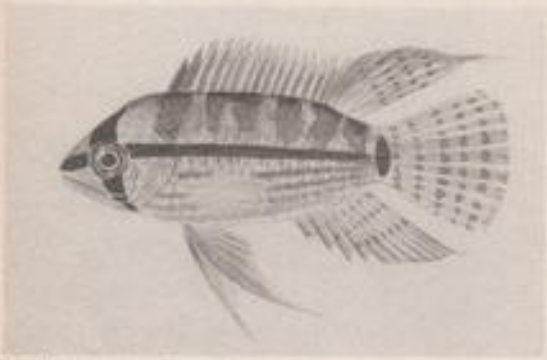
OUR EXPERTS' ANSWERS TO YOUR QUERIES

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

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

TROPICAL QUERIES

by Jack Hems



Apistogramma ortmanni

What can you tell me about ***Apistogramma ortmanni*** **?**

This species, popularly called Ortmann's dwarf cichlid, attains a length of about 2½ in. and requires, if it is to flourish, soft water giving a pH reading of about 6·0 to 6·5. A temperature in the lower to upper seventies (°F) is suitable. The male of the species can sometimes be most short-tempered and snappy and, all in all, a couple are best given a well-planted tank to themselves. Small live food such as whiteworms, gnat larvae, brine shrimps, and any acceptable dry food should be placed on the menu.

Please give me some information on the archer (*Toxotes jaculator*), **with special emphasis on its requirements in the way of food and suitable accommodation.**

The archer fish is native to the East Indies. In the wild state it reaches a length of about 6 in. In captivity, however, it more often stops growing when it reaches about 4 in. It requires live food such as flies—it is easy to hatch flies from the pupae of anglers' maggots—small moths, spiders or even beetles or mealworms thrown onto the surface of the water, where their movements will attract the attention of the fish. As for living conditions, the archer fish thrives best in slightly salted water, say, one teaspoonful of pure salt (not iodized table salt) to every gallon of freshwater. Keep the water at a temperature in the middle to upper seventies (°F) and the aquarium well-covered to prevent winged insects escaping and the fish from jumping out. Archer fish mind their own business but they look best and seem more at home in a tank to themselves. Plant up their aquarium in the regular way with plants such as species of *Vallisneria* or *Cryptocoryne* or both.

Is it true that some *Hypostomus* **catfish are characterised by sail-like dorsal fins?**

All species of *Hypostomus* have a large dorsal fin. All the same, a few species are characterised by extra large dorsal fins. The species which bears the trivial name of *boliviana* has a massive dorsal fin adorned with large black or brownish black spots.

I have just acquired a fish called a silver shark. I have not been able to find anything about it in my books. It measures about 6 in. and is aptly named because it is silvery in hue, with black tips to its shark-like fins.

The silver or bala shark is described in the more comprehensive freshwater tropical aquarium fish books. It appears to be widespread over Thailand, Borneo and Sumatra. In the natural state it reaches a length of about a foot. It takes quite a few years, however, to attain a length of 7 or 8 in. in captivity. Provided the silver shark (*Balantiocheilus melanopterus*) is given a spacious tank and non-bullying and non-over-large companions, and food such as whiteworms, flake food, shredded raw red meat, and the like, it will live a long time. It is fond of browsing on algae, and its tank should have thickets of strong-growing plant life. A temperature of 75°F (24°C) or therabouts should be maintained.

Firemouth Cichlid *(Cichlasoma meeki)*

What are the sexual distinctions of the firemouth cichlid and does it attain any great size?

Exceptionally, perhaps, the firemouth cichlid reaches about 6 in. More usually, however, it stays around 5 in. A well-grown male is distinguished by his dove grey overcast with greenish ground colour, overlaid with some dark bars, and his glowing orange-red mouth, throat and belly. A similar sized or sexually developed female is never quite so beautifully coloured. Again, a well-developed male has noticeable extensions to his dorsal and anal fins.

Please give me some information about a fish I have called *Cyanotilapia afra.*

All I can tell you about this cichlid is that it is a zooplankton feeder (in the main) which frequents certain rocky shores of Lake Malawi. It lives in the wild in shoals and requires, in captivity, hard and alkaline water and a temperature in the upper seventies (°F).

I have recently obtained cultures of micro worms and micro eels but find that some of these creatures escape the attention of the small fish and end up on the bottom of my aquarium. Is there any danger of these livefoods settling down and breeding in the grit?

There is no danger of micro worms or micro eels breeding in your aquarium. The greatest danger is that if you feed too many at a time those that are not eaten within the space of a few minutes will soon die in the interstices of the planting medium and, sooner or later, lead to pollution of the water. Feed these live foods very sparingly. It would be a good plan to include one or two species of Corydoras catfish in your set up to help keep the bottom free of uneaten food.

Is the festive cichlid safe in its larger sizes with peaceable fish some 2 to 3 in. long?

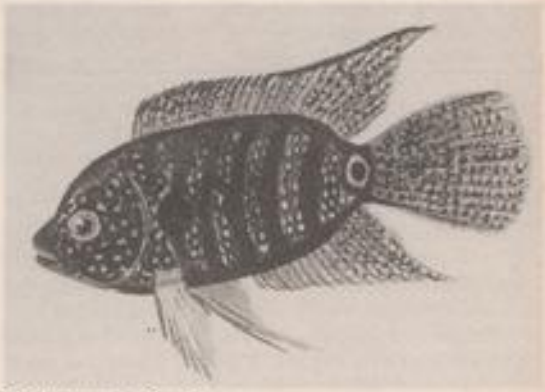
The festive cichlid is usually too shy and timid to molest any of its companions. It is certainly not overtly aggressive and in a well-planted aquarium should do no harm.

Could you give me your opinion on the feeding of *tubifex* **worms? I have been told that they carry diseases into the aquarium?**

Tubifex worms do make their home in filthy mud. Therefore the knowledgeable aquarist washes them well in several changes of water before feeding them to his fish. Whiteworms cultured in a plastic bowl or wooden box make a safer and better live food for aquarium fish.

I have under-gravel filtration and I also keep some spiny eels. What I want to know is whether the spiny eels will ferret out the whiteworms and *tubifex* **worms which escape being eaten and wriggle into the gravel?**

Provided you do not feed too many worms at a time spiny eels will make short work of them before they touch bottom or, after having touched bottom, work very far into the planting medium. If, however, lots of worms are introduced at a time and many of them work their way below the filter plates, it is hardly necessary to say that the spiny eels will not be able to winkle them out. Clearly, lots of worms dying below the filter bed will not do the water any good.



Cichlasoma octofasciatum

Would you recommend *Cichlasoma biocellatum* **for a community tank?**

No. That is if you mean a regular-sized tank housing a collection of medium-sized barbs, tetras, livebearers, and the like. The place for the aggressive Jack Dempsey—aptly named because of its fighting qualities—is on its own in an unplanted tank. By the way, the species is now known to science as *C. octofasciatum.*

I have just bought a *Gnathonemus petersii* **and would like to know something about its habits and preferred food?**

The above species is a bottom-haunter, with a snout peculiarly adapted to probing into mud or grit in search of food, alive or dead. Feed your fish, therefore, on whiteworms, well-washed *tubifex*, floor-hopping water-fleas, tiny shreds of raw red meat, chopped or whole earthworms or, for that matter, a few different brands of first class dried food. Do not place *G. petersii* with any fishes that will frighten it or chase it about. Plenty of plants along the back and both ends of the aquarium are recommended.

Barbus fasciatus

Is the zebra barb easy to keep and how large will it grow?

If you mean the horizontally striped yellowish to brownish silver cyprinid known to science as *Barbus fasciatus*, then the short answer to the first part of your question is yes (give it the same conditions and food as for any other popular barb). It attains about 4 in.

Is there a book which deals exclusively with the discus?

Apparently you do not study our advertisers' announcements at all well, if at all, for at least two of our regular advertisers have mentioned *The Discus* by Gunter Keller. There is another more expensive book called *All About Discus*. The author's name escapes me.

Early in the spring, I intend to set up a 36 in. by 15 in. by 12 in. tank specially for a red-bellied piranha. Please tell me if plants will be tolerated by the piranha and the best way to keep it and feed it?

You can introduce plants into a tank housing a red-bellied piranha without fear of their being uprooted or chewed to pieces. Maintain a temperature in the middle to upper seventies (°F) and keep the top of the aquarium covered with a sheet of glass to prevent the piranha—a good leaper—from jumping out. Also, bear in mind that genuine piranha fish have razor-sharp teeth. So make certain that children do not put their hands in the water. Feed the piranha on flesh foods, alive or dead, such as uncooked raw red meat, slivers of cod, fresh haddock, and the like, large earthworms, unwanted livebearer fry or even surplus baby goldfish.

BOOK REVIEW

Key to British Fresh & Brackish Water Gastropods *by T. T. Macan* (Freshwater Biological Assocn., 60p).

Pondsnails, unwelcome in many tanks, are an important part of water ecology, but not always easy to identify. This is a reprint of the 3rd (1969) edition of the well-known, 46-page, illustrated guide to our 57 pondsnails, to which has been added a page of 12 variations in nomenclature used in the recent *Atlas* of British shells, together with two recent additions, *Hydrobia neglecta* and *Physa gyrina* which, unfortunately, are not included in the identification key. It still includes the American *Lymnaea catascopium*, which became extinct when its only pond in a Leith timber-yard was filled-in a few years ago.

Ever changing names of scientific nomenclature are a nightmare to readers and recorders of our fauna and flora. The late Fred Taylor, a famous pre-war Oldham naturalist, lost what we thought would be a asting memorial to his many waterlife discoveries and ntroductions when "Fred's Snail," *Faludestina taylori* of the Reddish and Droylsden canals, first became *Bythinella scholtzi*, then the recent *Atlas* changed it again to *Marstompsis scholtzi*. Long considered an alien introduction, this is now thought to be native, and isn't even given a vernacular name!

Though southerners will find their shells larger than these northern averages, the key is invaluable. The weakest part is distribution. Excepting for Lakeland, this is very limited. The tiny American trumpet-ramshorn, *Menetus dilatatus*, introduced to canals and warm mill-dams around Manchester over a century ago, is said not to have spread more than 20 miles; but I have a note of it on Raasay in the Hebrides. The glutinous snail, *Myxas glutinosa*, normally in soft water, occurs in the hard water of Lake Bala. The mud snail, *Lymnea glabra*, given as "not common," had its early 20th century introduction site, where it produced a white variety near Manchester, built over long ago. All the old books spelled its name *Limnea*.

The Key is indispensible to pond-hunters; but they will still have to spend more on Kerney's 1976 *Atlas of Non-Marine Mollusca* if they are not to waste a lot of time finding several interesting species.

ERIC HARDY.

COLDWATER QUERIES

by Arthur Boarder

I am shortly setting up two tanks for coldwater fishes and wonder if I should use base compost in them. I have been told that this is unnecessary. What is your opinion?

You should certainly use a base compost in your tanks as otherwise how can the water plants get rooted and grow? The only times I have recommended to refrain from using such material is for a tank for treating sick fishes or for a hatching tank. The former is to ensure that all is as sterile as possible and the latter to make sure that there are no tiny pests which could harm eggs or fry. I favour the type sold by merchants as washed river grit. This can be sifted twice, once to remove the fine sand and then to sift out any stones large enough to clog a siphon tube. The fine sand may be washed out under a strong running tap. Too much fine sand will tend to pack up too tightly and prevent any waste matter from the fishes from penetrating it. Also for any tank 24 × 12 in., or over I suggest that a little potting compost is laid near the back of the tank to a depth of about an inch. Leave the front half clear. Cover this well with the grit, deepish at the back but not above the front base frame. It may seem to be a lot of trouble in the first place, but remember that the tanks can stay for very many years without ever having to be emptied completely.

I intend to take up the hobby of breeding fancy goldfish and have a fish house with several tanks. I have previously kept tropicals and have heating available. Is it necessary to use this extra warmth for breeding coldwater fishes?

The short answer is no, but I strongly recommend that you use some form of warmth for hatching and rearing the fry. It is of course possible to breed such fishes without using any artificial warmth, especially when one has a fish house which may, perhaps get some sun heat during the breeding season. For many years I bred coldwater fancy goldfish without using any artificial heating, but used an outside frame for hatching and rearing. This certainly warmed up the tanks, as glass will always attract heat from the smallest amount of sun. However once I started to use some extra warmth I found a great improvement in the rate of growth. I used some 100 watt heaters in the tanks and found that they had an added advantage in that they tended to aerate water well and the water above the heater rose to the surface as it heated up and then spread over the surface to fall back again to the bottom. This ensured that the water was being brought into contact with the atmosphere regularly. I also found that when a large number of eggs were in the tank it was beneficial to use a good stream of air from a diffuser stone. Once the eggs hatched I would reduce the strength of the flow of air so that the tiny fry were not washed around too violently. Remember to have several spare tanks as the fry must be moved on as they grow as nothing will check their rate of growth more than an overcrowded tank.

I have a fair sized garden pond with some goldfish in it. I would like to have an added interest and so propose to have some newts in it. Do you think this is a good idea and if so where can I get some?

If you live in a country area it is very probable that newts will come to your pond to breed. Otherwise you will have to find a pond with some in and catch some. Once you put them in the pond it is almost certain that they will not leave the water until they have finished breeding. Newts have to come to the surface to take in air and so if you watch closely you can catch them with a net when they break surface. You have to be fairly quick as they seem to glide up to the surface unnoticed and it is only when they turn to swim below that their pale bellies show up. Once newts have bred in a pond it is almost certain that they will return to that pond the following season. Newts can feed under water and so could take any worms etc., which you offer to your goldfish. Also if you hope to get the goldfish to breed it is very probable that the newts could eat many of the fry. There are three species of newts in Britain, the Smooth newt, (*Triturus vulgaris*); the Great Crested newt, (*Triturus cristatus*) and the Palmated newt (*Triturus helveticus*). The first named appears to be the most common and the last named the rarer one. Newts usually go to ponds to breed about the end of February or in March. Once breeding is over the newts leave the water and spend the rest of the time hidden among dense ground foliage or under stones. They become fairly sluggish and lose their attractive appearance they have when they assume their water breeding colours. Many smooth newts came to my ponds to breed every year but I never saw either of the other species. Every year many frogs would come to my ponds to breed but I never saw one toad there. In my brother's pond, in the heart of London many toads came every year to spawn but never a frog.

I have a garden pond and a couple of tanks of goldfish of various kinds. My trouble is that I cannot get any live foods for the fishes and wonder if their health will suffer if they have to

do without. What do you think about this problem?

It is possible to keep your fishes without giving them any live foods at all. I have experimented with a good flake food and have fed some fantail goldfish on this food exclusively for four years now and they are still in the pink of condition. They have had nothing at all but this flake food except any soft vegetation they may have found in the tank. If you read on the packet of flake food all the ingredients there are in the food it is no wonder that the fishes keep healthy on such a diet. I have used live foods in the past and have also had trouble from pond creatures whilst so doing and long ago made up my mind never to feed with any live foods from a water-borne source. The safer ones are garden worms, white worms or maggots which have not lived in water and so are not likely to bring in any pests or diseases.

Is it better to use rain water instead of tap water for my fish tank?

Rain water is all right providing that it is pure, but if it is caught after running from a roof, then it could be dangerous to fishes and it would be better to use tap water. If you can catch some rain water without it having come into contact with any filth it should be safe for your fishes. It may also be all right if you can catch some rain water from a roof after there has been a lot of rain to give the roof a good washing. If you have doubts about the state of the rain water from your roof, just tie a sock over the down spout and examine it after several heavy rain storms. I shall be surprised if there is not a good quantity of soot and muck in the sock which could have polluted your fish tank had you used the rain water.

I would like to breed some good quality fancy goldfish so that I could eventually show them. However the good quality parent fish I have seen are so very expensive. What would be my chances of breeding some good fish from fish which are not actually show specimens but which have come from a good strain?

Providing that you are sure of the strain I see no reason why you should not proceed as you suggest. The most important point to bear in mind is that the strain from which you get your fish has produced some winners. At every spawning of fancy goldfish it is almost certain that only a very few really good fish are produced. There will be many which have a slight fault which, although they would not win a prize at a show, are nevertheless able to throw some better fish than they are themselves. So that even if you bought a pair of prize winners they may not give you many extra good specimens. Where divided tail and double anal fin types are concerned, it is possible that among their progeny there will be some much better fish and even from their first spawning it is possible for a few excellent specimens to appear with the required divided tails and paired anals. The most important point for you to bear in mind when buying your prospective parents is that they have come from a well established strain which has been producing winners over a fairly long period. The best method for you to adopt is to visit some good shows and find out who are the winners in the classes of types you prefer.

I have a tank, 48 × 12 × 15 in., which I want to set up as a coldwater tank with fancy goldfish. I would like your opinion as to which varieties I should use which will agree together and present a colourful appearance?

Yours is a very good sized tank and lends itself very well for your intended purpose. I suggest that you have two each of the following: Red fantails; calico fantails; veiltails; red-cap orandas and moors. You can use fishes up to two inches long, not counting the tail. I have not recommended any single tailed fishes as I consider that they are not as good for a tank as the types with double tails. These latter fish move around fairly quietly and are not inclined to rush about as would single tailed types. The moors can be either fantail types or veiltail. With the fishes suggested you will have a fine contrast of colour and the fishes should have enough space in which to grow and thrive.

See that your water plants are well established before you add any fishes and also make sure that they are in good health when introduced. Do not overfeed the fishes and have a good lighting system overhead to emphasise the varied colours of the fishes. Two forty watt lamps should be sufficient. When setting up the tank you should black out the back and ends of the tank so that one cannot see through to wallpaper behind or at the ends.

I have a garden pond of a fair size with a number of goldfish. I have read varied advice on the feeding of the fish during the winter. What amount of food should be given?

In a well run pond there is really no need to feed at all during November and through to March. If the fishes have been well fed during the autumn, they should be able to go through the winter without having to be fed. You must realise that in any fairly well planted pond, there is sure to be a certain amount of food available for the fish if they become hungry and search about among the water-plants. During most winters there are spells of mild weather when the fish may be on the feed and a little food can be offered at such times, but this must not be over done as the following day the weather may turn very cold and any uneaten food could be left to pollute the water. When feeding during the winter months, if necessary, I prefer to use broken garden worms.

KOI QUERIES

by Hilda Allen

I hope to build a filter outside my pond which is 27 ft. × 9 ft. but I am unable to copy the one shown in "The Aquarist" for October as my pond is already raised two feet from the ground. Could I make one similar, (with ¾ in. overflow pipe etc.) on a level with the pond, with the water flowing from the pond via a 2 inch diameter pipe to the filter and the water pumped back into the pond? I have two small pumps that will give me about 800 gallons per hour. I would like to copy the frame-work shown in last June's "Aquarist" if this would be all right for my purpose.

With one or two minor alterations, plus a little experimentation, I see no reason why your plans for an outside filter should not work. You will realise that the pipe framework illustrated in "a Pond for Koi" last June is for under-gravel filtration within the pond and I suggest that instead of ¾ in. plastic pipe you should use 1 in. or 1¼ in. diameter pipe drilled with ¼ in. holes at 2-3 inch intervals. The framework should be arranged to provide an even flow of water through the gravel and the pipes can be spaced about 15 to 18 inches apart. The two pick-up points for your pumps should be diagonally opposite to each other. The filter should measure about 9 feet × 9 feet which is 81 sq. feet (one third of the pond size); with your pump output of about 800 gallons per hour this will give an ideal flow-rate of around 10 gallons per hour per square foot through the filter.

I have noted your plans to have the base of your filter filled with broken bricks, with a drain-off plug as in the October article; this will provide an excellent method of removing the thickest settled sludge. The gravel should be of ¼ inch screen size and the depth of twelve inches or more allowing for a space of at least six inches between the top of the gravel and your 2 inch connecting pipe from the pond. It would be a good idea to flatten the end of the 2 inch pipe within your pond to prevent small fish or large debris getting into your filter. This is easily done by immersing the end of the vinyl pipe in very hot water for a minute or two and when softened it can be gently nipped together with pliers to leave a wider slot. You will find that your pond-water level will always be slightly higher than that in your filter; it is impossible to say by how much but you will know that your gravel-bed must always be flooded with water; you can also experiment with the depth of gravel. Your filter will be a combination of under-gravel and outside filtration on a level with your pond; apart from a trial and error period which may be necessary, especially concerning the flow rates, there seems to be no good reason why it should not be very effective. I would be pleased to hear of any adjustments you decide are necessary, such information benefits other readers.

Would you advise the use of a pool-heater in a koi-pond during the severest weather we are likely to get in the next few months?

It is several years since I last used a pool heater as I have found that the constant movement of surface water provided by pumps used in continuous operation of filters has been very effective in preventing the formation of ice and I have been able to keep small areas free of ice. This is all the traditional pool-heaters should be expected to do, they cannot warm a pond. I have heard of people using household immersion heaters in their koi-ponds but the cost of running these must be prohibitive and beyond the reach of most of us. It is advisable to partially cover any koi-pond exposed to the worst elements, especially if it is shallow and protective covers made of ridged P.V.C. sheets, heavy duty polythene sheets, polystyrene or rush mats firmly fixed to wooden frames have been used. One Danish fish-keeper even covers his entire pond with ping-pong balls at the onset of winter and this has proved very satisfactory through winters far more severe than our own. Never, under any circumstances, should you break the ice on a pond; the shock could kill all your fish. By the use of a pump, a trickle of water from a hosepipe or a can of hot water it is usually possible to keep a hole in the ice if the frost does not last as long as it did in the unforgettable winter of 1963. I do not recommend the method used by a friend last year. He dashed outside with a kettle of hot water which he pressed on to the ice to make a nice round hole. It did, but unfortunately he forgot to let go of the handle or lift the kettle and ended up in the icy waters. Such noisy activities frighten fish and are not believed to be of great benefit to half-frozen fishkeepers. Depending upon the severity of the weather and whether or not you operate a pump it may be advisable for you to buy a pool-heater.

A few months ago I made an under-gravel filter for my pond which is about 80 feet square. I used 25 feet of plastic, ¾ inch diameter and drilled with ¼ inch holes every 2 inches or so and this was covered with 4 cwt of pea-gravel. After working well for a month or two the

output from the pump became less and less so I raked the gravel and the output increased for a few days before falling off again. I drained the pool and found the gravel full of mud and rotting plants. The filter seemed to work well for a time and I would be pleased if you could tell me how I might be able to use it for a longer time.

You did not say how the pipe and gravel were arranged but there seem to be several factors why the system did not continue to work satisfactorily. It would seem that your pond is stocked with plants and if in baskets then it appears that some of the soil and plants have finished up in your gravel which is something to be avoided. The ¼-inch holes were far too small and ½-inch would have been better and then making sure that only minimum closure occurred after drilling through. Probably the main cause of failure, and that which would arise in any pool, is the very small quantity of gravel used with insufficient capacity to deal with any mass of waste or to permit the development of biological action in aerobic conditions. Your filter probably worked only as a mechanical filter until becoming blocked. You did not indicate the depth of your pond, the number of fish or size of pump but I would suggest that you require at least 12 or 13 cwt. of gravel, the nearest you could order for delivery is ½ cubic yard and this could be ¼-inch screened size. The gravel must be thoroughly washed before going into the pond and even then one or two complete water changes may be necessary. The hardness of the water may be too high for fish to survive without damage in the beginning and you should continuously operate the whole system for at least one week before introducing any fish. There is not much purpose in exceeding a flow-rate of 10 gallons an hour for every square foot of filter but the flow should not be less than 5 gallons per hour/square foot.

Provided the rules of filter size and flow rates are observed there is little reason why under-gravel filtration should not be completely satisfactory in the long term, especially as a cure for green water. Pond filtration differs from tank filtration in that the filters have a natural break from overwork for about five months of the year during our winters when the activities of the fish, feeding, waste products and sunshine are all drastically reduced. My own under-gravel filters have operated quite satisfactorily for 7½ years in one pool and 6 years in the other without ever becoming blocked or causing trouble in any way. It is advisable to remove settled mulm, excreta, etc., by bottom drainage or syphon and to change at least 10% of the pond water regularly. These basic rules of good fish keeping ensure that filters are not overloaded with more than they should be expected to do.

PLANT QUERIES

by Vivian De Thabrew

I found your comments on water lilies in the May *Aquarist* very interesting. I tried to reproduce water lilies (*N. alba*) in my tanks, using tuber cuttings, some years ago. Proceeding purely by guesswork, I did the job wrong, insofar as I put the cuttings straight into water 15 in. deep. However, and I think this might interest other aquarists, although the cuttings never sent up floating leaves, neither did they die. The plants are lovely to look at, the leaves are almost translucent, about 4 in. in diameter, a pinkish green in colour. I have the same cuttings still and the only time that floating leaves were produced was when I cooled the tank for breeding purposes. Soon after I brought the tank in from my garage, the lily sent up extra leaves and ultimately flowered. Finally, super column, keep up the good work.

I find your comments concerning the propagation of water-lilies very interesting. I am also extremely pleased to learn that you have been successful in propagating these by the same method as adopted by me.

There may be two reasons why the cuttings did not readily put forth floating leaves:

1. They were at the stage of their life-cycle when they were not producing such leaves.
2. The water temperature was higher than that was required. The latter seems the more probable reason, as on cooling the tank for breeding, they produced these leaves. It also appears that the water-lily you have is a sub-tropical species requiring lower temperatures.

I have tried unsuccessfully to grow plants in my tank. They last approximately 6-8 week before they die. The tank is 20 in. long with a 12 in. of water depth. A 15 watt tube in a reflector is on for 12-14 hours a day. As I live in a chalky area, the water was tested and found to have a DH of 20 and a pH of 7·8; the water when left to age in the tank drops in hardness to 10 DH after 3-4 days. But I cannot drop the pH. I have tried filling the outside filter with peat and running for five days non-stop, but the pH has not altered. None of my plants will grow, so your help is greatly appreciated.

It appears that your biggest problem is the very high pH of 7·8; very few aquatic plants tolerate this condition and your attempt to lower this is absolutely right. It should be brought to around 7·0 level. Can you get some rain water? This seems to me the answer as it takes considerable time to lower your pH by other means.

Filtering the water through peat should be done for a few weeks to bring about a significant change in the alkalinity. If you can maintain a good organic base within your planting medium you are certain to gradually alter the pH. As you may already know, the breakdown of organic tissues brings about certain acids.

If you can spare the time and another tank, try and experiment with the planting medium using clay and a generous mixture of peat and coarse sand. Once you have filled the tank with your tap-water leave it for a week and then test the pH. Repeat this test for several weeks. You should find a marked drop in the pH level.

I have read with great interest the Plant Queries in *The Aquarist*. From the letters I have read in your magazine and those in 'What Is Your Opinion?' it would seem that there are many people like me who have difficulty growing plants in a tropical aquarium. I was, however, very interested to note the reference by Vivian De Thabrew to growing the plants in peat and would be pleased to have answers to the following:

1. **What sort of peat should one use?**
2. **In an aquarium already established can one use peat in pots under the longer plants to save disturbing the whole set-up?**
3. **If so what sort of pots can be used?**

The peat I have recommended is peat moss which is prepared for aquarium use. Even garden peat can be used provided it is properly sieved, but remember that it contains more acid than that of aquarium peat.

The peat should be incorporated with clay and unwashed river sand. You may certainly use small plant pots which you can bury in the gravel. The pots used can be plastic or clay ones, though it may not be easy to obtain very small clay ones. The ideal size is about two inches in diameter.

Care should be exercised when using plastic pots as some of them may prove to be toxic to your fish. Therefore, it is necessary to experiment with one of these pots placed in a separate small tank with a few fish. If the fish do survive for a time without ill effects, then you can use these pots with confidence.

I am intending to set up an aquarium for South American tetras. My problem is maintaining adequate plant growth; after a few months they stop growing, become stunted and the leaves start to discolour. I am thinking of growing them in a peat/John Innes compost mix covered by a couple of inches of gravel. Do you think that would help? The only plant that seems to thrive and grow with me is *Vallisneria torta;* could you therefore tell me of any other plants that would grow with this species in the same temperature and pH range? How about *Cryptocoryne* and *Aponogeton species?* My lighting is a 30 watt gro-lux and the tank size is 30 in. × 15 in. × 12 in. Also, would condensation drips from the aluminium hood have any long-term harmful effects on the plants?

I am pleased to learn you are contemplating using a peat/compost planting medium. This medium has been well proven by every research institution and herbarium in Europe.

This mixture should be covered over with at least three inches of gravel and sand. The 30 watt Gro-lux lighting used for ten hours per day should be adequate. You do not mention the temperature and pH range you maintain, but remember most tropical aquatic plants thrive in a pH range of 6·5-7·0 and a temperature range of 72°-80°F.

Contrary to the popular belief among many plant distributors, over 50% of the species imported require only a moderate light of medium intensity. Only a very few species available to the aquarist require bright and strong light. Research carried out in their natural habitat has proven this fact. Most Cryptocorynes, the hardy Aponogetons, along with *Synnema triflorum, Bacopa, Marsilea, Echinodorus cordifolius* and *E. tenellus* do well under these conditions.

It is obviously better to avoid the condensation from the aluminium dripping into your tank, as it may be more harmful to your fish than to the plants. Your cover-glass should check this to a large extent.

I have two tanks, both are 24 in. × 12 in. × 15 in. deep. Both tanks are well established and both are well-planted and thriving. Both are lit for approximately 10 hours a day with three 25 watt tungsten bulbs each. Shortly I shall be away from the house for anything up to 18 hours a day. Please can you tell me which would be the best thing to do:

1. **Reduce my lighting power, say three 15 watt bulbs for a long period.**
2. **Increase my bulbs to say three 40 watts for a short period, say four or five hours.**
3. **Go higher still to three 60 watts.**

By the way, I didn't mention my tanks get no natural light at all, they are tucked away in an alcove. I want to stay with tungsten bulbs if possible as I've tried fluorescent lighting and I don't like it for either plants or fish. My plants are Vallis, *Sagittaria,* Amazon Swords, Crypts, *Hygrophila,* Java Ferns and *Bacopa monnieri.* I don't employ filtering of any type.

I am pleased to learn that your plants are thriving in both your tanks. It appears that you have struck the right balance and have created the correct condition for good plant growth. But as you say, if you are going to be away for about 18 hours per day, you will have to make some arrangements concerning lighting.

Have you thought of using a time switch to give your plants the very same period of lighting? If, for some reason, this is not possible, try using three 40 watts for 6 hours per day and, whenever possible, for a longer time. Tungsten bulbs are adequate provided you give the plants the required intensity. In several major plant-breeding stations in the U.K. and abroad, tungsten bulbs are regularly used for growth stimulation. All the plants you have mentioned should do well at this light intensity.

I had bought some Water Hyacinth plants which were in v.g.c. The first two weeks they grew very well, but later the roots started falling off (maybe pushed) and the plants eventually rotted and died. I have a 4 ft. tank lit by one 4 ft. Tru-lite and one 2 ft. fluorescent tube for 14 hours a day. I use u/g filters. The water temperature is 80°F. The fish are Mollies, Swordtails, Angels and Red-tailed Shark. The other plants are Cryptocorynes and Wisteria. Can you please tell me the best conditions for the Water Hyacinth?

The Water Hyacinth which you have acquired must be *Eichhornia crassipes.* I am liable to agree with you that the reason for your plant dying away was undue pressing of the long, spongy roots into the gravel. As you already know, the Water Hyacinth is essentially a floating plant which sends down its cluster of roots for anchorage to the bottom.

The plant requires a very nutritious medium in which its roots can anchor and take up the nutrients. It also requires very strong light. Your lighting certainly seems adequate, but what about the condition of your tank bottom? It should contain substantial quantities of organic detritus such as plant residues. You can help the situation by providing a mixture of clay and plant compost and covering this with a deep layer of unwashed river sand or fine gravel. I have found excellent results by keeping this plant at a temperature of around 76°F and plenty of humidity. This humid condition can be achieved if you keep your water level fairly low and cover the tank with a sheet of glass.

RESULTS OF THE TETRAMIN AQUARIUM COMPETITION

Right: The panel of judges working their way through the thousands of entries.

THE TetraMin Aquarium Competition Judges, gathering in London just before Christmas, faced a very difficult task in finding the twenty winners and 50 runners-up in the TetraMin Aquarium Competition.

The judging was unexpectedly difficult for two reasons. Firstly, there were nearly two thousand correct entries and secondly, there was a very high standard of slogan writing.

The panel of judges, which included John Young of *The Aquarist & Pondkeeper* and Andrew Bartyla of TetraMin, spent almost 5 hours assessing and sorting through the entries, looking for those that showed originality and where relevant, the ability to complete two or four lined rhymes. Eventually, they selected the final 70 with the top 20 winners being clearly better than the 50 runners-up. All these entrants have now received their prizes, which were £50 worth of Aquarium equipment for the winners and TetraTest Laboretts for the runners-up.

The large number of entries showed that this type of competition is so popular that Tetra may well announce a similar one in 1978, so watch out for future announcements in *The Aquarist & Pondkeeper*, your local pet shops.

The twenty winners of the £50 first prizes in this competition were:

1. Mr. P. Allison, 17 Blithemeadow Drive, Norwich.
2. Mrs. M. Balley, 14 Park Road, Brighton.
3. N. Burcham, 12 Langside Ave., Bournemouth.
4. Mrs. L. Darlow, 500 St. Albans Road, Watford.
5. Susan Harriman, 18 Quebec Road, Stockton.
6. D. Haslam, 81 Newington Drive, Bury.
7. Mr. R. E. Hill, 23 Cornbrook Road, Birmingham.
8. Mrs. Phyllis Peacock, Pit Lane, Bradford.
9. Mr. R. Peck, 62 Shelbourne Road, Bournemouth.
10. M. D. Pendrill, 57 Lochgreen Ave., Troon.
11. C. Phillips, 53 Thistlewaite Road, London E.5.
12. Mrs. J. C. Porter, 35 Alexander Road, Neath.
13. Malcolm Ridler, 136 Ashley Down Road, Bristol.
14. Mr. G. R. Todd, 1 Belgrave Terrace, Scarborough.
15. E. D. Tyler, 7 Unity Road, Hessle.
16. Mr. M. Walters, 238 Calmore Road, Totton.
17. Mrs. S. Walters, 11 Bromley Road, Southampton.
18. Mr. P. Williams, 206 Royston Ave., Southend-on-Sea.
19. Peter Willis, 95 Nortoft Road, Bournemouth.
20. Mr. C. J. Wright, 28 Parkland, Blaydon-on-Tyne.

MARINE QUERIES

by Graham F. Cox

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

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

I have a 48 in. × 9 in. × 12 in. aquarium. It contains a pair of 2 in. Clownfish and a 1½ in. Electric-blue Damsel. The nitrites are at a zero level and have been so for over a month. The set up is 3 months old. The fish are in good health and will even take food from my fingers.

I was considering adding a lionfish and/or angelfish. Maximum price I can afford is about £7·00.

What type do you recommend would get on with my present fish—or is the tank too small?

I would also like to know how long a period must elapse after the addition of copper before a tank is safe for invertebrates?

Firstly I would advise you that you should *not* allow the wonderful tameness of coralfishes to inveigle you into the usual "beginner-hobbyist" trap of overfeeding.

Try always to remember the two golden rules of feeding technique for marine aquarists:

(1) Never should even *one* uneaten morsel of food be allowed to reach the floor of the tank.

(2) Feed only *half* the amount of food each day which your natural instincts would indicate to be necessary.

If you must add a lionfish to this aquarium, then bear in mind that, attractive though these species undoubtedly are, any specimen of the genera *Pterois* and *Dendrocheirus* would soon grow large enough to eat both your clownfishes and the Electric-blue Damsel. My advice therefore would be to obtain one of the dwarf species in the genus *Brachypterus*. These delightful little fishes show the same majestic stealth and calm as the members of the larger genera and yet, provided that you first buy a largish anemone (say *Stoicactis* or *Radianthus* species) and allow the clownfishes 2-4 weeks to familiarise themselves with it *before* buying the *Brachypterus* dragonfish, the clownfishes are then double-safe.

Also, as a "belt-and-braces" protection for the damselfish, may I recommend that you create at least one (1) complicated cave-and-tunnel structure in the opposite corner of the tank to the anemone. Use living-rock to create this structure and build it at the same time that you add the anemone (first see remarks concerning *copper* below) as a last resort refuge for the damselfish. This structure could also provide a useful haven (if made large enough) for your angelfish.

Regarding the latter, in view of the relatively small aquarium you have chosen (about 18 gallons gross capacity, and therefore contains about 15 gallons of seawater), I would recommend you to buy one of the many species of dwarf angelfishes of the genera *Centropyge* and *Genicanthus*. The following is an attempt to list these fishes in descending order of aquarium hardiness:— *Centropyge bispinosus* (Coral Beauty), *Genicanthus lamarki* (Swallowtail Angel), *C. eibli* (Dwarf Rainbow Angel), *C. loriculus* (Flame Angel), *C. heraldi* (Lemonpeel), *C. bispinosus* (Bicolor Angel). As stated, the Coral Beauty is the hardiest fish in the list and therefore ideal for a beginner, whereas the Bicolor Angel is the most delicate on the list and should be avoided for about 6-12 months whilst you slowly acquire more expertise. Please remember that you will always come across exceptions and variations to the above sequence, e.g. a sessile, diseased Coral Beauty would *not* be as hardy as an exceptionally young and fit specimen of the Bicolor Angel. Before leaving this question of Angelfish selection might I suggest that you also consider a juvenile (i.e. 1 in. to 2 in. long) member of the much larger *Pomacanthus*, *Holocanthus*, *Euxiphipops* etc. genera, such as, say a juvenile Emperor Angelfish

(*P. imperator*). Although this species grows to nearly 18 in. in nature, they are *very* slow growers and such a juvenile would give you several years of pleasure as he slowly acquired adult coloration. Such a fish, even as a juvenile, would cost you substantially more than £7·00, but is well worth the additional money. At all costs, however, please remember the golden rule that you must *not* exceed 7½ in. of fish (total) in your aquarium (i.e. ½ in. of fish to 2 gallons of water) *even* when the system attains full bacterial maturity—and this won't be for a further 2-3 months yet in your case!

It is impossible to provide a definitive answer to your final question, since the details you provide are so sketchy. The sort of thing I would have liked to know here are:—

(1) In what form was the copper added?
(2) For how long a period was it added and at what dosage strength?
(3) What is the precise composition of the filter-bed, i.e. what weight of cockle-shell (if any), and what weight of silica (if any) and what weight of oolitic coralsand (if any) were added?

You see if one assumes everything for the worst, i.e. the filter-bed is entirely siliceous in nature (no crushed cockle-shell and no oolite) and you used one of the many crude copper sulphate-citric acid formulae given in various books and used it on several occasions, the probability is that your aquarium would now *never* be safe for invertebrate life, although it would continue to function with total efficiency as a fish-only aquarium. Then again, assuming everything for the best, if your tank's filtration was built up of successive layers of crushed cockle-shell white silica and oolitic-coral sand (in the approximate ratios of 3:1:6 :- respectively), and you used "Cuprazin"(*which contains almost no copper at all!*) and you only used the "Cuprazin" on a dozen or so occasions in all, then provided you make the following three simple changes, you could introduce invertebrates tomorrow with perfect safety:—

Change 1. Take out *all* rocks, shells and corals and lightly bleach (½ cupful of "Brobat" per bucketful of water) for 12 hours. *Wash well under running tap for one hour.* Return to aquaria on completion of Change 3 below.

Change 2. Put down *at least* ½ in. thickness of new oolitic coral-sand on top of the old filter-bed giving all-over coverage.

Change 3. Change 25% to 33⅓% of your seawater for newly-matured synthetic seawater.

You can now add living-rock, anemones, corals, sponges, molluscs, crustaceans, living algaes etc., in total safety. However, for the future, please remember that with invertebrates now in the aquarium, should a protozoan disease (e.g. oodiniasis or white-spot disease etc.) break out in future, you must treat the tank with "Myxazin" and *not* "Cuprazin."

SPAWNING *Ancistrus lineatus*

continued from page 467

(vii) The tank water pH reading of 6·8 does not concern me unduly as most tanks tend to move into the acid region as the water ages.

Questions

A few questions are also posed: Why did the five fry leave the spawning site in advance of the rest? Did they develop earlier, and if so why? If one accepts that they did develop earlier, why did they not return to the spawning site and their brothers and sisters, as was the pattern with the rest of the brood when first they left the spawning site. Did the addition of the plant food to the tank have some effect on the subsequent spawning? To these questions, and others, I have as yet no answers, but I am as they say, working on it.

Now comes the intriguing part. Whilst putting this article together it occurred to me that I should try to get the fish to spawn again. At the time I had little idea what spawning frequency of the fish might be and decided to simulate the tank conditions of the first spawning and hope for the best. There was no difficulty in achieving the necessary water conditions, as on checking I found that the temperature, water hardness, etc., was much the same as before. What I did do that I feel is significant, was to change a couple of buckets of water (about 4 gallons) and add some more plant food. The next night the fish spawned again.

Second spawning

The second spawning occurred exactly 38 days after the first, and everything looks at this stage (about half way through the incubation period) to be progressing much as before. The question I now ask myself is, what caused the fish to spawn? Was it the water change? Was it the plant food? Was it a combination of the two, or were the fish going to spawn anyway?

Water changes speak for themselves, and are well known for their ability to induce fish to spawn, and are of course the most likely "trigger" for the spawnings. Yet the fact remains that the fish were subject to several water changes before the addition of the plant food, and they never spawned then. A perusal through the ingredients of the plant food gives no clue. No known aphrodisiacs there. Yet in this hobby one never knows, and probably will never know for sure until some form of communication is established between fish and man. Until that day, and I very much doubt that I shall be around when it comes, I shall continue as always, and follow the procedures that I have found to be successful.

Edible Frog in favourite situation on top of a waterfall and among cover-providing foliage.

FROGS AND TOADS AND CONSERVATION

by Cleeland Bean

THOSE with a special interest in frogs, toads and newts will be concerned at the way in which these creatures have declined in the countryside during recent years. In places where frogs were formerly common they are now absent, and to a lesser extent this also applies to the toad. Observation shows that the disappearance of the frog has been caused by the elimination of ditches, wetland areas, small ponds and drinking pools which were once numerous enough on farmland. Equally destructive has been the use of toxic chemicals and the contamination of our remaining waterways by effluents.

Fortunately in my own area frogs are still numerous enough, but this is because the animals come to a hillside spring of clear water on rough limestone ground where farming activities are not intensive. Important also is the fact that most of the spawn escapes the attention of schoolchildren and laboratory technicians. Nowadays criticism has been directed at those who take away large amounts of spawn to be used in school, college and university biology classes. Indeed, frogs are so few on the ground these days that conservationists fear that the animals could go the way of the dodo.

Artificial frog pools

One useful method for maintaining their numbers in semi-suburban and rural areas is to provide easily

constructed plastic pools in garden or field. These would serve as breeding sites, and it is surprising how quickly such pools will develop balanced ecological systems whereby aquatic creatures, plants and bottom sediments will support the correct food chains to suit frogs, toads and newts. Worth noting is the way in which frogs will usually migrate to relatively shallow water for spawning purposes, whereas toads make for deeper pools or ponds. Even if both species occupy the same pool a similar rule applies.

The times at which frogs breed can vary depending on local weather conditions and site locations. Strangely enough water channels on higher hillside slopes may contain spawn as early as 12th February, yet at lower levels no spawn will be found in certain areas until the middle or end of the month. Early March is also a favourable period for the appearance of massive spawn clusters; my own observations show that spawning usually occurs over an interval of nine days ranging from the 19th of February to the end of the month. But elsewhere, of course, general spawning will still be in progress during March and early April.

Common Frog showing characteristic dark patch from eye to shoulder.

Toads

Much the same breeding pattern applies to toads although the latter emerge slightly later than the frog from their hibernation quarters. Extremely cold weather does not apparently harm frog spawn in water capped by ice, but naturally enough the eggs if caught or trapped in the ice will die. Usually, however, the appearance of frog spawn indicates that warmer weather is ahead with the worst of the winter period at an end. I have observed this to be the case over a 10-year stretch by keeping watch at the same breeding site.

The construction of garden pools as possible frog nurseries need not daunt us in these days when it is simply a matter of using plastic lining materials to fit any shape of hole which we may care to dig. Although containers with diameters of not more than 6 feet and less than 12 inches deep have been known to attract frogs year by year larger water areas are preferable. Obviously small water spaces will limit the number of frogs, while for toads larger water areas would need to have a depth of at least 18 inches. Essential, too, for both frogs and toads would be shallow departure points from a pond or pool.

Observation shows that toads and frogs will go to the same breeding places year after year while by-passing what would seem to be equally suitable spawning grounds. For this reason it may be necessary to transfer spawn to particular garden pools in order that the young frogs on hatching will return to their birth place. We in turn may then be able to supply quantities of spawn to conservationists elsewhere, thus keeping up the frog population. It was during 1975 that naturalists at Great Shelford,

Cambridgeshire, gave away spawn from 50 frogs raised in a local nursery in a bid to stop the reduction in the frog population.

Population decline

Surveys in East Norfolk, East Anglia and the Isle of Wight have already shown that across those regions there has been a severe reduction in the frog population during the past ten years or so. On the other hand toads have not suffered to the same degree, and their higher survival rate is believed to depend on a habitat which brings them less into direct contact with water than is the case regarding frogs. In this respect the latter may be more exposed to water pollution, while at the same time their readiness to breed in shallow water is less likely to be fulfilled under modern farming conditions whereby the smaller ditches and hollows are being eliminated.

Possibly we may soon need protection for the common frog and toad as is now the case with the natterjack toad under the Wild Creatures and Wild Plants Protection Bill. During 1975 the right thing was done by British Nuclear Fuels when it built a pond for a colony of natterjacks at Windscale, Cumbria. This happened when the toads were found inside the perimeter fence of the atomic power unit during preparations for extension plans. Not so favourable, however, are present plans for a £1 million extension to a holiday camp at Ainsdale, Southport. It is among the sand dunes there that the natterjack toad also breeds, but this will no longer be the situation if Sir Fred Pontin is allowed to add 272 chalets and a sports block to his holiday camp.

When looking again at the not so common frog and toad the use of specially constructed garden ponds as breeding areas for these amphibians may help to build up their numbers. Once the site has been chosen the selection of bottom soil and water plants must be done with care. For example, any soil used should be free from fertiliser, peat, leaf mould or bonemeal, and the material should be good quality garden loam of a clayey nature which will be enriched by working in old manure stocks. If the water is to have a sufficient oxygen supply, and to be free from excessive algae growth, submerged plant species must be chosen to keep the pool well balanced in an ecological sense.

Basic to any pool system are the submerged oxygenating plants which also assist in absorbing mineral salts dissolved in the water. Such plants should be the first types to take root in the bottom soil layers; next will come the marginals or shallow water plants, while third on your list may be the floaters which remain on the surface of the pool. A convenient enough method for growing submerged plants is to put them into plastic containers of different sizes with perforated sides, these can then be moved around if desired. Once the soil has been added to the containers a layer of shingle may be placed over its surface. Frogs and toads will of course take advantage of the cover provided by these plants, with the latter entwining their strings of eggs around stems and leaves.

Plant cover

A most useful oxygenator is Canadian pondweed, others include *Callitriche palustris* and *Hottonia palustris* with the recommended use of one bunch for every two square feet of water. Another size or space ratio may include a dozen plants for each 24 square feet of water. These species will provide a suitable environment for various forms of aquatic life and insects upon which frogs and toads will feed. Other obvious submerged plants are the lilies depending on our preference for the larger or smaller varieties. If we hope to introduce the larger varieties a water depth of not less than 18 inches would be necessary. Regarding a pool which covers an area of 100 square feet it may be noted that the water depth here should be at least 30 inches.

Suitable for both amphibians and shallow water plants will be a shelf or ledge which may extend wholly or partly around a pool. A ledge of this sort need be any deeper than nine or ten inches beneath the water, and it would provide appropriate growing conditions for tall or low set marginal plants. These would give good cover for young frogs or toads during the vulnerable period when they leave the water to come ashore; at this time predators such as birds, animals or indeed human beings may be at hand to destroy many specimens especially if sufficient cover is not available.

Before coming ashore young frogs will remain in shallow water for a time as if getting the feel of their limbs by walking partially submerged. Then, when a particular day comes and at some silent signal hundreds will emerge together to begin life in another dimension. But before doing so the leaves of water lilies, surface floating plants and the marginals may have done much to keep them safe thus far. Fortunately there are lilies to suit large pools, and much smaller varieties which can be grown in water areas confined to tubs or ornamental bowls.

Suitable for the latter are miniature forms of *Odorata minor* and *Pygmaea alba* which could be described as dwarf lilies. In contrast to these there are large white water lilies such as *Odorata alba* and the appropriately named Albatross. Surface water cover and camouflage for frogs can again be provided by floating plants like *Azolla caroliniana* or Fairy Moss, which will form a green colour across the surface of the water. Aptly named again is *Hydrocharis* or Frogbit which displays small white flowers and likewise floats on the surface. Notable points about the leaves of both submerged and floating plants is that these will help to screen sunlight thus preventing thick algal

growths which would produce green slime and cloudiness of the water.

The ecology of a pool or pond can also be upset if certain quick-growing plants are introduced. For this reason plants of the Duckweed variety should be excluded or otherwise the complete water space will become choked by them. Quite different, though, are the useful low-growing or tall-growing marginals; within the former group is *Mentha aquatica* (Water Mint), *Caltha palustris* (Marsh Marigold), *Myosotis palustris* Mermaid (Water Forget-me-not) and *Typha minima* (miniature Reed Mace). Some of the tall-growing marginals include *Iris laevigata* (Water Iris) *Glyceria* and *Acorus calamus*, *Typha latifolia* (Great Reed Mace) and *Ranunculus linguagrandiflora* which is a 3-feet high buttercup.

With such growth around a pool many young frogs and toads are likely to escape the attention of predators. Apart from breeding quarters for the common frog one would like to see expansion rates for the edible frog which is larger than the common species, and lacks the latter's dark patch which extends from eye to the shoulder. Bolder markings also occur on the edible frog, and the back of its thigh will show spotted yellow, black or white dots. By contrast the leg of the common frog is barred or blotched minus the spots. Different also are the vocal sacs of the edible frog as found below the ears of the animal, and when these are inflated for uttering notes during the breeding season the frog assumes a rather comical appearance.

Although numerous specimens of the edible frog were introduced to the eastern counties of England during the early nineteenth century the species has remained relatively uncommon. Some will be found in parts of Norfolk and the Fens, and other specimens do at times turn up in the southern countries, but in general the species has not continued to extend its breeding range. Nowadays too the natterjack toad faces extinction, and yet this species was once common enough on the West Coast; two hundred years ago its habitats included Putney Common, but today its breeding range is restricted to six or seven small areas.

Motorway massacre

Concerning common frogs and toads we note that each year thousands of these creatures are killed on our motorways, and this massacre is helping to eliminate both species. Obviously then, if the animals are attracted to breeding pools and have to cross busy roadways to reach them, naturalists should ensure that as many specimens as possible will safely reach their destinations. For example, efforts should resemble the 1977 'toad lift' operation which was conducted by the aid of naturalists and police at Llandrindod Wells, Mid-Wales.

On that occasion many toads were carried across the A483 in buckets during darkness, and for this purpose 'Slow' signs were erected to warn motorists that such work was proceeding. In this way a torchlight patrol consisting of volunteers had helped thousands of toads to reach their spawning grounds. Similar work is done in Southern Germany where each spring special environmental groups are kept busy on the main highways for up to eight hours a day in transporting frogs and toads across roads. Typical is the main link between Munich and the Alps where during the spring season the road will be closed for several hours to allow frogs and toads to reach their breeding grounds. Because of such care many thousands of these creatures have been saved from destruction during recent years.

Miniscule common froglets, ready to commence a terrestrial existence, make use of leaf of frogbit.

Year old edible froglet also among frogbit whose 10p. piece size leaves give the scale.

The *Xiphophorus* Genus (3) Swords of Every Hue

Written & Illustrated by Barry Durham

PITY THE POOR ichthyologist who only sees one *Xiphophorus helleri* when the aquarist recognises so many varied and colourful forms. Even the sub-species previously described are but minor local colour or size variations, but when one expands the horizon to take in all the colour, tail and fin variations, and combinations of them, the world of the Swordtail is exciting indeed.

There are reds, oranges, blues, greens, golds, blacks, albinos and piebalds. Fish with black fins that contrast against the coloured body; fish with spangles which flash like little diamonds or emeralds in reflected light; fish with metallic mirror-like scales; fish with flowing dorsal fins and even fish with two swords instead of one.

There are now over a dozen recognised basic colours of Swordtail and these are multiplied by the wagtail or black-finned forms and the hi-fin and double sword variations. And new colours are being added each year by dedicated aquarists and fish farmers.

Some of these beautiful varieties began as genetic accidents, but the whole thing really started from the first crossing of a wild swordtail with a wild platy. Without going into all the genetic ins and outs, suffice it to say that such a cross transferred certain colour genes between the fishes to produce different coloured offspring.

Only about half the fry from such a cross would contain the new colour, half the remainder would look like one parent and the other half like the other. That is only the beginning of the story, however, for many such crosses result in high proportion of sterile offspring. The few fertile fish must be bred back to the parents in an effort to "fix" the colour pattern in a higher proportion of the next generation. Then comes the weeding out process to ensure that only the best fish (those which match up to the standard set) are allowed to breed.

One must always be careful, however, not to breed brothers and sisters together too often as this can lead to genetic deformities such as hump-backs, creeping in.

Once a colour or fin variety has been fixed it is then necessary to try and run two or three parallel lines of the strain, either yourself or by passing fish on to other interested aquarists, so that as they diverge through succeeding generations there are always fish distantly related enough to breed back into one of the other lines and so prevent the strain petering out, and either reverting to its original form or becoming beset with malformations.

From that very brief description of line breeding you can appreciate the tremendous amount of work that must have gone into producing even the most basic colour variations. Even now, working with fish which invariably have mixed Swordtail/Platy ancestry, which tends to cut down the incidence of genetic malformation, it can take at the very least a year, and usually very much longer, to create a new strain that will breed true every generation.

Most of this work has now been done for us, however, (although there must be new strains just waiting to be discovered) and the aquarist is now faced with a welter of choice when picking the Swordtails to populate his aquarium.

Perhaps the most popular are the reds, probably because they seem to be the most readily available, though all too often the ones for sale in the shops are undersized individuals which will never grow any more because they have fully formed swords when their body size is around two inches. While this size may be fine for a small tank, it is far from realising this beautiful fish's true potential. A four-inch long red Swordtail with a gold, black-edged sword almost as long again as his body, is a beautiful sight to behold. All male Swordtails should get close to this size with proper feeding and room to swim and grow, and the females should reach about half an inch larger. Albinos are the exception and they are usually a little smaller.

The colours and colour combinations of Swordtails currently available are:

GREEN—the nominate form of *X. helleri* known also as the "Wild" Swordtail, not I might add because it is vicious or acts madly in the aquarium, but because this is the predominent colour in the fish's natural habitat in Mexico. The body is olive brown with a greenish sheen which is more prominent in some fish than others. There is a deep red longitudinal stripe running sometimes from the eye, sometimes right

from the tip of the snout, to the caudal peduncle where it changes to black to edge the top of the sword. On some specimens, where the red stripe starts behind the eye there is a short black stripe running through the eye to the mouth. The red stripe along the lateral line is usually flanked by two other paler stripes. The body colour fades under the belly to give a whitish chest and throat.

The dorsal fin is positioned in the centre of the back at the top of the rise from the snout and is fairly low, sweeping backwards towards the tail. It has a number of red spots sometimes arranged in rows near its base. The tail is sometimes yellowish and other times colourless like the remaining fins. The sword extension to the caudal fin is long and can be gold, bright yellow, orange, red or greenish. The lower edge is black and this colour extents on to the base of the tail as a short dark stripe.

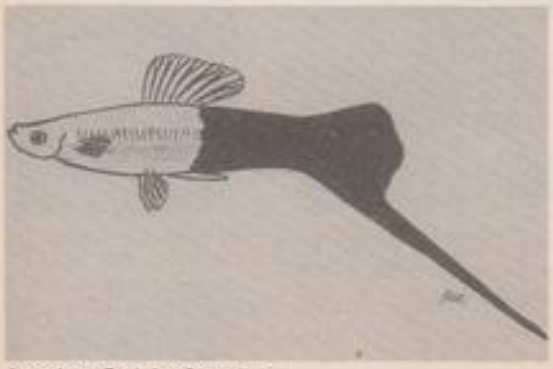
The colour of the females is the same although paler.

RED—The body and fins are a deep red with the colour extending all over the body even under the throat and belly. The eye is black with a silver or gold iris. The sword is gold edged in black top and bottom. Some fish, however, just bear the black edging on the bottom of the sword.

RED-EYED RED—The body and fins should be the same red as the Red Swordtail, but their eyes should also be red including the iris. The sword, too, should match the body and have no edging.

RED JET—There are two forms of this fish—one German, one American. The German or "Frankfurt Hybrid" was created by crossing a male red maculatus platy with a green Swordtail. After the line breeding process had been carried out a fish was produced with a red head and front half of the body, while the rear half was a deep black. The sword was not as long as in the green Swordtail and was also coloured solid black. The scales were sprinkled with bright green dots and the black colour progressed into the red through a series of fine black dots. The fins were sprinkled with dark markings.

The American Red Jet Swordtail has a stark transition between the red on the front of the body and the black at the rear. The fins are usually coloured according to which half of the body they are on, although the dorsal usually has black rays reminiscent of the wagtail. The Sword is exceptionally straight and long. This fish was produced by crossing a wild green Swordtail with a Montezumae Swordtail (*X. montezumae*) from the same area.



American Red Jet Swordtail

ORANGE—Paler in colour than the red this fish was created by crossing a red Swordtail with a domesticated green. The dark red lateral line stripe is prominent against the orange background which is a solid colour above it. Below the lateral line the orange colour pales in the centre of the scales leaving them edged in dark orange. The colour fades altogether on the throat and belly of the fish and like the green Swordtail it has a silvery or gold throat. The sword is usually a solid gold colour but only the bottom edge has the black line which extends to the caudal peduncle. The fins are orange but the colour fades a little towards the extremities.

ALBINO—The body and fins are pinkish white including the sword which should have no edging. The pupil of the eye is red. This variety does not usually attain quite the same size as the others with the males only reaching 3½ in. (9 cms.) in the best specimens and the females 3¾ in. (9½ cms.).

GOLD—The body and fins are an even golden yellow as is the sword. There is no black edging on the sword.

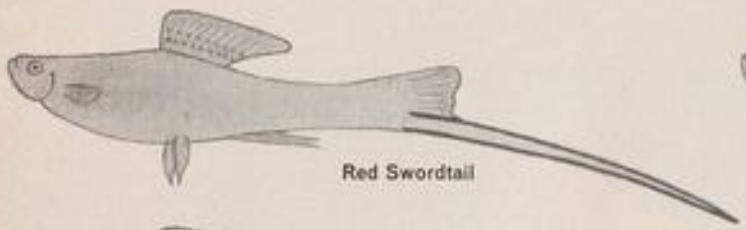
BLACK—A very difficult fish to obtain in its most perfect form which is an even shiny black all over including the fins.

LONDON—An orange bodied fish which is covered with a scattering of metallic green scales edged in black. The fins are yellow with black dots or streaks and the sword is also yellow edged in black.

BERLIN—This seems to be a combination of the previous two types. The basic body colour is black with almost all the scales having metallic green centres. Orange or yellow appears on the snout and colours the underside of the belly and throat and the fins are also either orange or yellow. The eye is black with a silver iris. The sword is golden with either a black edging or a black coloration extending far into it from the caudal peduncle. A really beautiful fish which is an incredible sight in reflected light.

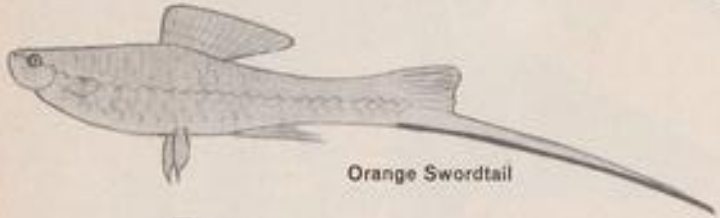
PINEAPPLE—Not unlike the Green Swordtail except that the basic body colour is gold or yellow (the yellow ones are sometimes called Banana Swordtails). The red stripe running from the snout to the base of the tail is present and the gold sword is edged in black. Fins are either gold, or colourless in the yellow variety, with some red dots in the dorsal.

PIEBALD—A fairly recent strain developed by Dr. Joanne Norton in America. One of the exciting things about this fish is that you never know what colour of fish you are going to end up with! They



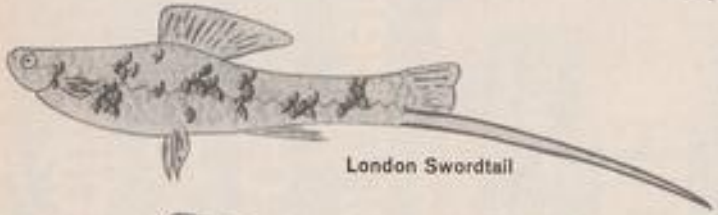
Red Swordtail

Weisbaden Swordtail



Orange Swordtail

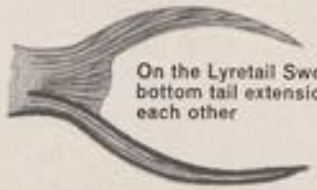
Wagtail Swordtail (Green Form)



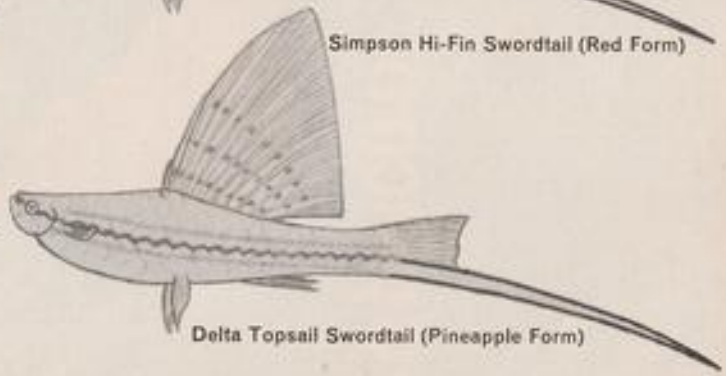
London Swordtail

Simpson Hi-Fin Swordtail (Red Form)

Berlin Swordtail



On the Lyretail Swordtail the top and bottom tail extensions curve towards each other



Delta Topsail Swordtail (Pineapple Form)

are basically orange and black when young but at two months things start to happen and these colours start to disappear. One day the fish may be red or orange with large black spots the next it will have a white head and the black will have started to go as well. It may lose all its red or only part of it, and the same with the black. The fish may be almost all yellow or white at the age of four to five months and then three months later it could be back to red again. You never really know. Most fishes end up with some combination of colours. There is no edging to the sword and the fins may be coloured, colourless or contain just a few spots of colour.

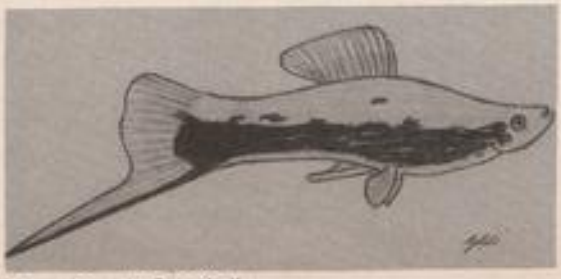
WEISBADEN—This form first appeared in 1937 and although initially there were several forms of it they now seem to have settled into one. The upper half of the body is greenish-olive (like the Green Swordtail) and the lower half is black, the red lateral line stripe forming the dividing line. The fins are coloured according to which half of the body they are on, i.e. dorsal green or colourless, ventrals, pectorals and anal fin to be black. The tail is half black and the sword should be yellow edged in black. There is also a red form where the top half of the body is scarlet as opposed to green.

The fish was developed by crossing a male Green Swordtail which had black markings on the belly with a green female to produce the first variety, and a red female to produce the second. Due to genetic problems the red variety does not breed true, only half the young end up looking like their parents. Half the remainder are red, half are black.

BRONZE—Body colour is pale yellowish bronze with two red stripes. The dorsal fin is an intense red and the other fins are reddish. (This variety is not often seen).

WAGTAIL—The wagtail Swordtail occurs in three colour forms: red, gold and green. The body colours are as described under the separate headings but the rays of the fins and the tail are black. In all cases the sword is black. In the best specimens the black colour of the rays extends also into the fin membranes to provide an even greater contrast with the body colour.

TUXEDO—Not unlike the Weisbaden form except that they breed true. The body colour is either red, orange or gold with a black patch covering the lower half of the body apart from the belly which is either gold or silver. The black patch is not as well defined as in the Weisbaden variety extending irregularly above the lateral line and petering out on the gill covers. The fins are coloured according to body colour with no black in them and the sword should be gold in all cases with a black edging. There may be a small amount of spangling on the black patch.



Young Tuxedo Swordtail

SIMPSON HI-FIN—This is perhaps the best known of the fancy fin shapes of Swordtails. It was established by a Mrs. Simpson of California who noticed one young fish in a brood with a larger dorsal fin than the others and managed to breed from it. The result was fishes with long narrow flowing dorsal fins which often extend well beyond the caudal peduncle in the males. In the females the fin is larger than normal but only about half the body length.

The fin flows over the back of the body and is only held erect when the male is chasing the female of his fancy.

The hi-fin has now been bred into almost all the foregoing colour variations producing some exceptional fish.

DELTA TOPSAIL—Unfortunately this fish is not seen often in Britain for it rivals the Topsail Platy in beauty. It is not unlike the Simpson Hi-fin but in this case the front rays of the dorsal fin hold it erect like a sail. Again it now appears in several colour varieties.

LYRETAIL AND DOUBLE SWORD—These are very similar and often confused. The true Lyretail Swordtail has a sword which curves upwards towards a downward curving extension from the top of the tail. In the Double Swordtail both top and bottom caudal extensions are held straight. Several colour varieties are now available with the lyre and double sword and they have now also been bred into the hi-fin and delta topsail forms as well. These latter forms have presented something of a problem, however, for the males have developed an excessively long gonopodium which in some cases makes breeding impossible. The only way to get more lyretail males is to breed a normal male Swordtail of the appropriate colour with a lyretail female. This is especially true in the Delta Topsail and Hi-fin varieties, although the long gonopodium is also evident in ordinary lyretail and double-sword males.

Hi-fin and ordinary lyre and double sword fish are sometimes confused, especially in female fish, as the lyretail trait has also tended to extend the other fins as well. The dorsal on a normal lyretail or double sword is larger than on fish without the tail extensions, but does not approach anything like the length of the hi-fin.

One peculiarity of these strains is the fact that the females as well as the males carry the tail extensions.

ONE TANK FOR TWO ROOMS

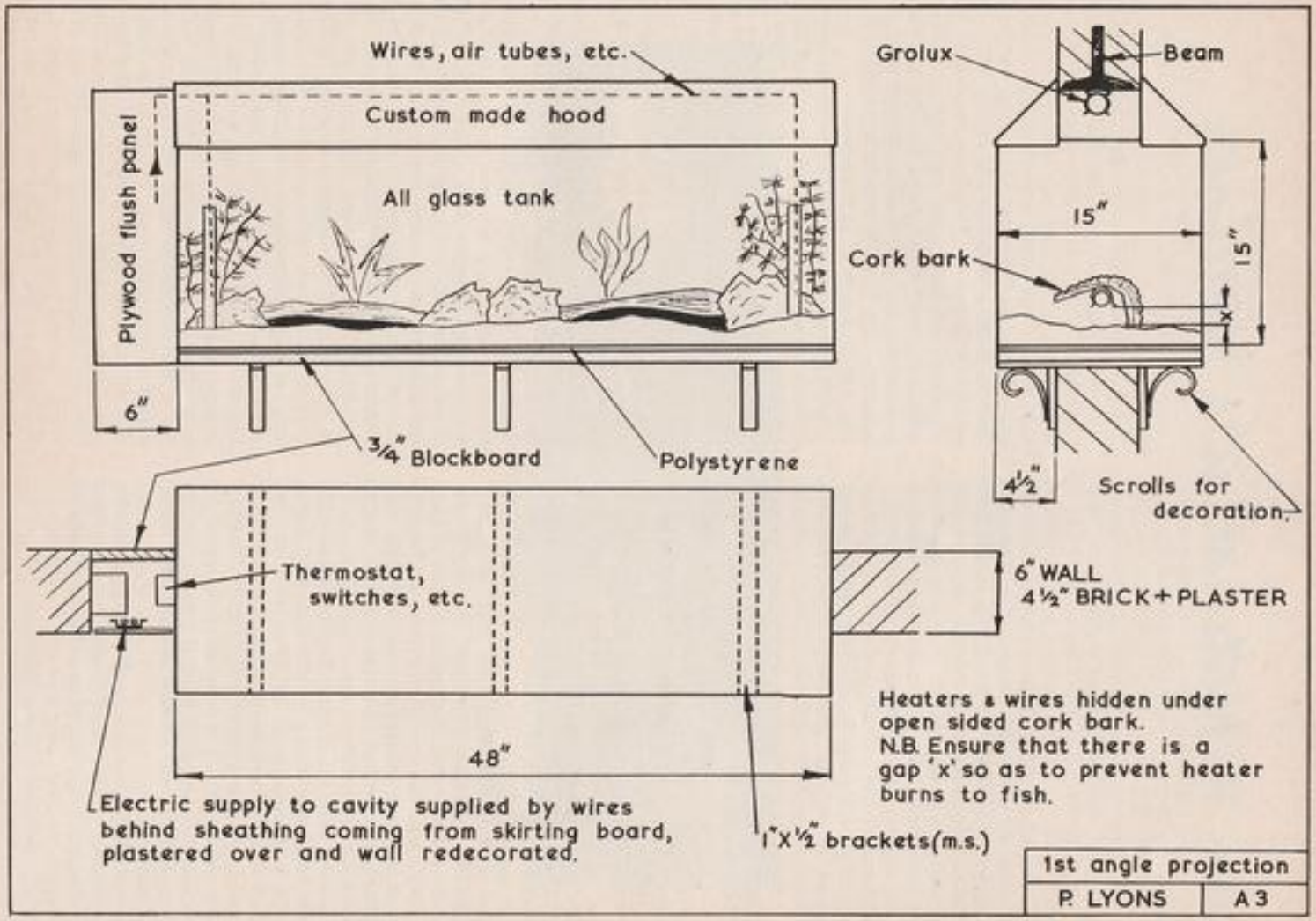
Written & Illustrated by P. Lyons

WHEN talking to many Aquarists and would-be-Aquarists, how many times have I heard them say, "I would like a big tank, but I've nowhere to put it." But how many properties have that bare dividing wall between lounge and hall or dining room which could be modified to house a larger tank for viewing from either side without encroaching on valuable room space?

I have recently fitted a 48 in. × 15 in. × 15 in. all glass tank between my hall and lounge. The average D.I.Y. man should be able to tackle it: Firstly, I chipped away at the plaster roughly to the size of the tank, and then Accro props were used to support the upper part of the wall while a beam was installed. (Anyone attempting this part of the job should ask the advice of a builder, as beam sizes and types will vary according to the wall and load upon it.). The actual hole length was 4 ft. 6 in. to allow switches, wiring, thermostat and aerator to be fitted behind a flush panel (6 in.) in a cavity at the side of the tank. The tank itself was placed on a ¾ in. blockboard shelf with 1 in. × ¼ in. mild steel brackets welded and fastened securely to shelf and wall to support the overhang of the tank on either side of the wall. A Grolux lamp was fitted on the underside of the beam, and 2 removable hoods were made for either side of the tank.

The tank was laid out in such a way that all heaters were concealed. I used 4-75 watt heaters with an outside thermostat hidden behind the flush panel, and the heaters were concealed under a half section of cork bark. The wires and under-gravel filter tubes were hidden by careful planting of bushy plant growth.

The tank is stocked with the usual assortment of community fish and it is now the focal point of the room. It has the effect of having a tank in each room without losing valuable room space.


Wires, air tubes, etc.
Custom made hood
Plywood flush panel
All glass tank
6"
3/4" Blockboard
Polystyrene
Thermostat, switches, etc.
48"
Electric supply to cavity supplied by wires behind sheathing coming from skirting board, plastered over and wall redecorated.
1"X1/2" brackets(m.s.)
Grolux
Beam
15"
15"
Cork bark
x
4½"
Scrolls for decoration.
6" WALL
4½" BRICK + PLASTER
Heaters & wires hidden under open sided cork bark.
N.B. Ensure that there is a gap 'x' so as to prevent heater burns to fish.
1st angle projection
P. LYONS
A3

From a Naturalist's Notebook

by Eric Hardy

WHAT'S NEW among fishes, reptiles and amphibians? There seems no end to the answer. Six distinctive new Cyprinid "minnows" of the genus *Diondа* have been discovered in streams in Mexico, and are described further on in these notes. Five new species of gecko include three from Hispaniola: *Sphaerodactylus ocoae*, *S. zygaena* and *S. thompsoni*. Also new are *S. callocricus* from Dominicana and *Aristelliger hechti*, from the Caicos Islands. Four new frogs are: *Cophicalus saxatilis*, a tree-frog from Australia, *Adenomera lutzi* from Guyana, *Eleutherodactylus caprifer* from the Pacific lowlands of Ecuador and a reed-frog, *Hyperolius cystocandicans* from Kenya's mountains. Two new snakes, *Sibon neilli* from Belize, Central America, and *Philodryas borellii* raised to specific rank in the U.S., are both colubrines. A greaved (*Teiid*) lizard, *Ameiva anomala* from the Pacific lowlands of Colombia, a dwarf Plethodont salamander, *Bolitoglossa diminuata* from Costa Rica, and an African toad from the Ivory Coast, *Bufo danielae*, are also new.

The North American bull frog has been established in Jamaica. Apropros my recent remarks on temperature and sex-change in frogs, in India, large numbers of male tiger-frogs have been found with fully developed oviducts opening into the cloaca. In South America, leaf-sitting glass-frogs and tree-frogs have been found when examined by infra-red colour photography to reflect near infra-red light (700-900 nanometers), an advantage in cryptic camouflage as well as temperature regulation.

In Berlin Zoo, an Asiatic banded crait-adder, *Bungarus fasciatus* lived 14 years and another colubrine, *Ophiophagus hannah*, lived for 11 years 2 months. Indiana University medical school has shown that our European adder-venom can be neutralised by American pit-viper antivenom. It was no laughing matter for an American laughing gull when it became the first recorded victim of the western diamondback rattlesnake recently.

Russians continue to be the leading field-workers on sand-lizards, with Tertyshnikov of Stavropol Pedagogical Institute studying the influence of weather and climate on their activity and Borchwardt of Leningrad University the development of their backbones. Welsh workers at Aberystwyth found that toads may gain lead-poisoning from lead-contaminated earthworms, which may have picked it up from plants contaminated by nearby motor traffic's anti-knock in petrol. Following my recent remarks on adders preying upon nestlings in bird-boxes, Italian observers found them feeding on broods of rock-doves. Not all animals succumb to snake-venom, however. The Virginia oppossum in the U.S. has a high natural resistance to rattle-snakes.

Little is known of the evolution of the head-backbone joint in snakes since they lost their shoulder-girdle. Gregory Pregill of Kansas University museum has specially researched this in the common *Coluber constrictor*, and how the trunk-muscles inserted on the skull move the head. The muscles mostly concerned are obliqus capitus magnus and rectus capitus anterior, which have no other function but to move head (for feeding) and neck (in their sideway undulatory movement). The theory of snake origin is evolution from limbless burrowing lizards.

Of the new *Diondа* minnows from Mexico, Contreras-Balderas and Verduxco-Martinez of Ciudad University, Monterrey, described *D. mandibularis* from the Upper Rio Verde with a distinctive double S-shaped intestine, teeth, scale-numbers and protruding lower lip (hence its name) adding a new Nearctic (North America-Greenland) element to the local fauna. It has a blacker lateral stripe, bordered by much whiter marginal stripes, than five other new Diondas which Hubbs and Miller of Michigan University recently described from the same region. These include *D. rasconis*, with an elongated intestine (herbivorous feeding) and a small barbel and also a very dark lateral stripe and a golden overcast to its silvery scales.

D. catostomops has a down-turned snout with a barbel and a paler lateral. *D. dichroma* has more irridescant blue fins in the male, becoming sooty at spawning. *D. ipni*, straight backed and without a barbel, but more distinctive tubercles in the nuptial male than most species, also has a bold black blotch on each fin. *D. erimyzonops* is much rarer and associates with similarly coloured *Gambusia vittata*. However, the classification of American cyprinids has been in a chaotic state from the discredited significance given to possession or not of coiled intestines and barbels.

The freshwater eel has a long aquarium history back

From a Naturalist's Notebook

by Eric Hardy

WHAT'S NEW among fishes, reptiles and amphibians? There seems no end to the answer. Six distinctive new Cyprinid "minnows" of the genus *Diondа* have been discovered in streams in Mexico, and are described further on in these notes. Five new species of gecko include three from Hispaniola: *Sphaerodactylus ocoae*, *S. zygaena* and *S. thompsoni*. Also new are *S. callocricus* from Dominicana and *Aristelliger hechti*, from the Caicos Islands. Four new frogs are: *Cophicalus saxatilis*, a tree-frog from Australia, *Adenomera lutzi* from Guyana, *Eleutherodactylus caprifer* from the Pacific lowlands of Ecuador and a reed-frog, *Hyperolius cystocandicans* from Kenya's mountains. Two new snakes, *Sibon neilli* from Belize, Central America, and *Philodryas borellii* raised to specific rank in the U.S., are both colubrines. A greaved (*Teiid*) lizard, *Ameiva anomala* from the Pacific lowlands of Colombia, a dwarf Plethodont salamander, *Bolitoglossa diminuata* from Costa Rica, and an African toad from the Ivory Coast, *Bufo danielae*, are also new.

The North American bull frog has been established in Jamaica. Apropros my recent remarks on temperature and sex-change in frogs, in India, large numbers of male tiger-frogs have been found with fully developed oviducts opening into the cloaca. In South America, leaf-sitting glass-frogs and tree-frogs have been found when examined by infra-red colour photography to reflect near infra-red light (700-900 nanometers), an advantage in cryptic camouflage as well as temperature regulation.

In Berlin Zoo, an Asiatic banded crait-adder, *Bungarus fasciatus* lived 14 years and another colubrine, *Ophiophagus hannah*, lived for 11 years 2 months. Indiana University medical school has shown that our European adder-venom can be neutralised by American pit-viper antivenom. It was no laughing matter for an American laughing gull when it became the first recorded victim of the western diamondback rattlesnake recently.

Russians continue to be the leading field-workers on sand-lizards, with Tertyshnikov of Stavropol Pedagogical Institute studying the influence of weather and climate on their activity and Borchwardt of Leningrad University the development of their backbones. Welsh workers at Aberystwyth found that toads may gain lead-poisoning from lead-contaminated earthworms, which may have picked it up from plants contaminated by nearby motor traffic's anti-knock in petrol. Following my recent remarks on adders preying upon nestlings in bird-boxes, Italian observers found them feeding on broods of rock-doves. Not all animals succumb to snake-venom, however. The Virginia oppossum in the U.S. has a high natural resistance to rattle-snakes.

Little is known of the evolution of the head-backbone joint in snakes since they lost their shoulder-girdle. Gregory Pregill of Kansas University museum has specially researched this in the common *Coluber constrictor*, and how the trunk-muscles inserted on the skull move the head. The muscles mostly concerned are obliqus capitus magnus and rectus capitus anterior, which have no other function but to move head (for feeding) and neck (in their sideway undulatory movement). The theory of snake origin is evolution from limbless burrowing lizards.

Of the new *Diondа* minnows from Mexico, Contreras-Balderas and Verduxco-Martinez of Ciudad University, Monterrey, described *D. mandibularis* from the Upper Rio Verde with a distinctive double S-shaped intestine, teeth, scale-numbers and protruding lower lip (hence its name) adding a new Nearctic (North America-Greenland) element to the local fauna. It has a blacker lateral stripe, bordered by much whiter marginal stripes, than five other new Diondas which Hubbs and Miller of Michigan University recently described from the same region. These include *D. rasconis*, with an elongated intestine (herbivorous feeding) and a small barbel and also a very dark lateral stripe and a golden overcast to its silvery scales.

D. catostomops has a down-turned snout with a barbel and a paler lateral. *D. dichroma* has more irridescant blue fins in the male, becoming sooty at spawning. *D. ipni*, straight backed and without a barbel, but more distinctive tubercles in the nuptial male than most species, also has a bold black blotch on each fin. *D. erimyzonops* is much rarer and associates with similarly coloured *Gambusia vittata*. However, the classification of American cyprinids has been in a chaotic state from the discredited significance given to possession or not of coiled intestines and barbels.

The freshwater eel has a long aquarium history back

to Roman times, but the German biologist, F-W Tesch, has made most modern studies that way. As we all learned to our cost, eels will leave an aquarium if the water is unsuitable or from competition from too many eels. Fed on *tubifex*, *Daphnia* or young brine shrimps, the young transparent glass eel undergoes a reduction in length at certain stages of metamorphosis. Fed on chopped meat or fish, larger eels bite off with quick, jerky movements, sizeable pieces; but they develop fads for favourite foods. Normally they eat more at night than by day, but if accustomed to regular feeding times they will take food during the day. They grow quicker at favourable temperatures in a tank than in the wild, but are easily infected with disease. For this, biotics are mixed with their food, or they improve from a five hours bath in 250 m/litre of tetracycline. If a tube is placed in their aquarium, it becomes a hide-out refuge during daylight, which they leave at dusk to swim about. Several eels will crowd into one tube, even if several tubes are in the aquarium.

The most informative and authoritative book ever published on this fish is the recent 434 page, updated English edition of Dr. Tesch's classic German book on *The Eel* (Chapman & Hall £18). It covers in depth everything from fishing and cooking eels to their life history, pond-culture, anatomy, distribution and modern research. It is the first book to cover all the world's 16 eels from Africa and New Zealand to Japan; but reveals many gaps in our knowledge of their lives.

No mature eel has ever been caught in the Sargasso Sea despite its being accepted as their breeding origin. Doubt is held over the identity of Schmidt's famous 1927 egg found there. Little proof exists of how European eels navigate back to the Sargasso Sea. They have the greatest sense of smell in fish. The book does not support Tucker's famous modern theory that American and European eels are the same species, and casts doubt upon continental drift as the origin of the eel's long journey here. The common place of evolutionary origin of the world's eels is unknown. Though the book has 52 pages of references, its 12-page index omits much, even other fish mentioned in the text. But it will remain the standard textbook on the eel far in advance of any other for many years.

Marine aquarists aspiring to keep lobsters will find much useful information in Ayres and Wood's new 9-page Laboratory Leaflet 37, from the Ministry of Agriculture and Fisheries Research at Lowestoft: *The Live Storage of Lobsters*. At 4·4°C, 45 kg of these crustaceans require 237 litres of sea-water an hour to satisfy their oxygen requirements, but twice as much at 12·8°C, thrice at 17·2°C and four times at 21·1°C. Disease risks increase above 10°C. Tanks should be of non-toxic plastic, wood, stone, brick, concrete or reinforced glass-fibre, as shallow as possible to avoid the lobsters piling up. Water must be changed frequently, or adequately filtered, and shaded away from bright light. Feeding in the tanks presents special problems.

Away from the sea, artificial sea-water can be made up with the correct weight and chemical composition of five simple salts and tap-water. For this, another new publication by the same authors, a new updated edition of a 1966 publication, renamed: *Artificial Sea Water for Shellfish Tanks* (Lab. Leaflet 39) is recommended. It points out that common salt used should be pure vacuum-dried cooking salt, not rock-salt. If hydrated calcium chloride is used instead of flaked calcium chloride, the quantity should be increased 50 per cent, but do not use anhydrous calcium chloride. It may be cheapest to buy commercial or agricultural grades through industrial chemists in 50 kg lots in air-tight containers.

Lobsters require minimum salinity of 27‰ and 1·023 SG made up per litre of water at up to 10°C, of 23·51 g sodium chloride, 5·74 magnesium sulphate, 4·55 magnesium chloride, 1·19 flake calcium chloride and 0·56 potassium chloride, giving an approximate salinity of 30‰. To increase the salinity of natural sea-water add 1 lb 3 oz of salt per 100 gals for each unity of salinity required, or 1 lb 7 oz for each unity of specific gravity required. Water should be added when SG is 1·019 or more. The SG requirement lowers as water temperature rises, e.g. 1·022 at 10·1-15°C, 1·021 at 15·1-20°C and 1·020 above 20°C.

Dionda manibularis, a new cyprinid "minnow", a river fish from Mexico.
Photo: Courtesy San Diego Socy. of Nat. History.

Labeotropheus fuelleborni

by Philip Allen

Labeotropheus fuelleborni is a colourful cichlid from Lake Malawi. It is apparently a common species occupying any rocky outcrop round the lake and is a medium sized cichlid attaining a length of around 5 inches. Peaceful with other species of the same size, but not very peaceful amongst its own species.

A mature male *L. fuelleborni* is a beautiful powder blue colour with seven or eight vertical bars of a slightly darker blue. The fins are often suffused with orange. Females come in two colour varieties. The one is similar to the male only the colouration much duller. The other is known as an O.B. morph (O.B. being short for Orange Block) and has a pale orange, or fawn, background liberally peppered with dark brown/black spots and blotches. There are other colour varieties of *L. fuelleborni* (e.g. yellow flanked) but these are not seen too often.

Sexing *L. fuelleborni* is simple when the fish are in breeding condition. It is not quite so easy if the females are blue. Then the males can generally be identified by the yellow egg spots on the anal fin, the female having none or only one or two faint spots.

L. fuelleborni has a very distinctive mouth, similar to that of the "sharks" (*Labeo*). This underslung mouth is perfectly suited to grazing algae from the surface of the rocks amongst which these fish live. The algae abound with small aquatic life, (copepods, tubificial worms etc.). Feeding in the aquarium is no problem; they will take all the usual foods offered: white worm, *tubifex*, ox heart, flake foods etc. I find that to maintain a good growth rate or to induce spawning, feeding is best done seven or eight times each day. Also, some green stuff should be included in their diet—duckweed or spinach which has been boiled and chopped are two suitable vegetable foods.

Water conditions in Lake Malawi are alkaline and very hard. This is not essential in aquariums but is desirable if the fish are to look their best. My own malawi tanks are ex-marine tanks and the bottom is covered with about 2-3 inches of gravel, crushed cockleshell and crushed coral in approximately equal proportions. The crushed shell and coral continuously buffer the water conditions to maintain them hard and alkaline. (The tanks are also partially undergravel filtered.)

Lake Malawi cichlids are best kept and bred as a community. I find that it is better to have three or four pairs (or preferably trios—1 male, 2 females) of different species in the same tank. In this way the male's aggression towards the female is split between her (or them in trios) and protecting his territory against males of other species. Tanks containing malawi cichlids should have plenty of rocks for females and non-dominant males to hide among. My own tanks are decorated with broken house bricks built into an intricate wall at the back. Plenty of hiding places also ensures that pairs can defend a territory during spawning.

L. fuelleborni spawns like most malawi cichlids, in that the male digs a nest (often under a rock) and

Female, normal appearance

Female with distended buccal cavity

then tries to entice any female of his species to join him. I have witnessed only one actual spawning of *L. fuelleborni* and this occurred under a housebrick. (It is more usual to discover the female brooding eggs.) The male displayed to the female for several days prior to spawning, extending all his fins and quivering like a jelly in front of her. Every time she refused to follow him to the nest he would chase her all around the tank before returning to his own territory. The female's signal of acceptance of the male was that she joined him and the pair chased round in a tight circle as if both fish were attempting to catch the other's tail. The pair then retired beneath the housebrick for a few minutes. By looking underneath the tank I could see most of the spawning (although it was a trifle uncomfortable.). The female, after another bout of quivering, laid three large yellow eggs. She immediately turned around and picked them up in her mouth and left the nest. The male did not run over the eggs to fertilise them as I expected but remained alongside the female as she spawned and quivered occasionally. He chased her as she left the nest and then began displaying to her again. Two minutes later they returned to the nest, this time the female laid only two eggs. (I did not witness any further spawnings, although twelve fry were later released.) No pair bond between the fish was observed prior to or after spawning and the two were only seen together during egglaying. The female incubated the eggs in her buccal cavity for 21 days. During this time I isolated her in a two-foot tank. She refused food for the whole 21 days, although a wide variety was offered. Her lower jaw became very distended as in the diagram.

On the 21st, 22nd and 23rd days after the spawning, three or four fry could be seen close to the gravel. At any movement outside the tank they immediately retired to the female's mouth. On the 24th day, the female's lower jaw was back to normal and twelve fry were swimming just above the gravel. I removed the female and placed her in a tank on her own to recondition her before returning to the community tank. Mouth brooding leaves the female in very poor condition and if she is returned to the community tank at once, she is often found dead the following morning. Another precaution to take, when returning the female or in fact when introducing any new fish to the tank, is to completely rearrange the tank decor. This causes the fish already present in the tank to find and defend a new territory, so that the newcomers usually go unnoticed in the confusion.

L. fuelleborni are not very prolific spawners (few malawi mouthbrooders are), the fry numbering from 2-3 up to 50 (50 being an unsually large spawning even for an extra large female.). The fry are easily reared on any food they are capable of eating. The colour of the fry is a rather drab fawn with several dark vertical bands. The blue coloration does not begin to develop until the fish are about 3 inches long. The mouths of the fry initially are not underslung like their parents. This characteristic develops as the fry grow, although the 'nose' never seems to attain the same proportions in tank bred fish as it does in wild specimens. (Possibly some dietary defficiency.)

Labeotropheus fuelleborni is one of the more readily available malawi cichlids and consequently one of the lower priced species and definitely worthy of a place in a cichlid community.

WHAT IS YOUR OPINION?

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

Photographs by the Author

IT'S CHRISTMAS EVE and I have finally found a few spare minutes to begin this month's feature. My thanks to the reader who sent me a Christmas card—and to the reader whose letter has amused me most in 1977. The funny letter, which I quote in full, as written, reached me from Mr. Gordon West, of Barton, Dunterton, Milton Abbot, Tavistock, Devon. Mr. West, possibly touched by the Christmas spirit, had the following to say: "Better by far perhaps if I had just sent you a Christmas card rather than a letter that can do little to swell your column. As a coldwater fishkeeper I have found over several years that reading your pages in *The Aquarist* is best done after the strengthening effect of a couple of large Scotches. Let me try to bring a blush to your cheeks and force you into the finest new year's resolution that you could make.

"You extolled, a while ago, a book that would enable you in future to use only the correct (?), proper (?) and, save the mark, SCIENTIFIC names for tropical fishes and I am not really denying that the ephemeral mess of dog Latin is not valuable and useful; it is and will be until a truly scientific table of designations releases us from this haphazard remnant of European culture. Rather like the Yanks who drew lines across Korea and then Vietnam and declared the sections to contain 'goodies' and 'baddies' you draw a line across a thermometer and say that all above it are scientific species and all below are just 'fish.'

"Example: repeated use of term Fancy Goldfish; this is acceptable up to a point but gets worrying when it is used in the singular. A fancy goldfish is impossible. I do not ask that you wrap your tongue around the proper (oriental) names of goldfish types but a less cavalier terminology ought to be possible for you. Most of them have been done into thoroughly descriptive English. Which, of several fantails, do you at any time mean? Please relax from the defensive position that says that all goldfish are hybrids of *Carassius auratus*. If you let in that argument you can throw your book of scientific names out of the window; Irishmen and pygmies are *Homo sapiens* too.

"Your problem begins in the pet shop where ignorance rules OK and misnomers fall like rain upon aberrations that would be better dead and are usually not far from that state. If you must abet them then be pleased to share their guilt. Resolution 78. 1. Not to refer to particular fish in general terms, e.g., 'Black Moor' should be MOOR qualified by fantail, broadtail or veiltail. 2. Spend a few pence on the FBAS or GSGB species books. 3. Visit at least one of the major coldwater fish shows this year or pay a visit to one of the established breeders of coldwater fishes. Any hope?

"Actually I find this month that I could have faced your lines with only one-and-a-half large Scotches. The horror crop is thinner than usual. Your correspondent who keeps and hopes to breed six different varieties of gold fish in twenty tanks—ruthless culling of one spawning from each would leave him after twelve weeks with a requirement for 150 sq. ft. of tank! And bless the lad who keeps his pond algae-free by giving it regular injections of mineral salts. He should be keeping lemmings. How do they manage to skip over Arthur Boarder's page and get to yours? Nevertheless, and you don't have to believe me, it's a good column and I'll take any excuse for a drink."

Your subtle humour did give me a laugh, Mr. West; but can I reply to your questions? I shall try. I do not write the letters that appear in my columns, nor do I necessarily agree with the views expressed; when necessary I shorten the letters and correct some of the English. I do not change the content of the letters as much of it is subjective opinion—and this feature solicits opinions. Speaking personally, as an Irishman who is not a pygmy, my singular reason for being vague when writing about my three coldwater fish is simple: ignorance! It's many years since I last kept coldwater fish and I admit to being very ignorant about either their correct or common names. I am also relatively poor. I should be delighted to be educated about the proper names of coldwater fishes. Perhaps the FBAS or the GSGB will send me copies of booklets—if the booklets contain drawings or photographs—that will enlighten me. I don't know any established breeders of coldwater fishes; nor can I afford to travel to Britain to visit one of the major coldwater fish shows; however, I should be delighted to visit breeders or shows if someone would pay my air fares. I'm geographically isolated from the

experts in coldwater fishkeeping and, hence, cannot learn from them in person. Any suggestions or offers?

I liked the amended greeting contained in the Christmas card I received from Mr. Daniel Bennett. It read: 'With best *fishes* for Christmas and the New Year.' Mr. Bennett, whose address is 24 Blackshaw Road, Old Glossop, Derbyshire, also had the following to say: "I have a lot of Java Moss and I would be happy to give a piece to readers who wrote to you after your stock had run out—or to anyone else who would like a piece." Anyone wishing to take up Mr. Bennett's kind offer should write directly to his home address. I suggest that those who write should enclose a waterproof, polythene bag and a suitably stamped, addressed envelope. To save Mr. Bennett from having to write, I suggest that he returns the empty polythene bag, in the s.a.e., to indicate when stocks have gone.

Numbers of other readers have sent me letters containing, amongst other information, details of fishes or plants that they would be willing to sell or exchange; or details of specimens that they would like to obtain but have been unable to do so. It would help if such offers or requests were written on separate sheets and not included in sections of letters intended for inclusion in *W.Y.O.* Such separate sheets should show the writer's full name and address. I did ask our Editor about the possibility of starting an 'Exchange & Wanted' column or page but, as yet, he has not informed me of his decision.

Mr. Alan Blackburn lives at 43 Parkinson Street, Burnley, Lancs. He writes about the subject: "I thought I would drop you a line as a follow-up to my previous letter and request relating to 'wanted' fish. I was extremely pleased to read in *The Aquarist* of your success in obtaining a male *A. borelli*. I too have had great success in obtaining the female *Haplochromis burtoni* I was seeking. Letters were received from far and wide—Clwyd, Harrogate, Bolton and London. I have taken two people up on their offers and have, in fact, been successful in breeding this species; so, if you know anyone who wants a few dozen *H. burtoni* fry, let me know . . .! Thanks a lot for your help with my problem: your assistance was most valuable. Please let me take this opportunity to thank everybody who offered me fish—whether accepted or declined. I thank them all for taking the time and trouble to reply to my plea."

This month's three photographs show some of the plants that thrive in my tanks. I hope they encourage those who've been unable to grow plants.

Swap Shop

Mr. D. Morgan's address is 'Davine,' 9 Holford Street, Aberaman, Aberdare, Mid-Glam. He writes: "How about *The Aquarist* publishing a sort of 'Swap Shop' for fish, etc.? There must be a lot of aquarists like myself who would like to exchange surplus fry, etc., but the cost of a proper advertisement would not be justified. This would not affect the normal service; and a moderate fee, say 50p, could even be charged for handling. How about it?" (Over to you, Mr. Editor). Mr. Morgan continues: "I read with sympathy your November, 1977, column where you described the fate of your fish delivered by post. I recall working as a postman in a student vacation and seeing, with horror, parcels clearly marked 'Fragile' being thrown about 10 ft. into a sorting basket.

"Recently I received £2 worth of plants from a mail order firm, only to find that the polystyrene carton had been well and truly crushed in transit, with

extensive damage to the plants. Fortunately, with one exception, they were not ruined entirely; and I am pleased to say that they are now growing quite well. In fairness to the Post Office, I know many parcels are inadequately packed; but in the light of examples such as your own it would seem that we must just bear the slings and arrows of outrageous fortune! However, moving on to happier topics I should like to give you my opinion on some subjects. First, dealing with pumps and U/G filters together, I should like to endorse the opinion in most fishkeeping books that it is better not to skimp on buying a pump. My first pump (an inexpensive one) is far noisier and produces much less air than my Rena 101. I keep my U/G filters running 24 hours a day in both my tanks and find that all my plants—*Sagittaria*, *Vallisneria torta*, *Cabomba*, *Eleocharis* and pygmy chain swords—grow strongly. The only plants that seem a bit straggly are *Elodea densa*; but this I attribute to the heat, as it used to grow strongly in a coldwater tank with a U/G filter. Incidentally, the usual fear expressed about continuous aeration/filtration, i.e. that the fish suffer in a power cut, etc., is, I have found, unfounded. On the few occasions when, for some reason, I have switched off the air and omitted to put it back on—once for 48 hours—there seemed to be no adverse effects at all. My opinion is, if you've bought a pump, use it! After all, the running costs will be only a few pence extra, and the fish will benefit.

"On to the new digital thermometers, I think they are great. First, they are accurate to plus or minus ½°F; secondly, they're easily read—even from the other side of the room (8-10 ft. in my home). Thirdly, whereas a bulb-type thermometer measures the temperature only at the bulb level (try it for yourself: hold an ordinary thermometer half-way up the stem; there's little or no response), the digital unit measures along its whole length, thus giving a better overall reading. Lastly, I think they look modern. The only disadvantage, I will admit, is that they must be fixed in one position—but you can always use an old type for spot checks of local heating. I should be pleased to correspond with any of your readers—especially those interested in guppies, gouramies and angels. I enjoy your columns very much." (I have not tried digital thermometers but a friend informed me that they are difficult to read, at night, if the room is lit only by an aquarium light. No doubt this problem would be much less annoying than those specimens supplied with 'rubber' suckers which, after a few weeks in an aquarium, either dissolve or harden and leave the thermometers lying on the gravel where their presence is of no use to anyone. Replacement suckers are not always easily found for some brands).

Bad Plant Growth

"Just recently there have been many letters in *W.Y.O.* relating to bad plant growth in aquariums. I have never had any trouble growing plants in my tanks and wonder if the reason for my success is that I use only rainwater. I live in a rural area where there is very little air pollution and the rainwater records a pH of 6.8 and is very soft," writes Mrs. Sally Pike, from 14 St. John's Road, Warminster, Wilts. She continues: "I must admit that I don't

even filter this water, but let it stand in an old plastic bath and then add it straight to the aquarium—heated to the temperature of the tank, of course. I also change about 10% of my tank water every week or so. The tanks are not heavily populated with fishes and all are fitted with U/G filters. One tank, for example—a 36 in. × 12 in. × 15 in.—contains about twenty small tetras and is heavily planted with *Cryptocoryne*, Java moss, Java fern, wistaria and a few *Aponogeton* 'bulbs.' This tank has been established for about only two months and the plants are racing away. None of the *Cryptocoryne* has shed any leaves, which these plants are sometimes inclined to do when they experience a change of environment, and are throwing out shoots galore. The moss is multiplying like mad and the

Java fern is producing babies from its holdstock. Even the *Aponogeton*, which are officially in their resting period, are producing new leaves.

"My lighting in this tank is a combination of Gro-lux (20 watts) and bulbs (2 × 30 watts), but equally good growth is obtained in my other tanks by one 30 watt True-lite and mixed fluorescent tubes.

The only plants that do not seem to respond well to this soft water are the *Cabomba*/*Elodea* type bunch plants; and also *Vallisneria*, which I have never been successful with. It doesn't die but, on the other hand, it never grows luxuriously. I hope this letter will be of interest to you and your readers, although it is not very encouraging to those who live in industrial areas where air pollution prohibits the use of rainwater altogether.

"I find that almost all plants respond well to soft, slightly acid water, and many of them simply will not grow well in the chemical hodge-podge that passes for tapwater these days."

Error

Mr. A. W. McCabe, of 26 Gruttenden Road, Great Moor, Stockport, Cheshire, writes to ask me to correct an error that appeared in his letter published in the December, 1977, issue. The letter stated that *Geophagus pellegrini* is of the South African genus; in fact, it is of the South American genus. Mr. McCabe says: ". . . The fish is in fact known south of the Rio Atrato and the Rio Jan Juan Casino in Colombia, which flows northwards into the Caribbean . . . Re. 'Exchange & Wanted': I have some ¾ in. *Melanochromis johanni*. If any readers care to get in touch with me I would sell them or exchange. They would, of course, have to come to my home." (Anyone interested should write directly to Mr. McCabe before calling at his home).

Mr. J. Fuller, of 3 Pike Way, North Weald, Essex, wishes to obtain a pair of *A. borelli* and *agassizi*. Please write directly to him.

New Society

Mr. M. R. Allport's home is at 5 Huntingdon Gardens, Calley Lane, Cradley, West Mids. At the moment he is thinking of forming a society, in his area, to increase the popularity of our hobby. He'd like anyone interested to write to him, enclosing a s.a.e., so he can attempt to get the idea off the ground.

A couple of points: please DO NOT send me queries that require personal replies; I just do not have time to send answers to individuals' questions. Such queries should be sent to Messrs. Boarder or Hems.

Please ensure that you PRINT your name, address and any important technical terms in letters intended for publication in this feature. I've had to exclude several interesting letters from this month's feature because I've been unable to read crucial, technical terms, not directly connected with the hobby. In at least one case, the publication of a word that I could not read might have resulted in confusion that could have led to a fire.

No one could accuse Miss Charlotte Barnes, of 26 Ousedale Close, Lewes, East Sussex, of being an untidy writer; her handwriting is a joy to read! She writes: ". . . I have some Java Moss to spare; not a vast amount, but it's growing steadily." Miss Barnes says that she will "do her best" for anyone who cares to write enclosing a s.a.e. and, I would suggest, a polythene bag. She continues: "I was very interested to see a letter from a Mr. P. Loweridge in October, 1977's *W.Y.O.* Like him, I also keep *Balantiocheilus melanopterus*, known as silver shark in this area. I had a pair, bought in May, at about 3 in. in length. One is now about 5½ in. long, and in need of more spacious accommodation. At present it is in a community tank with a pair of breeding angels, a silver dollar, a pair of rams, clown loaches and some other small fish.

"Unfortunately I lost one of the pair: it developed a thin film over its eyes. I tried a salt bath, but to no avail, and so decided to get expert advice. I phoned five dealers in my area and, although very helpful, they all had different opinions and all suggested different cures. In the end I bought a cure from my regular dealer; but although I followed the instructions exactly, the shark died. The following evening the remaining shark had developed the same condition. Rather than use the 'cure' again I painted the eyes over very carefully with a 2% mercurochrome solution. I wish I'd tried it on the other fish as they cost £5.50 each.

"I cannot find much information on this fish, except one reference describing them as 'voracious and predatory.' This has proved to be untrue in my opinion; my shark lives quite peacefully with neons, etc., which it is perfectly capable of catching and swallowing whole.

Sucking loaches

"One very annoying problem of mine is a habit one of my sucking loaches has acquired: it not only 'sucks' the sides of the tank but also the sides of fish—mainly angels and the silver dollar—but usually anything it can catch. The fish dart away in panic and I'm afraid they could get injured. Can anybody suggest a reason for the behaviour of the sucking loach?"

In the November, 1977, issue a reader asked for tips about showing fishes. Mr. G. Fenwick, of N.G.L.S., is an F.B.A.S. 'B' class judge, and he kindly sent the following letter from his home at 20 Ambassadors Way, Norham Park Estate, New York, North Shields, North Tyneside, England. "The main points I have found are listed below. 1. Comply with any rules given on the show schedule. The F.B.A.S. Book 5 deals with all aspects of this for F.B.A.S. sponsored shows. 2. Ensure that the fish is complete and without deformities, i.e. that the fins are all present and without splits, and the body, mouth, etc. are to the correct shape and in the correct position. 3. Prevent tank debris from entering the jar by straining the water through a fine mesh; and wash the net and fish in a separate container to prevent the introduction of debris with the fish. 4. Keep the show jar clean both inside and out, removing water marks, old glue from labels, etc. Plastic tanks and containers should not be used if badly scratched, or if milky, since the judge points only what he can see.

"5. Do not show heavily gravid female livebearers as they may be disqualified for giving birth in the show jar. Such births can also lose both fry and mother. 6. Do not feed the fish within 24 hours of the show. This allows the fish to evacuate its bowels, keeping the jar clean and preventing the fish from swimming with faeces hanging from its vent on the day of the show. 7. Show the fish in a container which is proportional to the size of the fish, i.e. an adult velifera molly in a 4 in. × 4 in. × 4 in. sweet jar, or a *Heterandra formosa* in an 18 in. × 10 in. × 10 in. tank would look foolish. The above tips could be condensed into three headings: (a) PRESENTATION—2, 3, 4, 5, 6, 7; (b) CONDITION—2, 5, 6; and (c) CONFORMING TO RULES—1, 3, 5.

Insulation

"To add further to your correspondence about insulation and electricity bills, I had a similar cash and insulation problem which I solved by utilizing discarded polystyrene foam packing from coloured televisions. I obtained the material from local TV shops where it was thrown away. To insulate my 6 ft. × 4 ft. external brick fish house I cut away the lumps and bumps with a hacksaw blade to give an oblong tile about 1½ in. thick, length and breadth varying with the size of the component it had contained. I covered the walls and ceiling with it and secured it with cast-off pieces of plywood plasterboard that I got from any source. Where I was unable to board, I secured with string ties along the face of the tiles and tied to nails at any convenient point.

"I have also insulated the loft in my home, to a certain extent, using the off-cuts and left-overs to place in a broken form between the joists of the loft. Insulating the walls of my home was slightly more expensive because I had to buy rolls of polystyrene foam which were glued to the wall with heavy-duty, fungicidal wallpaper paste. It seems to be of some use since the wall in question is 24 ft. × 8 ft. and acts

as a massive storage radiator in summer, making the living-room uncomfortably hot; and the reverse in winter, throwing a coldness into the room. The insulation has taken the edge off this at a fairly low cost."

No. 2 Hield Grove, Aston-by-Budworth, Northwich, Cheshire, heads an interesting letter I received from Mr. D. K. Calladine. He wrote: "I have just read through a number of your magazines and it seems to me that most of the people who write to you have trouble growing plants. This was a problem I had until I tried various methods, the best of which was simply to wrap dead, but well-washed, oak leaves around the roots and hold them in place with a strip of lead. I would also like to report the third spawning of a pair of pink, kissing gouramies—*Helostoma temmincki*—which, I am told, don't breed very often in captivity."

Eggs from compost

The letter I received from Mrs. L. E. Worley bore the postscript: "Address on other page." Unfortunately the other page must have gone to someone else at the Brentford offices; hence I don't have Mrs. Worley's address; however, her brief comments make interesting reading. She writes: "In 1977, on cleaning the pond, I sorted out some of the plant life, which was very thick, and put some *Elodea* on the compost heap. Next day my husband thought that perhaps I'd taken too much out; so we put a lot back into an 18 in. plastic tank and stood it in the garden with no cover. It was still wet.

"After about two weeks we noticed small fish had hatched from eggs which must have been on the plants. Today, five months later, the baby fish have been put back into the pond—all twenty-seven of them in good health. Have you heard of any similar incidents?"

Stafford Lodge, Winchester Road, Kings Somborne, Nr. Stockbridge, Hants., is the address of Mr. Andrew Gaisford. Andrew has one 27 in. × 12 in. × 15 in. tropical tank and does not wish to expand at the moment because of the possibility of university entrance later this year. His letter was prompted by several letters—including the one written by Mr. Bruce Smith—about plant failures. Mr. Gaisford writes: ". . . I am sure that Mr. Smith has a very valid point when he talks about tanks being too clean. In all my tanks no plants seem to survive until the gravel is considerably richer in mulm and the rotting remains of their predecessors. After setting up my present tank of tropicals I was finding that planting was becoming a fortnightly occupation; although I don't suppose the local pet shop was too worried.

"Although I have had more success by changing from coloured fluorescent lighting to incandescent, and changing the pH value of the water by replacing the hard water with rainwater, growing any plants beyond the *Ludwigia* line is still beyond the pale for me. Incidentally, it seems to me, and my dealer expresses the same opinion, that the coloured fluorescent lighting, despite its supposed advantages with regard to fish colouration, is a much too soft light. Furthermore, I find natural daylight the supreme medium for displaying—for instance—the beautiful bluish hue of my moonlight gouramies, otherwise totally drowned by fluorescent or any other artificial light.

"I must add that I have no other problems with my tank, only the great inability to have an attractive display of plant decor. I should be very interested to hear about any successes with aquatic plant fertilizers as I can find only one on the market."

Plant article

The plethora of people with plant problems prompted me to write an article about growing aquatic plants. Its publication was delayed several months but if it has not already appeared in print it should do so in the near future. In the article I mentioned my having tried some solid blocks specially manufactured to promote growth in both pot plants and aquarium plants. I tried the blocks for several months but must be honest and admit that, in the two tanks in which I tried them, the specific plants planted in the blocks failed to grow. Similar plants, planted in the gravel, flourished. However, I'm lucky in that I have no trouble with getting the majority of plants to grow and, hence, I merely tried the blocks out of interest and not out of necessity. My minor experiment with the blocks holds little validity as one cannot make valid conclusions from results obtained from only two tanks. Indeed, the manufacturer of the product kindly told me that many aquarists had found the blocks to be very successful in encouraging plant growth.

Readers are reminded that I accept no responsibility for the views expressed by contributors to this feature; nor do I necessarily agree with the opinions expressed. For a future feature please send me your opinions—c/o *The Aquarist & Pondkeeper*, The Butts, Half Acre, Brentford, Middlesex. Suggested topics for discussion: (a) specific species of plants that seem to grow well in the same aquarium; (b) plant species that appear to dislike each other's company; (c) details of any new year resolutions you made in connection with your fishkeeping; (d) details of the most expensive fish you own; (e) details of difficult fish that you have spawned; (f) coldwater fishes kept at tropical temperatures; and tropical fishes kept at room temperatures; (g) details of your experiences with living things sent to you by post; (h) details of your experiences with mail order firms that supply aquarium goods at cut prices; (i) the new features or changes you would like to see in an aquarium magazine such as this. I hope you'll send me a few lines. Shorter letters, clearly written or typed, stand a better chance of being published.

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.

THE well known breeder, Mr. L. Emery, spoke at the November meeting of the **Goldfish Society of Great Britain.** He first gave a short talk on the history of both the Bristol A.S. and the development of the Bristol Shubunkin. He then carried on to tell the members his method of breeding and raising this graceful fish, several of which he had brought along to the meeting to show the points being made during the lecture. These fish were auctioned, the proceeds going to the club funds.

The final table show of the year for single fish bred in 1977, attracted over 40 entries, all competing for the Morris Cluse breeders trophy. The winner of this cup is to be announced at the annual general meeting on 18th March.

* * *

MEMBERS of the **Huddersfield Tropical Fish Society** were well entertained in November by Mr. E. Stanton's talk on Fish Breeding. Also in November there was a slide show on Angels together with a Table Show. The results were as follow:

Barbs: 1, M. Town; 2, D. Hill; 3, B. Garrett. Sharks and Foxes: 1, M. Town; 2, B. Town; 3, J. Burton. Cats and Loaches: 1 and 2, R. Jenkinson; 3, B. Garrett. A.O.V. Trop: 1, B. Garrett. Cichlids: 1, B. Garrett; 2, G. Mitchell; 3, C. Harrop. A.O.V. Novice: 1, P. Knapton; 2, T. Kenyon; 3, J. Burton. Characins: 1 and 2, B. Garrett; 3, S. Moorhouse. Best Presented Exhibit: B. Town. Best in Show: P. Knapton.

* * *

LAST year at the annual convention held in Toronto, Canada, the International Betta Congress decided to establish a permanent address of inquiry for anyone interested in information regarding this organization. The address is: International Betta Congress, P.O. Box 1095, University Station, Des Moines, IA 50311. For additional information please contact William P. Hart, Box 183, Fort Pierre, SD 57532.

* * *

RECENTLY the **Corby A.D.A.S.** enjoyed a talk and slide show by Dr. D. Ford, of Aquarian. The Society meet on the first Wednesday of each month at the "Shire horse" Public House, and have some interesting talks and slide shows arranged for the months ahead. All Aquatic enthusiasts are invited to come along.

* * *

DETAILS of the **Thorpe & District A.S.** are as follows: Chairman: K. Appleton; Secretary: N. Newby, 125 Witard Road, Heartsease, Norwich. Tel: 34795. Treasurer: C. Fearnley. Membership Secretary: T. Cork, 92 Bignold Road, Norwich. Tel: 405176. P.R.O. and Table Show Secretary: T. Driver. Honorary President: Dr. David Ford.

Meetings are held on the first Wednesday of each month at 8 p.m. at the "Canary" Public House, Heartsease, Norwich. Adult Junior and family membership welcome. Regular meetings include lectures, visits, films and slide shows (a full programme has been arranged for this year) and monthly auctions of fish and equipment. Membership costs £2 p.a. for an adult; £3 p.a. for husband and wife; 75p p.a. for a junior. (Non-members 10p per evening).

* * *

THE **Association of Midland Goldfish Keepers,** which attracts members from a wide area of the Midlands, meets at the Poleshill Community Centre, Coventry and is only a few miles from the M.6 along the A.444. Meetings are held once every two months on a Sunday afternoon and commence at 2.30 p.m., normally finishing at 5 p.m. The new committee and members will give a warm welcome to all visitors, young or old, novice or expert. The Association enjoys a relaxed informal gathering of friendly members, who must pay one of the lowest subscriptions in the country, only £1·50 for a single adult and £1·75 for a married couple.

A most interesting programme has been planned for the coming months as follows: 19th March: Mr. J. Amos will show slides and talk about coldwater fish. 21st May: Table Show of any variety of fancy goldfish followed by a general discussion of the exhibit. 16th July: Visit to the extensive breeding establishment of fellow member Mr. T. Sutton. September: To be arranged. 19th November: The annual general meeting.

The Association is fortunate to have members who can be called upon to give talks to their fellow members based upon their own knowledge and experience which, in some instances, is quite extensive. Anybody who would like further details is invited to write to the Secretary, Mrs. J. Amos, 31 Greenview Drive, Kingsley, Northampton.

* * *

AT the November meeting of the **Llantwit Major A.S.** the winners of the Senior Class were: 1, G. Lewis, 2, 3 and 4, D. Lewis. Junior Egglayers Class: 1, R. Davies; 2 and 3, T. Fry; 4, D. Williams. During the judging, a Slide Show of his own fish and tanks were given by Colin Turner of Cardiff. During the interval the Club held a being and buy sale.

* * *

A NEW Committee has been elected at the annual general meeting of the **Cardiff A.S.** The officer selected are as follow: Chairman: R. Broocker; Vice-Chairman: M. Curwin; Show Secretary: Mrs. Susan E. Compton, 61 Inverness Place, Roath Park, Cardiff. Tel: 394347. Secretary: A. Purnell, 22 Oakley Place, Grange Town, Cardiff. Treasurer: Mrs. Ethel Boalch; P.R.O.: M. Bridger; Librarian: E. Antonio; Minutes officer: S. E. Compton.

* * *

THE following committee was elected at the annual general meeting of the **King's Lynn A.S.** Chairman: V. George; Vice-Chairman T. Turner; Secretary: S. George; Treasurer: H. Laws; P.R.O.: A. Freeman; Show Secretary: M. Laws. Also B. Rose, R. Warner, E. Cannon, C. Simper, R. Manning, G. Osler.

The show secretary presented the annual bench show trophy to P. Eyles. A bench show for all the winning fish of the year was judged by Mr. Gallop of Thetford A.S. Winners were: 1, M. Laws; 2, Mr. Brown; 3, B. Rose; 4, T. Barr.

Club meetings are held 7.45 p.m. the second Thursday of each month at the "North Star" Public House, North Lynn. Visitors are always very welcome. Please contact club secretary for any further information, Mrs. S. George, K.L. 671610.

* * *

IN November an Inter-Club table show was held between **St. Helens A.S.** and **Skelmersdale A.S.** This was won by Skelmersdale with 101 points to St. Helens 84 points. Out of 155 entries, B. Wilson of Skelmersdale had the best fish in Show with a rift valley cichlid.

The section winners were: Livebearers: B. W. Carter (St. H.). Characins: B. Wilson (S.). Barbs: B. W. Carter (St. H.). Anabantids: D. Algie (St. H.). Cichlids: B. Wilson (S.). Rasboras/Danios/Minnows: C. Lawrenson (St. H.). Catfish: B. W. Carter (St. H.). A.O.V.: L. Beely (S.). Juniors: R. Wilson (S.). Coldwater: R. Wilson (S.). Pairs: J. Dean (St. H.). Sharks/Foxes/Loaches: D. Parkinson (S.).

* * *

THERE were 235 entries for the **East London Aquarist & Pondkeepers Association** annual open Breeders Show. Results: Club furnished: 1, Brighton; 2, E.L.A.P.A. Ind. furnished: 1, T. Waller. Mini-furnished: 1, L. Baker; 2, P. Harris; 3, C. Cheswright; 4, F. Murdoch. Rooted plants: 1, M. Pearson; 2, 3 and 4, D. Cheswright. Floating plants: 1, L. Baker; 2 and 3, T. Waller; 4, J. Boss. Breeders results: Barbs: 1, C. Cheswight; 2, J. Boss; 3, M. Waller. Characins: 1, 2 and 4, B. Argent; 3, L. Baker. Cichlids: 1, F. Vickers; 2, G. Crosby; 3, A. Campion; 4, R. Thoday. D Cichlids: 1, B. Meach; 2 and 3, L. Baker; 4, A. Waller. Labyrinths: 1, 2 and 3, F. Simmons; 4, M. Shadrock. E.L.T.C.: 1 and 4, J. Boss; 2, D. Cheswight; 3, B. Argent. Fighters: 1, M. Pearson. A.O.V. Egglayers: 1, R. Thoday; 2, S. Webb; 3, M. Waller; 4, A. Waller. Das., Ras., Min: 1, P. Mathew; 2, J. Boss; 3, A. Waller; 4, M. Shadrock. Platies: 1, G. Crosby; 2 and 3, D. Byfield; 4, L. Baker. A.O.V. Livebearers: 1 and 3, D. Cheswight; 2 and 4, B. Meach. Pairs (Barbs): 1, A. Chapman; 2 and 4, K. Wrightson; 3, G. Campbell. Pairs (Characin): 1, J. Boss; 2, D. Byfield; 3, K. Argent; 4, F. Chapman. Pairs (E.L.T.C.): 1 and 2, C. Cheswight; 3, I. Bass; 4, D. Cheswight. Pairs (Das., Ras. Min): 1, B. Meach; 2, M. Waller; 3, B. Meach; 4, G. Campbell.

* * *

THE **Oldham & District A.S.** held their annual general meeting in November, and the following committee was elected. Chairman: R. Colley; Secretary: D. Stott, 21 Clarence Street, Heyside, Royton, Oldham OL2 6LY; Vice-Chairman: M. Hyt; Treasurer: Mrs. Brunt; Show Secretary: P. Harris, 37 Duffield Road, Salford 6; Asst. Show Secretary: A. Chadwick; Fund Raising: D. Allard.

The members heard with regret that Mr. Eric Birchwood had to resign the post of Secretary due to ill health. There was a vote of thanks going to him in his absence. It was hoped the Club would be able to hold the usual Open Show, but due to their making a loss on last year's event, there was some doubt. However, it was left at this meeting that members would endeavour to offer a new venue for the show.

* * *

RESULTS of the election of a new committee at the annual general meeting of the **East London A. & P.A.** were as follow: President: Mr. Campkins; Vice-Presidents: A. Fields, R. Dodkins, A. Arnold, F. Petto, Mr. Taylor; Chairman: J. Boss; Vice-Chairman: D. Flack; General Secretary: Mrs. Peggy Harris; Treasurer: A. Harris; Show Secretary: T. Waller; Show Organizer: L. Baker; Librarian: F. Simmons; Editor: R. Campion; Press Secretary: J. London; Programme Secretary: K. Wrightson; Equipment

Officer: K. Palmer; Social Secretary: Mrs. Rene Boss; F.B.A.S. Delegate: J. Boss; Lay Member: G. Line; Club Auditors: Mr. and Mrs. A. Arnold; Lay Member: K. Baker. Mr. Ron Dodkins was appointed a Vice-President and honorary life member in recognition of the long service he has extended to the Association as a past Chairman and committee member. He has also served as Secretary of the G.S.C.B.

* * *

AT the **Mid-Sussex A.S.** meeting in December the chairman, Mr. N. Short, welcomed new members and thanked Mr. Soper for running the club "barbecue in November, and other aquarist societies for their support at last month's meeting. Fund raising continues to gather momentum with increasing numbers of newspapers being collected.

The end of the show year was taken up with the Furnished Aquaria, which was judged by two new members, Mr. and Mrs. R. Watts, who awarded the cards as follow: 1, L. Pinney; 2, P. Levine. During the past month members of the committee judged the Home Aquaria contest. There were good comments on the high quality of the entries, and the cards were awarded as follow: Junior: 1, M. Franklyn; Senior: 1, N. Short; 2, R. Young; 3, B. Slade.

* * *

THE December meeting of the **Great Yarmouth & District A.S.** was the annual general meeting. The President, Mr. Lindsay presented the Champion Exhibitors trophy and the Livebearer's Shield to A. Kemp. The trophy for the Egglayer class was presented to G. Drewry and the Bill Johnson Memorial Cup for junior members was won by Miss Dawn Thorpe. The society regretted very much that the chairman for the past seven years, Mr. A. Kirby, had announced that he would like to stand down from committee activities in the coming year. It was approved by all present that Mr. Kirby and his wife Margaret be made Honorary Life Members of the club. The committee and officers elected for this year are as follow: Chairman: R. Stearne; Vice-Chairman: R. Durrant; Treasurer: D. Lacey; Secretary: P. Watson, "Petrne", 31 Common Road, Hemsby, Gt. Yarmouth, Norfolk; Asst. Secretary: J. Durrant; Public Relations Officer: G. Drewry; Show Secretary: Joyce Rumsby; Junior Member: Dawn Thorpe. Officers: M. Weekly, A. Thorpe, A. Kemp, C. Rumsby. Meetings are held on the first Monday of each month at the Imperial Hotel, North Drive, Gt. Yarmouth, at 8 p.m. New members will be made most welcome.

* * *

APPOINTMENTS for this year's committee of the **Havant and District A.S.** are as follow: Chairman: G. Ellis; Secretary: P. Goodhew, 23 Fernhurst Close, Hayling Island, Hants. PO11 0DT; Show Manager: K. Taylor; Show Secretary: G. Ellis, 42 Bridgefoot Path, Emsworth, Hants.

* * *

AT the annual general meeting of the **Bournemouth A.S.** held recently, a presentation was made to the retiring secretary, Mr. R. Matley, in recognition of almost thirty years service to the society and to the hobby. Mr. and Mrs. Matley will be leaving the district shortly to live in Spain. Special guests that evening included Founder Members Mr. J. Bartlett and Mr. S. Swain, and Founder Chairman Mr. R. G. Torrens who made the presentation. Also present were Mrs. Stevenson and David Hagg, who represented Atlantis Aquarium. Mr. Matley had also been chairman of the F.B.A.S. Wessex Area Judges Panel, and had done much valuable work in promoting the hobby in the south and south-west of England. The Chairman, Mr. J. Jeffery, then announced that Mr. Matley had been made an Honorary Life Member, and presented him with a Certificate of Life Membership.

After the interval, the elections for officers took place, with the following results. Chairman: J. V. Jeffery; Secretary: N. Walker; Treasurer: R. L. James; Committee: H. Greenhalgh, R. Bebb, H. Earl and A. Tubb. The results of the Table Show were announced, with Mr. Chatfield gaining 1st, 2nd and 3rd places in the competition for Platies.

The next meeting will be held on the first Monday in February at the Kinson Community Centre.

* * *

THE last two meetings in 1977 of the **Portsmouth A.S.** took place in the usual room at the Portsmouth Community Centre. At the first, Mr. J. Stillwell gave an excellent talk on genetics which he illustrated with slides. On the 21st December, Mr. K. Taylor kindly drove down from Horndean and entertained the members with a slide show of fishes in general which he prepared at short notice. It was of particular interest because a fairly large percentage of the specimens photographed are seldom seen in this country.

The "Good Companions" was the venue for a popular event in the society's calendar; the Christmas "Beer and Skittles", and it was thoroughly enjoyed by all those members and friends who went.

* * *

CHANGES have been made in the committee of the **Bedford and District A.S.**, and the officers are now as follow: Chairman: R. Langford; Editor: J. James; Secretary: W. Champkin; Treasurer: M. Jameson; Show Secretary: M. Jameson; Asst. Show Secretary: A. Hinds; P.R.O.: M. Dashwood. Anyone wishing to know more about the Club should write to the Secretary, W. G. Champkin, 31 Barkers Lane, Bedford, Beds. MK41 9SL. Telephone: Bedford 44514. New members are assured of a warm welcome to meetings, which are held the first Tuesday in every month at the Southfields Recreation Centre, Kempton, Beds. at 8 p.m.

* * *

WINNERS at the recent Open Show of the **Bradford and District A.S.** were as follow: Guppies: 1, Mr. and Mrs. Chadwick (Castleford); 2, L. Price (Castleford); 3, G. Craven (Meyborough). Swordtails: 1, J. Harrison (Grimsby and Cleethorpes); 2, Mr. and Mrs. Honnor (Doncaster); 3, J. Doody (Darwin). Platies: 1, P. Whitley (Barnsley); 2, Mr. and Mrs. Underwood (Southport); 3, S. Harrison (Grimsby and Cleethorpes). Mollies: 1, K. M. Fisher (Sherwood); 2, S. Harrison (Grimsby and Cleethorpes); 3, Mr. and Mrs. Welsh (York). A.O.V. (Livebearer): 1, Mr. and Mrs. Chester (Retford); 2, Mr. L. Gatenby (Bradford); 3, B. Jackson (Doncaster). Small Barbs: 1, R. Houghton (Southport); 2, P. Camfield (Castleford); 3, M. Price (Castleford). Large Barbs: 1, Mr. and Mrs. Roberts (Doncaster); 2, R. Houghton (Southpoet); 3, Mr. and Mrs. Chadwick (Castleford). Small Characins: 1 and 3, D. Harris (Meyboro); 2, M. Kemp (Sheaf Valley). Large Characins: 1, Mr. and Mrs. Chester (Retford); 2, R. Houghton (Southpoet); 3, P. Camfield (Castleford). Rasbora, Danio and Minnows: 1 and 3, A. Cook (Retford); 2, A. Simpson (Barnsley). Sharks and Flying Foxes: 1, O. Sugden (Bradford); 2, Mr. and Mrs. Dawson (Heywood); 3, A. Piggott (Grimsby and Cleethorpes). Fighters: 1, A. Cook (Retford); 2, D. Woodcock (Bradford); 3, P. Smith (Aireboro). Small Anabantids: 1, Mrs. P. A. Taylor (Atlantis); 2, A. Cook (Retford); 3, Mr. Kendall (Barnsley). Large Anabantids: 1, G. Bond (Southport); 2, Mr. and Mrs. Riley (Castleford); 3, K. Lancashire (Doncaster). Small Cichlids: 1, S. Price (Castleford); 2, Mr. Gray (Ind.); 3, J. and S. Greenwood (Swillington). Large Cichlids: 1, Mrs. P. A. Taylor (Atlantis) (Best in Show); 2, B. Sleight (Meyboro); 3, Mr. and Mrs. Underwood (Southpoet). Angel Fish: 1, J. and S. Greenwood (Swillington); Mr. and Mrs. Chadwick (Castleford); 3, Mr. and Mrs. K. Welsh (York). Corydoras and Brochis: 1, Mr. and Mrs. Hardy (David Browns); 2, Mr. and Mrs. Lowes (Ind.); 3, Mr. and Mrs. Riley (Castleford). Loach and Botia: 1, J. Cornforth (Bradford); 2, P. Camfield (Castleford); 3, D. Harris (Meyboro). A.O.V. Catfish: 1, D. Harris (Meyboro); 2, Mr. and Mrs. Summerscales (North Allerton); 3, K. Dugdale (Blackburn). A.O.V. Tropical: 1, P. Smith (Aireboro); 2, A. E. Head (Blakeboro); 3, T. Stansfield (Castleford). Breeders (Livebearers): 1 and 2, Mr. and Mrs. Hopkinson (Darfield); 3, Mr. and Mrs. Millington (Sheffield). Breeders (Livebearers): 1, Mr. and Mrs. Hopkinson (Darfield); 2, A. Waddington (Barnsley); 3, T. Busfield (Barnsley). Breeders (Egglayers): 1, B. Sleight (Meyboro); 2, P. Griffiths (Meyboro); 3, Mrs. Heap (Keighley). Breeders (Egglayers): 1, F. Simpson (Barnsley); 2, Mr. Stevens (Middlesboro); 3, Mr. and Mrs. K. Welsh (York). Livebearers (Pairs): 1, Mr. and Mrs. Walker (Barnsley); 2, Mr. and Mrs. Hopkinson (Darfield); 3, Mr. and Mrs. Millington (Sheffield). Egglayers (Pairs): 1, A. Simpson (Barnsley); 2, Mr. and Mrs. Richardson (Scarboro); 3, S. Harrison (Grimsby and Cleethorpes). Common Goldfish: 1, L. Waller (Rotherham); 2, Mr. and Mrs. Chadwick (Castleford); 3, Mr. and Mrs. Dawson (Heywood). Fancy Goldfish: 1, Mr. and Mrs. Wilkinson (Halifax); 2, Mr. Wilkinson (Halifax); 3, Mr. and Mrs. Dawson (Heywood). A.O.V. Coldwater: 1 and 2, K. M. Wood (Bridlington); 3, R. Houghton (Southport). Killies: 1, B. Sleight (Meyboro); 2, E. Rice (Barnsley); 3, A. E. Head (Blakeboro).

* * *

THE **British Killifish Association** (Manchester Group) will hold a meeting on the 16th April in the North Manchester area. There will be a full day to exchange ideas and fish. In the afternoon there will be an auction of members' fish and eggs. The meeting is open to members of the British Killifish Association. Enquiries with s.a.e. to the Secretary, 173 Parr Lane, Unsworth, Bury, Lancs BL9 8JN.

* * *

CHANGE OF ADDRESS

David Brown A.S.: Secretary: A. G. Copp, 14 Sutton Avenue, Dalton, Huddersfield HD5 9SY. Telephone: 0484 43398.

Kingston and District A.S.: Show Secretary, Mr. E. Lough, has moved to 14 St. Andrews Square, Surbiton, Surrey.

* * *

SECRETARY CHANGES

Mexborough Aquarist Club: Alan Hodgson, 41 Broadwater, Bolton-on-Dearne, Rotherham, South Yorks. S63 8EL. The Club meets bi-weekly on Wednesdays at the Hope W.M.C., Mexborough (nr. Doncaster and Rotherham). New members always made welcome.

Kingston and District A.S.: Mrs. Pat Lambert, 37 Chestnut Road, Raynes Park S.W.20. Meetings are held on the first and third Thursdays of the month at St. Lukes School, Elm Road, Kingston on Thames, Surrey. Meetings begin at 8 p.m.

Whitby and District A.S.: Mrs. Anne Forbes, 12 Lockton Road, Whitby, North Yorkshire.

Hounslow and District A.S.: R. Nelhams, 35 Exeforde Road, Ashford, Middlesex. Tel.: Ashford (Mx.) 59880.

* * *

AQUARIST CALENDAR 1978

5th March: Keighley A.S. Annual Open Show, at the Leisure Centre, Victoria Park, Keighley. Benching 12-2 p.m. Details from Olga M. Taylor, 14 Harold Street, Bingley, W. Yorks.

11th March: Riverside A.S. Open Show at St. Saviour's Hall, Cobbold Road, Acton, W.12. Benching Friday night and Saturday morning. Contact M. Nethersel, 13 Greyhound Road, W.6. Tel: 01-385 0276.

11th March: The British Aquarists Study Society First Spring Meeting at 2.30 p.m. in the Meeting Rooms of the Zoological Society of London, Regents Park, London, N.W.1, "The Saltwater Scene." Tickets, £1·25p, members and £1·50p non-members from W. Goodwin, 14 Dawlish Drive, Devon Park, Bedford.

12th March: Worksop Aquarist & Z.S. Open Show to be held at the Lady Margaret

Hall, Holbeck, Nr. Worksop, Notts.

18th March: Goldfish Society of Great Britain, annual general meeting and slide show on fish houses. 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London, W.C.2.

19th March: Heywood and District A.S. open show, in the Civic Hall, Heywood. Show schedules and advance postal entry forms available from J. W. Ridley, show secretary, 53 Miller Street, Heywood, Lancashire.

19th March: Reading and District A.S. open show at St. Peters School, Church Road, Farley, Reading. Ample car parking, only 5 mins. from M4. Schedules from P. C. Rushbrooke, 34 Melrose Gardens, Arborfield Cross, Berks. Phone 760303.

26th March (Provisional date). **Pondkeeper Don Valley A.S.** Open Show for further details re venue, etc., contact Show Secretary, Mr. C. Broomhead, 11 Newton Avenue, Stockbridge, Sheffield.

2nd April: Sheffield and District A.S. Open Show at Granville College of Further Education, Granville Road. Benching is from 12 to 2 p.m. Details from R. Sidebottom, 36 Delves Drive, Hackenthorpe, Sheffield S12 4AF.

2nd April: Malvern and District A.S. open show. Details from show secretary, B. E. Cureton, 27 Elgar Avenue, Malvern.

9th April: Kettering A.S. Annual Open Show at the Cornmarket Hall, London Road, Kettering. Show schedules will be available from R. Vickers, 141 St. John's Road, Kettering, Northants.

9th April: The Scunthorpe Museum Society Aquarist Group eighth annual open show at Charter Hall, Corporation Road, Scunthorpe. Schedules are now available from the show secretary, D. Caldow, 5 St. Martins Road, Scawby, Brigg, Sth. Humberside BW209BG.

16th April: Billingham Half Moon A.S. Open Show at the Corporation Hall, West Row, Stockton, Cleveland. Schedules from Show Secretary, C. W. Buck, 22 Danby Grove, Thornaby, Cleveland TS17 8BX. Tel: Stockton 65284.

16th April: Nelson A.S. annual open show at the Civic Centre, Stanley Street, Nelson. Details from R. McKenna, 52 Bath Street, Nelson, Lancs. BB9 0NP.

16th April: Halifax A.S. are holding a "Spring Show". Details to follow.

23rd April: York and District A.S. Open Show at the Livestock Centre, Murton, York. Benching 12 noon to 2 p.m. Details from Show Secretary, H. Welsh, 1 Enfield Crescent, Holgate Road, York.

23rd April: Leigh A.S. Open Show at Leigh C. E. High School, Leigh Rd, Leigh, Lancs. Details from: J. Gonsalves, 52 Penine Grove, Leigh, Lancs. WN7 5HU. Tel: Leigh 054675.

13th May: Port Talbot A.S. open show will be held at The Talbach County Youth Centre, Margam Road, Port Talbot, West Glamorgan. Ample parking space is available. Trophies, plaques, cards for all classes. Schedules will be available by early March from show secretary, A. E. B. Fouracre, 3 Cross Street, Velindre, Port Talbot, West Glamorgan SA13 1AZ. Tel. 3752.

13th May: The British Aquarists Study Society second spring meeting, at 2.30 p.m. in the Meeting Rooms of the Zoological Society of London, Regents Park, London, N.W.1. "Toothcarps of the New World." Tickets £1.25p members, £1.50p non-members from W. Goodwin, 14 Dawlish Drive, Devon Park, Bedford.

14th May: Gloucester A.S. open show at the Chequers Bridge Leisure Centre, Painswick Road, Gloucester. This show will be run in accordance with F.B.A.S. ruling. Trophies for first and second places plus award cards. Schedules will be available from March onwards. D. Parry, 49 Oxstalls Way, Longlevens, Gloucester (secretary).

14th May: Bournemouth A.S. annual open show will be held at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show secretary, J. V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth BH6 4JF. Tel: 0202 427523.

20th May: Goldfish Society of Great Britain general meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London, W.C.2.

20th May: Southend Leigh & District A.S. The next open show will be held at St. Clements Hall, Leigh-on-Sea. Further details in due course.

21st May: Merseyside A.S. Open Table Show will be held at the Rainhill Village Hall, Rainhill, Lancs.

28th May: Redcar A.S. Sixth Open Show again at the Coatham Bowl, Redcar. Run under F.B.A.S. Rules. Details: telephone Redcar 74599 or write Secretary, 13 Brancepeth Close, New Marske, Cleveland.

28th May: Loyne Aquarists open show, St. Paul's Parish Hall, Scotforth, Lancaster. Details from Mrs. J. A. Hodgson, 8 Hall Garth Gardens, Over Kellet, near Carnforth, Lancs.

18th June: Corby and District A.S. open show, Civic Centre, Corby. Schedules mid-March, F.B.A.S. rules. C. MacAllister, 18 Maidford Road, Corby, Northants.

15th July: Goldfish Society of Great Britain general meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London, W.C.2.

16th July: Scarborough A.D.A.S. Open Show at Gladstone Road Junior School, Wooler Street, Scarborough. Schedules (March) from J. F. Richardson, 5 Keld Garth, Pickering, N. Yorks. YO18 8DG.

22nd July: Basingstoke and District A.S. once again this year are holding a specialist show for all livebearing fishes in the Carnival Hall, Basingstoke. Details to follow.

23rd July: Gosport & District A.S. Annual Open Show.

30th July: Dorchester T.F.S. First Open Show. Details to follow later.