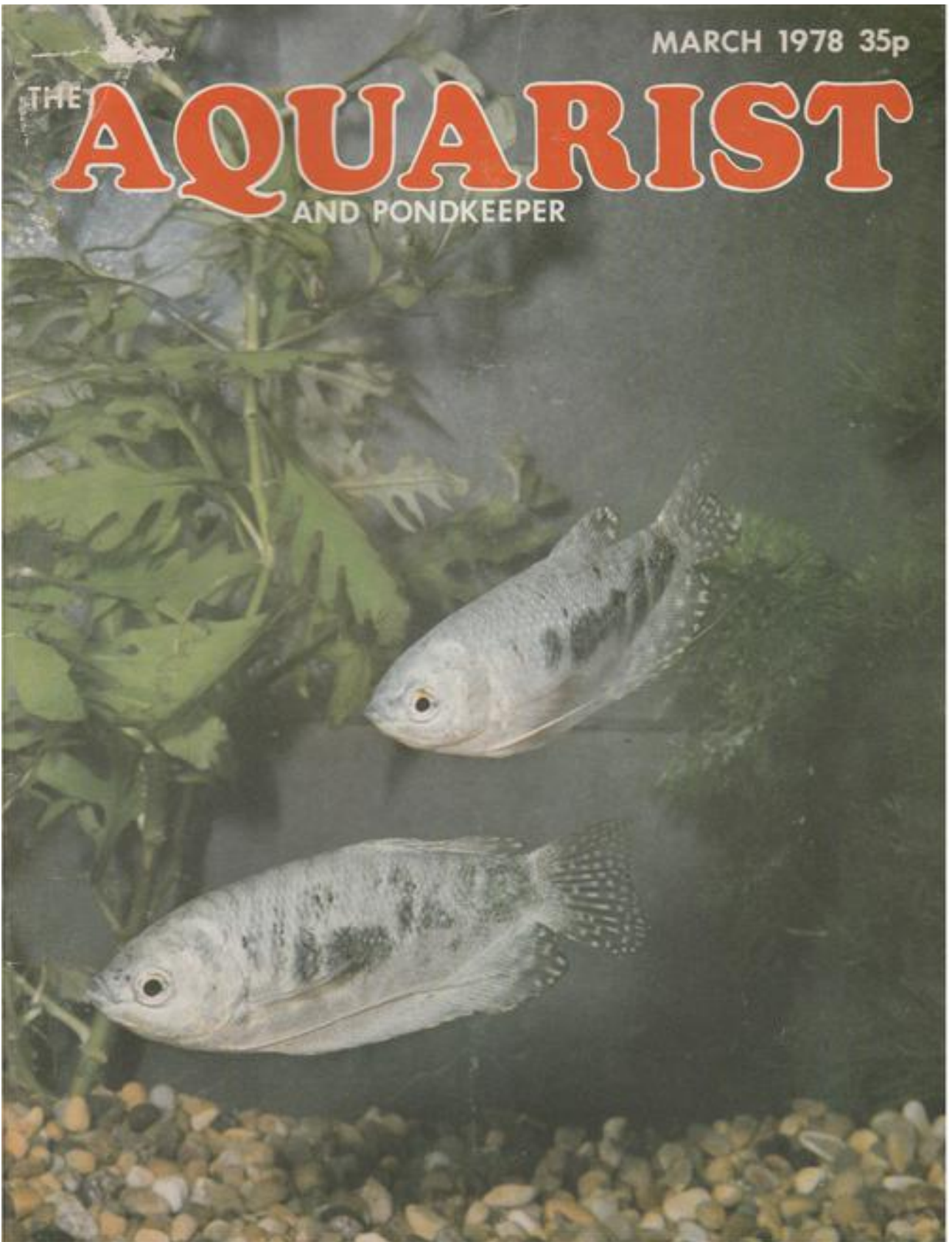


MARCH 1978 35p

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. 12, 1978

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

Our Cover:
Cosbie Gouramis
(*Trichogaster trichopterus*)

March, 1978

	PAGE
The <i>Xiphophorus</i> Genus (4) The Montezumae Group	508
Growing Aquatic Plants	511
Breeding <i>Colisa lalia</i>	515
Our Readers Write	518
The Black Widow	519
Tropical Queries	520
Coldwater Queries	524
A Gem of a Livebearer	526
Koi Queries	528
Marine Queries	529
Concept of Filtration	532
Product Review	533
Keeping Piranhas	534
From a Naturalist's Notebook	537
What is Your Opinion?	541
News from Societies	547
<i>The Editor accepts no responsibility for views expressed by contributors.</i>	

507

The *Xiphophorus* Genus

(4) The Montezumae Group

Written & Illustrated by Barry Durham

THE FIRST species in the Montezumae group of the Swordtail "family" is the famous (if rather inconspicuous) little fish known as *Xiphophorus milleri*.

Named for Dr. Robert Miller who discovered it in 1960, it was instrumental in bringing together the Swordtails and Platies into one big happy family. Prior to its discovery there had been some evidence to show that *X. helleri* and *X. maculatus* were fairly closely related but it was not conclusive enough to warrant placing them in a single genus. They both showed similar and differing characteristics and not until the characteristics which had been previously used to separate them showed up in a single species (*X. milleri*), was it possible to unite the *Platyposcilius* genus with that of *Xiphophorus*.

Like other members of the family it comes from Mexico and has so far only been found in one river—a tributary of the Laguna Catemaco. In body form it is similar to the Swordtail, even carrying a dark lateral line stripe, but in the structure of the gonopodium it is like the Platy. It is, however, smaller than both these fishes with the males only reaching 3.5 cms (1½ in.) and the females 4.5 cms (1¾ in.).

Colour is a drab pale olive brown with one or more dark stripes running from the snout to the caudal peduncle. There are also a number of transverse dark bands on the sides of the body and some males have a dark patch on the rear half of the body, not unlike the "tuxedo" Swordtail marking. Another interesting point to note is that both sexes carry a "gravid" spot. It is positioned just in front of the anal fin on the females and the gonopodium on the males. What its function is on the males is open to conjecture, but on occasion it has given rise to confusion between large males and small females.

I remember seeing a judge at an open show pick up a show tank containing a rather large male *X. milleri* which was hugging the bottom. He was about to dismiss it as a small female when it decided to show itself off and the judge looked quite startled when he found on closer examination that it was a male. (Incidentally it went on to win the section and bring a

trophy home for a friend of mine.) The judge confessed afterwards that it was the "gravid" spot marking which had made him think it was a female.

The fins of *X. milleri* are colourless apart from the occasional black dot or two and a dark band on the outer edges of the male's dorsal. Scales have a dark edge giving a reticulated pattern especially above the lateral stripe. There is no sword, nor even a hint of one.

One does come across a more "colourful" male from time to time and as well as the "tuxedo" there are others which have a large number of tiny black spots on the dorsal and caudal fins and gold to orange sides and belly, but they are few and far between.

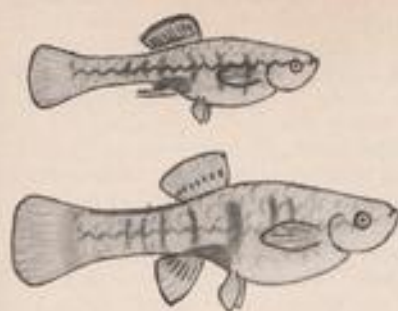
Like other members of the genus they are omnivorous, requiring some vegetable matter in their diet if they are to prosper.

The gestation period is usually five to seven weeks although young females may take longer and, as with most livebearers, this period can be lengthened or shortened depending on the temperature and the amount and quality of food available. Higher temperatures and a varied diet with plenty of live food tends to cut the pregnancy period down to as little as four weeks.

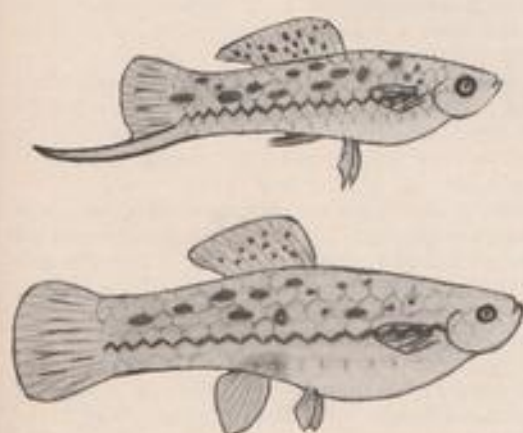
Broods are between 10 and 40 in number depending on the size of the female and grow fairly rapidly with the right food. To get the best specimens it is necessary to get the fry as big as possible before the males begin to sex out as any that sex out while very small will remain stunted. Temperature range is 22° to 26°C (72° to 79°F).

Xiphophorus montezumae, which gives its name to the group, is split into two sub-species: *X. m. cortezi* and *X. m. montezumae*, with *cortezi* inhabiting the lowland waters and *montezumae* the upland.

Xiphophorus montezumae cortezi is found in the streams and tributaries running into the rivers Axtla, Montezumae and Panuco in Southern Mexico, and is the smaller of the two forms with the males only reaching 4.5 cms (1¾ in.) and the females 6 cms (2¼ in.). Body form is similar to the common Sword-



Xiphophorus milleri



Xiphophorus montezumae cortezi
(spotted form)



Xiphophorus montezumae montezumae (male)



Xiphophorus pygmaeus nigrensis



Xiphophorus pygmaeus pygmaeus (male)

tail with a longish head, but the caudal peduncle is a bit stouter and the short sword curves upwards.

The markings on the body are similar to those of *X. milleri* but the basic colour may vary from a brownish olive to a warm reddish brown. The lateral line stripe is dark brown and above it all the six-sided scales are edged in dark brown giving a honeycomb effect. The best coloured males have a bright orange dorsal fin with a large number of small black spots and the body itself may or may not be spotted. In fact, there is such a variation in the amount of spotting that while some specimens may have no spots at all, others have very large spots, and some even go as far as having large black blotches all over the body. Apart from the dorsal and a few black streaks in the tail, the fins are colourless, but

March, 1978

the sword is usually pale yellowish-brown edged with thin black lines.

In the aquarium these fish thrive at a temperature between 22° and 24°C (72° and 75°F) and although they like plenty of swimming space, the back and sides of the tank should be densely planted to provide shelter for the smaller fish. As they like clean water, filtration is essential, and aeration should also be used as well if possible as these fish come mainly from moving waters.

Feeding poses little problem as they will take dried and live foods, but once again they do like some green stuff to be included, whether it is algae, lettuce leaf or a proprietary brand of vegetable food.

A pregnant female usually gives birth after a period of five to eight weeks, but the broods are fairly small

for the size of the parents, numbering only 10 to 40 young. They can take fine dried food immediately and with a proper diet grow quickly and begin to sex out at about eight weeks. The males will continue growing however until the short sword is fully formed.

Xiphophorus montezumae montezumae is also found in the same rivers as *X. m. cortezi* as well as the fast-flowing Rio Salto de Agua; it does not occur in lakes or swamps however. It grows a little larger than *cortezi* with the males reaching 5.5 cms (2½ in.) and the females 6.5 cms (2½ in.).

The head is shorter but the sword is still present on the caudal fin and although the coloration is not very different, this sub-species is easily distinguished by the much larger dorsal fin of the males. Again the basic body colour is dark olive to brown although this pales under the belly to a silvery yellow colour. The region behind the head may also tend towards metallic green. The stripe along the lateral line is either brown or red and is usually accompanied by two fainter stripes on the rear half of the body. These fainter stripes may be interrupted and dissipate into a row of spots just faintly indicating a zig-zag line. The scales have dark borders.

The male's dorsal fin is definitely his best feature, and when he spreads it, it does look beautiful. It is greenish yellow with numerous black dots and its tip extends beyond the base of the caudal fin in adult males. It is taller than the dorsal of *X. helleri* and more rounded. The short sword, which curves upwards is sea-green in colour with a brown border, and the caudal fin itself is yellowish with many small spots.

This sub-species prefers cooler temperatures to *cortezi* and is happiest between 20° and 24°C (68° to 75°F). Lower temperatures will be tolerated quite readily however as winter temperatures in its natural habitat drop to around 14°C (upper fifties Fahrenheit). Being an upland fish from fast-flowing rivers, filtration and aeration are essential, and being somewhat timid, it also likes clumps of plants in which to hide.

As it is omnivorous it takes all the foods mentioned for *X. m. cortezi* and the breeding characteristics are also very similar. At cooler temperatures the gestation period is longer.

The fourth member of the Montezumae group is the so-called Pygmy Swordtail, and in this fish's case the word "pygmy" not only applies to the size of the fish, but also to the size of its "sword" as well. *Xiphophorus pygmaeus* carries a small "dagger" at the best of times, and no "weapon" at all at the worst.

Again the species is split into two sub-species: *X.p. nigrensis* and *X.p. pygmaeus*. Both like warmer temperatures and do best in the upper seventies to low eighties Fahrenheit (25° to 28°C).

X.p. nigrensis is in fact one of the rarest of all the Swordtail family coming originally from the warm

source regions of the Rio Choy where it lives among dense vegetation and stones in deep water. Coming from such slow-flowing water it is a sturdily built fish with a high back and it may produce a short sword comparable in length to *X. montezumae*, but such specimens are rare. Usually there is just the hint of a sword on the lower edge of the caudal fin.

It is a small fish with the males only reaching 3.5 cms (1½ in.) and the females 4 cms (1½ in.). The same stripes and reticulated pattern evident on other fish in the family appear on adult fish, although the females are paler. Sometimes there is a dark patch at the base of the tail and the "sword" has a black lower border extending to the caudal peduncle.

The dorsal fin is small, rounded and set well back and the male's gonopodium is somewhat longer than its relatives. Basic body colour is a steely blue which is brilliantly iridescent on some specimens and there has also been a report of some yellow males being found.

It will take all the foods listed for the other members of the *Xiphophorus* genus and although little is known of its breeding habits, it is understood that the gestation period is between five and eight weeks and broods number only 10 to 30 young.

Males of *X.p. pygmaeus* are even smaller than those of *nigrensis* making it the smallest member of the Swordtail family. They reach only 3 cms (1½ in.). Females are a little larger attaining some 4 cms (1½ in.). It has so far only been found in one small area of the Rio Axtla preferring deep water near the banks where there is dense vegetation and rocks. It lives alongside communities of *X. montezumae cortezi* and *X. variatus variatus*, although these latter species inhabit the slightly shallower water very close to the banks. As the water here flows a little faster than in the habitat of *X.p. nigrensis*, the body form of *X.p. pygmaeus* is slenderer, but once again there is only just a hint of a sword on the base of the tail.

The body colour is bluish with an iridescence in reflected light and a black stripe runs the length of the body from the lips through the eye to the caudal peduncle. The scales have dark borders and there may sometimes be dark markings between the lateral stripe and the top of the back. As with *nigrensis* the dorsal fin is rounded and set well back, but it also has a black border. It is yellowish and adult males carry a series of dark markings between the fin rays. The bottom edge of the tail has no black line making it difficult to distinguish the little spike of a sword. Its colour is a very pale yellow, sometimes with dark markings between the rays and on the edge similar to the dorsal fin. Females are similarly coloured, but paler.

Feeding and breeding are similar to *X.p. nigrensis* and these fishes do best in a tank which is densely planted with good filtration and aeration, and a temperature of around 27°C (80°F).

for the size of the parents, numbering only 10 to 40 young. They can take fine dried food immediately and with a proper diet grow quickly and begin to sex out at about eight weeks. The males will continue growing however until the short sword is fully formed.

Xiphophorus montezumae montezumae is also found in the same rivers as *X. m. cortezi* as well as the fast-flowing Río Salto de Agua; it does not occur in lakes or swamps however. It grows a little larger than *cortezi* with the males reaching 5.5 cms (2½ in.) and the females 6.5 cms (2½ in.).

The head is shorter but the sword is still present on the caudal fin and although the coloration is not very different, this sub-species is easily distinguished by the much larger dorsal fin of the males. Again the basic body colour is dark olive to brown although this pales under the belly to a silvery yellow colour. The region behind the head may also tend towards metallic green. The stripe along the lateral line is either brown or red and is usually accompanied by two fainter stripes on the rear half of the body. These fainter stripes may be interrupted and dissipate into a row of spots just faintly indicating a zig-zag line. The scales have dark borders.

The male's dorsal fin is definitely his best feature, and when he spreads it, it does look beautiful. It is greenish yellow with numerous black dots and its tip extends beyond the base of the caudal fin in adult males. It is taller than the dorsal of *X. helleri* and more rounded. The short sword, which curves upwards is sea-green in colour with a brown border, and the caudal fin itself is yellowish with many small spots.

This sub-species prefers cooler temperatures to *cortezi* and is happiest between 20° and 24°C (68° to 75°F). Lower temperatures will be tolerated quite readily however as winter temperatures in its natural habitat drop to around 14°C (upper fifties Fahrenheit). Being an upland fish from fast-flowing rivers, filtration and aeration are essential, and being somewhat timid, it also likes clumps of plants in which to hide.

As it is omnivorous it takes all the foods mentioned for *X. m. cortezi* and the breeding characteristics are also very similar. At cooler temperatures the gestation period is longer.

The fourth member of the Montezumae group is the so-called Pygmy Swordtail, and in this fish's case the word "pygmy" not only applies to the size of the fish, but also to the size of its "sword" as well. *Xiphophorus pygmaeus* carries a small "dagger" at the best of times, and no "weapon" at all at the worst.

Again the species is split into two sub-species: *X.p. nigrensis* and *X.p. pygmaeus*. Both like warmer temperatures and do best in the upper seventies to low eighties Fahrenheit (25° to 28°C).

X.p. nigrensis is in fact one of the rarest of all the Swordtail family coming originally from the warm

source regions of the Río Choy where it lives among dense vegetation and stones in deep water. Coming from such slow-flowing water it is a sturdily built fish with a high back and it may produce a short sword comparable in length to *X. montezumae*, but such specimens are rare. Usually there is just the hint of a sword on the lower edge of the caudal fin.

It is a small fish with the males only reaching 3.5 cms (1½ in.) and the females 4 cms (1½ in.). The same stripes and reticulated pattern evident on other fish in the family appear on adult fish, although the females are paler. Sometimes there is a dark patch at the base of the tail and the "sword" has a black lower border extending to the caudal peduncle.

The dorsal fin is small, rounded and set well back and the male's gonopodium is somewhat longer than its relatives. Basic body colour is a steely blue which is brilliantly iridescent on some specimens and there has also been a report of some yellow males being found.

It will take all the foods listed for the other members of the *Xiphophorus* genus and although little is known of its breeding habits, it is understood that the gestation period is between five and eight weeks and broods number only 10 to 30 young.

Males of *X.p. pygmaeus* are even smaller than those of *nigrensis* making it the smallest member of the Swordtail family. They reach only 3 cms (1¼ in.). Females are a little larger attaining some 4 cms (1½ in.). It has so far only been found in one small area of the Río Axtla preferring deep water near the banks where there is dense vegetation and rocks. It lives alongside communities of *X. montezumae cortezi* and *X. variatus variatus*, although these latter species inhabit the slightly shallower water very close to the banks. As the water here flows a little faster than in the habitat of *X.p. nigrensis*, the body form of *X.p. pygmaeus* is slenderer, but once again there is only just a hint of a sword on the base of the tail.

The body colour is bluish with an iridescence in reflected light and a black stripe runs the length of the body from the lips through the eye to the caudal peduncle. The scales have dark borders and there may sometimes be dark markings between the lateral stripe and the top of the back. As with *nigrensis* the dorsal fin is rounded and set well back, but it also has a black border. It is yellowish and adult males carry a series of dark markings between the fin rays. The bottom edge of the tail has no black line making it difficult to distinguish the little spike of a sword. Its colour is a very pale yellow, sometimes with dark markings between the rays and on the edge similar to the dorsal fin. Females are similarly coloured, but paler.

Feeding and breeding are similar to *X.p. nigrensis* and these fishes do best in a tank which is densely planted with good filtration and aeration, and a temperature of around 27°C (80°F).

"WHY CAN'T I grow plants?" Without doubt this is the question I've been asked most frequently during the past twenty-five years. It's not an easy question to answer as in any given aquarium there are so many variables.

As I've said many times in print, there are particular environmental requirements common to the majority

certain amount of light and water; too little or too much of either or both will either prevent optimum growth or result in the plant's death. Our plant will have to be kept in an appropriate temperature: too much heat, or lack of it, and the plant's growth will be affected—possibly resulting in death at either extreme. The fuchsia will also require oxygen and carbon dioxide; usually one will not have to concern

GROWING AQUATIC PLANTS

SOME NOTES ON BASIC REQUIREMENTS

Written & Illustrated by B. Whiteside, B.A.

of growing plants. These include heat, light, water, oxygen, carbon dioxide; and certain mineral salts containing elements such as nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, sodium, iron, etc. Many or all of the above—in greater or lesser quantities—are required by both land and aquatic plants.

Let's look at a typical pot plant and try to discover how to grow a good one. A greenhouse fuchsia will do for an example. Such a plant will require some sort of soil or compost, and a pot, in which to spread its roots. A mixture of loam (containing mineral salts), peat and sand, in a plastic flower-pot of suitable size, will be appropriate. The fuchsia will require a

oneself about supplying these gases if the greenhouse is adequately ventilated.

Given the above, and freedom from pests and diseases, the fuchsia should grow and, eventually, produce flowers, fruit and seeds; however, after a certain time the plant growth will begin to slow down as food supplies—in the form of soluble mineral salts—begin to go down. At this stage one must feed the plant. This can be done by moving it to a larger pot, i.e. potting on, and adding fresh compost; by sprinkling a pinch or two of chemical fertilizers on the surface of the compost in the pot; by watering the compost in the pot with a liquid fertilizer, suitably diluted; or by spraying the leaves of the plant with a

similar, dilute solution of plant foods, i.e. foliar feeding. To keep the plant flourishing it will be helpful to remove any dead or dying leaves; it will be necessary to ensure that both shoots and roots have sufficient growing space; and dead flowers will have to be removed to ensure that the plant does not waste its energies on fruit and seed production. If we wish to grow new plants from our adult specimen we can take stem cuttings and root these in a separate pot in a suitable compost.

If we were to grow our fuchsia in a pot of plain sand or gravel, instead of compost, it would fail to do well unless we used the hydroponics system culture, i.e. supplying nutrients in the form of solutions watered into the sand or gravel at regular intervals to prevent starvation.

mind the needs of our proverbial fuchsia. Firstly, water. Suitable water should be fairly soft and slightly acidic. A hardness level of around 8 DH and a pH of about 6.8 should be suitable—although plants can thrive in a variety of water conditions. Tap water, taken after the tap has been allowed to run for a few minutes, is usually quite suitable—particularly if it has been allowed to stand for, say, 24 hours to allow gases such as chlorine to disperse. (The water should be warmed to tank temperature if it is to be added to a tank that already contains fishes.) If the tap water is too hard it can have its temporary hardness reduced by being boiled; or diluted to a lower level by having some clean, matured rain water added. If it is hard and alkaline it can be softened and slightly acidified by being left



Plants shown include Dwarf lily and Water Wistaria.

Can we learn anything about growing aquatic plants from the above description? I think we can. The only major differences between our fuchsia and our aquatic plants are that the latter live in an underwater environment whereas the former lives in an environment surrounded by air; and whereas we can easily adjust the environment in a greenhouse without worrying about anything other than the plants, in the aquarium we have to consider the needs of the fishes as well as those of the aquatic plants. Without too much bother one should be able to provide a set of conditions that suits both fishes and plants—although, in the relatively small space of an aquarium, the environmental conditions tend to change, sometimes rapidly.

Let's take a tropical aquarium as the most common example and try to supply it with the conditions that will be suitable for aquatic plant growth—bearing in

standing in a bucket containing clean, pure garden peat. Very soft water can be rendered more hard by the addition of calcium sulphate (plaster of Paris), although this chemical is rather insoluble in water and any left after being added to the water in a plastic bucket should be filtered out before the water is tested and added to the aquarium. Dilute phosphoric acid can be used to soften and acidify water. The beginner would be wiser to avoid the use of chemicals and stick to tap water and clean rain water. If any chemicals or peat are used it will be essential to test the pH and hardness of the water before adding it to the aquarium.

Aquarium gravel that is free from pieces of calcium carbonate, e.g. chalk, limestone, marble, pieces of bone and sea shells, is best. Crushed granite is an excellent type of gravel to use if your dealer cannot supply

calcium carbonate-free gravel. (This chemical tends to dissolve slowly in aquarium water, making it harder and more alkaline. For this reason all rocks containing CaCO_3 should also be banned from the aquarium. Snails should also be excluded, if possible, from the planted tank because their shells contain calcium carbonate and because many of them will eat higher forms of plant life as well as some algae.)

Loam, clay or peat may be used as a growing medium under the gravel in a tank; but such media tend to cause problems if one uses U/G filtration. Personally, I do not use U/G filters in planted tanks—I prefer outside box or power filters—but some aquarists can grow good plants in tanks filtered by U/G filters. I feel that they remove soluble minerals from plants' roots in the gravel. I do not now use any growing media under the gravel in my tanks but, at the moment, I am testing a brand of plant plugs

form a strong root system in peat it is difficult to remove individual plants without the whole peat 'bag' being pulled up. I'd prefer to use plain gravel and, if required, employ plant plugs for special plants that are heavy feeders.

Many aquatic plants take in food materials through their leaves and stems as well as their roots; indeed, floating plants obtain all their food from the water unless they have long roots that reach down into the gravel. Some plants, e.g. hornwort, have no roots; and species such as Java moss use their tiny roots only for attachment and not for obtaining food materials. Hence it can be seen that mineral salts dissolved in the aquarium water provide an important source of food for many aquatic plants. If tanks are kept too clean plants can suffer from starvation. Outside filters keep the water in my tanks crystal clear and I never use a siphon or vacuum cleaner to remove the tiny



A well planted aquarium showing Chain swords, Water Sprite and Pennywort.

that should be useful for supplying extra food materials to strong-growing plants such as Amazon swords. Some aquarists might like to try a special type of soil now being sold specifically for aquarium use. In the past I have successfully encouraged plant growth by using ordinary garden peat under the gravel. Such media can present problems if plants are removed from the gravel, if the gravel is disturbed, or if it is stirred up by digging fishes such as *Corydoras* species. When using peat—a substance which contains little in the way of plant foods in the form of mineral salts—I always steeped the peat for a time, wrung it out, and tied it into an old nylon stocking or the leg of a pair of tights. The 'bag' of peat was placed on the base of the tank and covered with suitable gravel. The nylon net kept the peat in place and helped to prevent it from clouding the water. Even nylon can disintegrate under water; and when individual plants

amount of mulm that occasionally gathers on the base of my tanks. I feel that this should remain there if plants are to obtain food and grow. Quantities of such waste—mainly from fish droppings—work their way down into the gravel and provide plant foods for bottom rooting plants. Such waste will also break down and salts in solution will be available to those parts of plants not rooted in the gravel. So, don't keep the base of your tank too clean.

When a tank is newly set up it is useful to add a quantity of one of the liquid plant fertilizers specially compounded for use in aquaria. Makers' instructions should be carefully followed as regards concentrations and frequency of application. In some tanks plant growth can be improved if after regular water changes appropriate quantities of liquid plant fertilizers are added. However, in a tank containing a good selection of fishes and plants the waste from the former is

usually sufficient to supply all necessary plant foods once the plants have become established.

Aeration and filtration are useful in planted tanks for a number of reasons. Water movement ensures that oxygen is dispersed in the water at all levels; it allows carbon dioxide gas to reach the water surface where it can escape by diffusion; and it ensures a fairly even distribution of temperature, preventing pockets of cold water. As many aquatic plants come from areas of moving water, aeration and filtration may help to improve plant growth by providing moving water. I find that the majority of plants do best at temperatures in the 78-81°F region. It is useful to stick some polystyrene tiles on the outside bottom glass of an aquarium. This serves at least two important purposes: it ensures that the plants' roots are not subjected to lower temperatures if the tank is housed in a cold room in winter; and it prevents light from getting at plants' roots in the gravel. (Many readers probably know that while plants' shoots grow towards light, their roots grow away from light; and gravity has a similar effect on each. Thus if light reaches plants' roots in the gravel a conflict in the direction of growth is set up in the roots.)

If you recall what I said about our original fuchsia plant and have read what I've since written about comparisons with aquatic plants you'll note that I've dealt with water, heat, oxygen, carbon dioxide, growing media, water movement and plant foods. The last important subject is lighting. Although natural sunlight is the ideal, most plants in aquaria have to make do with artificial lighting. This is a common area of controversy and each aquarist is entitled to his or her own opinion. My opinion is that special red coloured fluorescent tubes, on their own, do not produce good plant growth in aquaria. If you wish to use such tubes I'd recommend the addition of at least one tungsten bulb to increase the intensity of the lighting. A strong light on for a shorter period should produce better plant growth than a weaker light on for a longer period. The fluorescent tube I have found to be the best for aquatic plant growth is also the most expensive I have come across; and even with it in use I like to add at least one tungsten bulb. Indeed, if I were to have only one light source for an aquarium I would stick to tungsten bulb lighting kept on for about about 10-12 hours daily over a well stocked and well planted tank. With fewer plants this would probably be excessive. I'd use the following wattages of tungsten bulbs—preferably Rough Service bulbs as they last much longer—over the following tanks for the daily period stated: 18 in. x 10 in. x 10 in.—40 watts; 24 in. x 12 in. x 12 in.—two 40 watt bulbs; 30 in. x 15 in. x 15 in.—three 40 watt bulbs. These suit my heavily planted tanks; yours may require fewer or more watts for shorter or longer periods.

One should take care that floating plants and surface leaves of bottom rooted plants do not cut off supplies of artificial light to shorter plants. It is also important to ensure that cover glasses are kept clean—scrub them monthly with a nailbrush; and that the insides of lighting hoods have a clean, reflective surface—clean or polish them when necessary.

The photographs show some of my decorative tanks as they are or as they were. Plants shown include my favourites and thrive under the conditions that I have described.

The following is a list of plants that I would recommend to those who may not have had much success so far: Java fern, Java moss, water sprite (Indian fern), *Cryptocoryne affinis*, *C. nevilli*, pennywort, *Aponogeton* species (except the lace plant), water wistaria, Amazon swords—various species, giant *Hygrophila*, *Hygrophila polysperma*, *Bacopa*, *Cabomba*, *Ludwigia*, *Nymphaea stellata* (dwarf lily), *Sagittaria*, *Ambulia*, and *Lobelia cardinalis*.

If your plants fail to grow, read through what I have written about the fuchsia and about aquatic plants and try to identify what factor or factors may be missing and causing the failure of your plants to grow properly. If you find that one or two species grow well in your tanks, buy some more of these species and plant your tanks fairly heavily. By all means try the occasional new species that you would like to grow in your tank; but buy only one or two of each species at a time in case the conditions in your tank do not suit them. This approach will save money in the long run and ensure that you do not spend a lot of cash on expensive plants that will soon fade away and die. If the one or two plants thrive, you can always buy more.

These are my opinions, formed after more than twenty-five years' experience as an amateur aquarist. You may disagree with some or many of them—and you are perfectly entitled to do so; but if you have found it difficult to grow aquarium plants in the past, some of the above information and opinions may help you to grow better plants in the months and years ahead. I hope so! Do remember that some plants—such as *Cryptocoryne* species—may take several months to settle down in a new environment. Give them time to do so; don't keep moving them around.

I'd be pleased to hear from you, c/o *What Is Your Opinion?*, if as a result of reading this article your ability to grow aquatic plants improves. You may discover something I've missed; or you may come up with some new information about species of plants that do not do well in the same aquarium as other specific species. If you send me details of your findings I'll try to publish them; they could also help to improve other people's success rates in this important and fascinating branch of our hobby—the cultivation of aquatic plants in tanks stocked with fishes.

BREEDING

Colisa lalia

by

Jørgen Hansen & Pamela Stewart

ONE OF THE most beautiful and popular labyrinth fish to be found in the aquarium hobby is perhaps *Colisa lalia*, the dwarf gourami. It is one of the veterans of the hobby, as it was imported to Europe as early as 1903.

The dwarf gourami is to be found mainly in Eastern India and Bangla Desh, where the rivers Ganges and Brahmaputra meet in their lower course and from the world's greatest delta in joining with the Bay of Bengal. Another place of origin is stated to be the Coromandel Coast in South-east India.

Colisa lalia can vary much in intensity of colour within its area of distribution. Mackasack, a missionary in India, found meagrely coloured specimens in the lakes of Rajasthan in the West, twice as colourful specimens in Lake Keetham, and the most beautiful specimens of all in the East. A theory has been forwarded with regard to the colouring being dependent upon the water's pH value, such that acid water should give pale colouring while alkaline water should give strong colouring.

Colisa lalia inhabits waters near the banks of the lakes where plant growth, consisting mostly of *Cryptocoryne*, is dense. Mackesack has recounted how a single cast of the net in amongst the plants was enough to catch 4-5 specimens.

The fluctuation in temperature in the course of a year in *Colisa lalia's* environment is very large. Air temperatures of 0°C. have been measured at night in the wintertime, while in summer in the daytime air temperatures of 43°C have been registered.

Until the genus *Colisa* was set up in 1831 by Cuvier and Valenciennes the present members of the genus were classified under the name *Trichogaster*. *Colisa lalia* was thus described in 1822 by Hamilton and Buchanan under the name *Trichogaster lalia*. The genus *Colisa* comprises 5 species from India, Bangla



Male fish on sentry duty under nest

Desh and Burma:

- (1) *Colisa chuna*
- (2) *Colisa fasciata* (Block & Schneider 1801)
- (3) *Colisa labiosa* (Day 1878)
- (4) *Colisa lalia* (Buchanan & Hamilton 1822)
- (5) *Colisa sota*

We acquired our *Colisa lalia* at an auction in the local aquarium club in sharp competition with several other members, as the offered pair were fully grown and just ripe to be set in a breeding tank.

The male was 5 cm. in length and gleaming with colour. The whole of its flattened body gleamed with alternate red and blue transversal stripes, while the breast and the throat area was bluish-black. The anterior half of the elongate dorsal fin was also of the latter colouring, while the posterior half, and likewise the whole of the caudal fin, was of a light grey and studded with red spots. The anterior third of the anal fin was the same bluish-black while the posterior two-thirds were similarly studded with red spots on a grey background. The pectoral fins were completely transparent, while each ventral fin was reduced to a single fin ray functioning as a tactile and gustative organ.



Male fish builds bubble-nest by collecting thread algae and blowing bubbles amongst it

The female was of a similar size as the male but much more modest in colouring. The basic body and fin colouring was a light brown but if one looked carefully one could distinguish the blue and red transversal stripes. She had a very plump appearance, indicating that she was full of eggs. Nine years ago, when we also had a fully-grown pair of *Colisa lalia*, we had had high hopes because the female was plump and got visibly plumper with every day that passed. Unfortunately she died within the week of dropsy, which was easy to diagnose when we fished her up, as all the scales on her body stood out at right angles. This time, however, our female was not diseased.

We placed the pair in a tank measuring 40 x 40 x 30 cm with a water level of 20 cm. The tank was planted with *Sagittaria* which in some places reached the surface, and green thread algae was present in quantity at the bottom. The temperature was 28°C



Culmination of embrace and eggs spurt out and rise into nest

516

1mm



fig 1



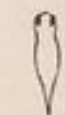
fig 2



fig 3



fig 4



Egg development in *Colisa lalia*—

Fig. 1: First day.

Fig. 2: Second day. The tail is just appearing.

Fig. 3: Third day. Eye pigmentation present.

Fig. 4: Fourth day. The yolk sac has been absorbed and the fish is swimming freely.

and the water's pH and DH values were 7 and 18 respectively.

Three days later the male began to build a bubble nest which did not, however, resemble those we know from the paradise fish (*Macropodus opercularis*) and the fighting fish (*Betta splendens*), where the nest consists of bubbles only. Here the male collected lots of thread algae together and by blowing bubbles up in between, he eventually built a nest 5 cm in diameter and 3 cm high. The use of algae and plant parts may enhance oxygenation of the eggs due to the continuing photosynthesis of the former.

When the male had completed his construction of the nest he began to pursue the female and eventually

THE AQUARIST

managed to drive her under the nest where she, after much persuasion, finally submitted to an embrace. The male inflected his body such that the female was pressed on each side of the belly by his head and tail, and such that his sexual aperture was adjacent to hers. Thereafter they revolved round in this position, each trembling over the whole body, whereupon 20-40 eggs were squeezed from the female and floated upwards into the bubble nest.

The female was brutally chased away immediately afterwards, whereupon the male collected together those eggs which had missed the nest, and spat them carefully into its midst. He also took the eggs which had landed in the nest and spat them farther in, accompanied by more bubbles. When everything was as it should be, the female was hunted forward for another squeeze and thus it continued for the following hour until finally she concealed herself far in amongst the plants and refused to emerge. The male thereupon, in gleaming colours, stood like a sentinel just beneath the nest.

The eggs were about 1 mm in diameter and limp so that they were almost impossible to perceive amongst the thread algae. Unfortunately, there were a number of snails in the tank and as these began to display a little bit too much interest in the contents of the nest, we fished the latter up in a small plastic beaker which we allowed to float at the surface of a snailless tank.

Development occurred as described below:

- 17.3.77 Spawning occurred.
- 18.3.77 Small tails are visible on the eggs.
- 19.3.77 Eye pigmentation is present. The fry are hanging around the side of the beaker and in dense quantities amongst the thread

algae in the nest. There are at least 300.

20.3.77 The tiny fry, not much more than 2 mm in length, are swimming freely. We feed them with crushed trout fodder very finely sieved. The male is beginning to construct a new nest, and the female is regaining her plumpness.

27.3.77 The fry are large enough to accept small *Cyclops*. The second brood is swimming freely, and the male has ceased attending to them.

12.4.77 The first brood are 10 mm long, and have clearly developed ventral fins. The labyrinth which develops within the first 20 days of life is apparently not in use yet.

The dwarf gourami can reproduce by the age of 8 months and can, in the course of its relatively short life of three years, produce innumerable offspring. It can be kept at temperatures of between 15-32°C, although large fluctuations of temperature should, of course, be avoided. When breeding it is important that the air has the same temperature as the water from the beginning of labyrinth development until at least two months have passed. In fact, it is a good general rule with labyrinth fish that air and water temperatures should coincide in order that the fish do not catch a chill.

Colisa lalia can seem somewhat shy when placed in a new tank, but it settles down quickly if adequate vegetation is present and if provided with reasonably peaceful tank-mates. One of the best companions for this species is the pearl gourami, *Trichogaster leeri*, which also appreciates peace and quiet and a well-planted tank.

ADVANCE NOTICE

THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES

Members of The Confederation of United Kingdom Aquarists

present



THE 27th BRITISH AQUARISTS' FESTIVAL

EUROPE'S BIGGEST AND BEST AQUARISTS' SHOW

at

BELLE VUE ZOOLOGICAL GARDENS, MANCHESTER

on

SATURDAY AND SUNDAY 21st 22nd OCTOBER 1978



Marine Disaster

One reads so many letters from beginners of Marine Tanks delighted with their success and it is quite a joy to read them, but I think it only fair to warn them of what *can* happen.

After twenty to thirty years, during which I shrink from even thinking how much I've spent in testing every method, gadget, machine and suggestion of 'Specialists,' may I warn all concerned.

If you buy Live Rock it's great fun waiting to see what will grow in it or on it. My pieces looked lovely, bits of colour, tiny anemones, etc.

I had examined the rocks minutely, but after a time my Feather Dusters died one by one, then anemones gradually disappeared and small fish. Then I saw movement under a rock and a black crab vanished in the 8 in. of Coral sand. It was several tedious hours work running the water off, taking all the rocks out and catching up the fish. I found two such crabs and my trouble stopped. Sooner or later, no matter what caution or quarantine precaution you take you'll get Oodinium or Copepods or some variety of bug in the tank. Just on one fish. You spend hours catching it up among the rocks and coral, but next morning you discover it on two or three other fish and it usually ends up with losing the whole tank full of fish no matter what time, care and expense you spend.

I had the loveliest looking tank you ever saw. 78 in. x 24 in. x 22 in., gorgeous old rocks and coral with U/G filtration, undulating plastic with 1/4 in. holes all over it, 1 1/2 in. of broken shell and 8 in. of coral sand. Gradually I collected: a blue and white striped Angel 7 in., Foxface 6 1/2 in., two blue Surgeons 5 in., Batfish 7 in., a dozen mixed Damsels from all-blue to black and white striped, a Pearlscale Butterfly 5 1/2 in., various Wrasse, two large Wimples, six various Clowns and a colourful shrimp which cleaned up most of the flatfish, plus—strangely enough—a big bright red Hermit Crab in a green shell. He often changed his shell, but returned to his big green one. Beyond the odd chase all these fish lived together, and all got on to dried food and became very tame. There were six uplifts from the very bottom, and for two years there was never a happier aquarist. I'd ended all troubles, or so I thought, perfect health for two years, all fish full of colour and growth until in 30 hours all

were dead. Water test perfect; nothing found on skin, in gills nor 'innards' of fish???

In a 40 gallon tank, I've a lovely mixture which I've neglected shamefully at times, no change of water, sometimes for months, but all contents terribly fit. My fellow aquarists, we hardly know anything yet, so carry on researching, please. At 86 I've done enough. My Menil Fallow ignore extremes of heat and cold, get no infections, come from the wood at my whistle to be 'scruffed' and petted. They show real affection, so what more can an old man wish? It's more than one gets from fish!

Your ancient reader with appreciation,
V. V. PEDLAR,
Uplands, Parbold, Lancs.

Sexual Swordplay

Upon reading your article about Swordtails in the January edition of *The Aquarist*, I was prompted to write and tell you about an unusual Swordtail which I now have in my care.

This, now, male sword did not actually start life as a male sword. It started its life as a medium sized platy. Upon the death of the only male platy in the tank, things began to change.

From repeated observations over a period of two or three weeks, it was seen that the anal fin characteristic of a female was gradually closing to forming a gonopodium, i.e. it had changed from female to male. But the change did not end here. To our amazement we noted that the caudal fin was beginning to grow and in about six weeks it had grown into a complete swordtail.

Now the fish is very attractive. It has a thin black line running along the bottom of the "sword," and it is a very bright red, much brighter than the female swords in the tank.

Is this a very unusual event and also would the male be fertile? I hope you publish this letter or answer my questions.

Yours sincerely,
K. N. R.,
Wiltshire.

SPECIAL 'COLDWATER ISSUE' IN APRIL

In addition to all our usual features, next month's edition of 'The Aquarist' will contain special articles on various aspects of coldwater fishkeeping, plus some beautiful colour illustrations and a well deserved tribute to Arthur Boarder, now in his eighties and still one of the most respected and best loved specialists in the hobby.

Once again we must apologise to readers for the recent delays in publication due to industrial action within the printing industry.

THE BLACK WIDOW

by Philip R. Allen

THIS ATTRACTIVE characin is native to South America (Paraguay). The Black Widow or Black Widow tetra, as it is sometimes called, grows to a length of about 2½ ins. although specimens caught in the wild are very occasionally seen about 3 ins. long. They are usually sexually mature when they reach a body length of around 1½ ins. Although not a spectacularly coloured fish, its unusual shape, pattern and peaceful disposition make this a very desirable community tank member. The front part of the fish (as far back as the dorsal and anal fins) is silver, the back being slightly darker than the belly. This expanse of silver is broken up by two vertical black bars. The rear part of the body is black as are the dorsal, anal and adipose fins. All the other fins are hyaline (transparent). The black markings are seen at their best when the fish are young and in adult fish during spawning. When Black Widows get older and larger the black fades to a rather less impressive dirty grey.

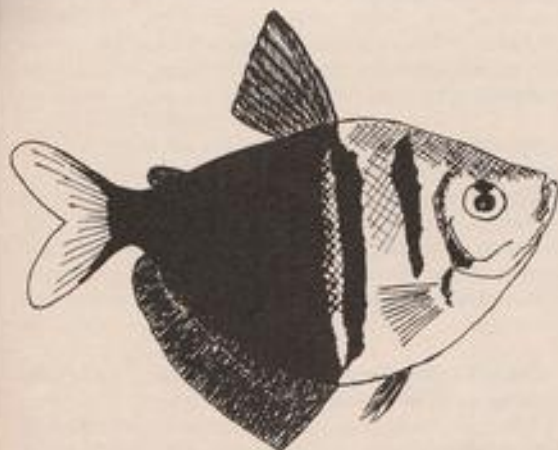
Sexing Black Widows is impossible when they are young, but fish over 1½ ins. long can be distinguished by the females' "fuller figure". Also, when selecting fish from one spawning, male fish in general are slightly smaller than their female counterparts. Black

Widows are voracious feeders, devouring any food item small enough to swallow. This enormous appetite is a boon to the breeder because females can be conditioned quickly and the time-lag between spawnings can be reduced to around ten days.

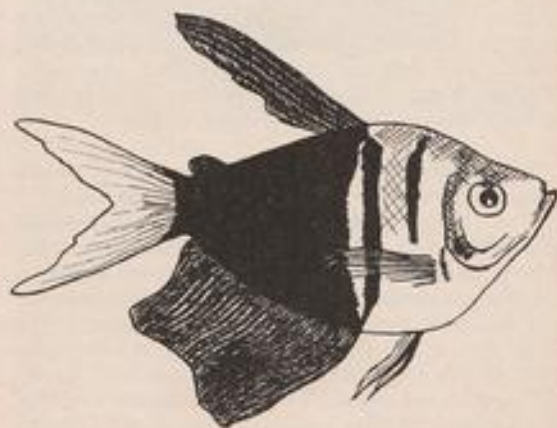
Inducing Black Widows to spawn is usually very easy. My own method is to place the male/males into the set up breeding tank one evening, wait two days and introduce the female/females. The females especially should have been well conditioned and look "fit to burst". Spawning more often than not occurs during the night or the following morning.

The spawning tank in my experience can be almost any size, but I have had most success using rather large tanks (e.g., 36 in. × 15 in. × 12 in.). I personally prefer these large tanks because the fry can be raised to a reasonable size before there is any need to move them into growing-on tanks. A number of other aquarists to whom I have spoken prefer to use very small tanks. Their reason being that a higher percentage of eggs is fertilized. I agree with this to an extent but Black Widows are so prolific (six or seven hundred fry from a single spawning is commonplace), that the

Continued on page 522



Normal form of the Black Widow



The Polish Tetra or long-finned Black Widow



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



Pearl Danio

I introduced three lively *Pangasius sutchi* into my 4 ft. community tank. Now I have been warned that this catfish is very predacious and should be isolated from other species. I should welcome your opinion on this matter?

P. sutchi in its larger sizes of, say 6 or 7 in. is quite capable of attacking and eating other fishes much smaller than itself. Yet among sturdily built fishes of about its own length, it is not likely to cause any trouble. I am glad to note that you have purchased three *P. sutchi* for your tank. For one such catfish without the companionship of its own kind often becomes frighteningly shy, takes little or no interest in food, and goes into a fairly rapid decline.

I have obtained some pearl danios and would like to know how to sex and breed them?

The sexes of medium-sized to large *Brachydanio albolineatus* are not difficult to tell apart, for the female is paler in colour and, in general, larger in the body than the male. A female ripe for breeding—a condition denoted by noticeable bloating of the abdomen and lower sides—scatters non-adhesive eggs as she is chased about the aquarium by the highly coloured male. The best set up for breeding is a longish tank with an inch or two of water over a floor of glass marbles, well-washed granite chippings, and the like, or a grid of horizontally linked glass or

by Jack Hems

plastic tubes. For as the female releases her eggs, they will fall into the interstices of the bottom covering and there remain safe from the snapping mouths of the parent fish. The latter should be removed from the spawning tank immediately—or at least before three days are out. The minute fry hatched from the eggs become free-swimming in the space of four days. They require *infusoria* or a suitable substitute such as a proprietary liquid fry food. As they increase in size increase the depth of water—at exactly the same temperature—and give powder-fine dried food or micro worms or both.

The only anabantid in my newly set up aquarium housing guppies and small tetras is a male Siamese fighting fish. Every few days I find a male guppy of small neon tetra dead on the sand. Do you think the fighting fish is responsible for the fatalities?

I most certainly do. Both the male and the female Siamese fighting fish are persecutors of smaller or less assertive fishes than themselves. Moreover, the fighting fish or bettas are always too ready to tear at flowing-finned fishes, especially those of petite shape and size.

Would a spotted metynnis be all right in my community tank?

The spotted metynnis (*M. maculatus*) is well-mannered and will not harm other fishes. It will, however, spoil the appearance of a decorative tank by reducing a lot of the underwater plants to shreds. It is, in short, a great stripper and eater of submerged plant life.

I should very much appreciate some information on the two-spot African barb.

Two-spot barb is a popular name applied to two different barbs from India. One is the old favourite properly known as *B. ticto*, that attains a length of



Barbus puckeri

about 3 in., with silvery sides and a dark spot above the anal fin and another behind the gill-plate, and *B. puckeri*, sometimes called Pucker's barb, that lives for years and at full size measures about 2 in. This fish has a fiery red band or glow along the sides and a greenish or golden green sheen on the back. It has a black spot in the base of the dorsal fin and another black spot in the base of the tail. It is streamlined in shape, peaceable, and very active. The female grows slightly larger than the male. Like *B. ticto*, it accepts any food normally taken by an omnivorous fish and is quite comfortable at a temperature in the lower to middle seventies (°F).

What is a wimple piranha?

Wimple piranha is a popular name used for *Catopristomus* from the rivers and streams of Bolivia and thereabouts. It is not a true piranha, though in general outline and jaw-shape it resembles one. It is characterised by silver sides, small teeth and long extensions to the anterior rays of the dorsal fin. It attains a length of about 4 in. and can be kept with other fishes of about its own size in a spacious tank. By spacious, I mean a tank that allows plenty of swimming space. It accepts the regular live foods and flesh foods such as earthworms, strips of raw red meat, and uncooked fresh haddock or, say, cod.

I should appreciate some information on a tropical cyprinid bearing the scientific name of *Leptobarbus hoeveni*.

This fish has turned up in dealers' tanks every so often over the last few years. For all that it is little known and not easy to come across in comprehensive aquarium books. I do not know how large it grows, but it certainly grows larger than the general run of tropical cyprinids. It is native to Borneo and Sumatra, is not a faddy feeder, and in its smaller sizes, at any rate, gets on all right with other species.

I have just acquired a loach of the genus *Botia*. It has sides coloured a sort of slatey blue or lavender grey and yellowish to orange fins. Have you any idea which species it is and how it should be cared for in the aquarium?

March, 1978

In all probability your loach is *Botia modesta* from Thailand. This loach likes to make a home among thickets of plants or behind or among groups of stones. It resents the close approach of other fishes and almost always drives them away with a sudden rush. It feeds on small worms, red meat and other flesh food and can inflict needle-like pricks with moveable spines just below the eye. It attains a length of about 3½ in.



Botia modesta

Would a young *Channa micropeltes* cause any trouble in a large community tank?

Channa or *Ophicephalus micropeltes* would soon give rise to problems in a community tank. First, it would develop into a stealthy stalker and killer of regular community fish. Secondly, as it can attain about 3 ft. it would require a tank for itself.



Ctenopoma oxyrinchus

I have just acquired two *Ctenopoma oxyrinchus*. What can you tell me about this fish?

C. oxyrinchus is a labyrinth fish from Africa and therefore has the habit of rising to the surface every so often to take in a gulp of atmospheric air. Hence a warm air-space between the water level and the glass cover is of great importance. The water should be maintained at a temperature in the middle to upper seventies (°F). The species attains a length of about 4 in. and flourishes well on gnat larvae, various red or white worms, pieces of lean meat and unwanted livebearer fry. It will bully and make

war on other fishes easily intimidated or of smaller size.

Is there such a fish as a long-nosed *Distichodus*?

There is and its scientific name is *D. lusosso*. It hails from Angola, is mild-mannered and grows to a length of about a foot. That is in the natural state, at any rate. It requires plenty of vegetable matter in its diet and has derived its popular name from the shape of its snout: elongated and pointed and well-suited to extracting small live food from the interstices of crumbled stones.

Is *Elassoma evergladei* easy to keep?

All this little fish from Florida demands is a small tank to itself. Plant it well to afford hiding places or shelter, for the species is shy. Introduce such things as Grindal worms, gnat larvae, brine shrimps,

and tiny fragments of raw, red meat as food. Warm living room temperature is quite suitable for this fish.

What food and temperature do you advise for an electric catfish?

Earthworms, strips of raw, red meat, uncooked cod, fresh haddock, and the like, and a temperature in the lower to middle seventies (°F).

A few days ago, I bought a catfish under the name of dwarf mystus. It has eight barbels, no horny plates or scutes on the muddy or brownish-grey sides, and some pale horizontal bands extending from the head to the tail. Please tell me the proper name of this fish, its country or origin, and its maximum size.

Catfishes of the genus *Mystus* are found in India. Your fish is probably *M. micracanthus* from the northern part of the sub-continent. It is said to attain a length of about 4 in.

THE BLACK WIDOW continued from page 519

loss of a few eggs is almost desirable; growing on several hundred fry requires more tank space than I care to devote to them. I also find that Black Widow fry are very susceptible to changes in water conditions and also to pollution; this means that when spawned in small tanks, water changes may result in a total loss of the spawning. Another reason for using larger spawning tanks is that group spawnings which many aquarists might require, can be induced if vast quantities of fry are wanted; three females spawned with three or more males can result in 2,000 plus fry.

Spawning takes place in typical characin fashion. The males vigorously chase the females until they are sufficiently stimulated for egg laying. After each subsequent chase the male and female form an 'S' shape side by side and as they jerk back straight, the eggs and milt are ejected.

Spawning occurs at all levels in the aquarium but is more often concentrated around thickets of plants and in the top corners. The eggs are adhesive and stick to anything they come into contact with. When the adults complete spawning they are very likely to turn round and eat all the eggs. To prevent this they should be removed immediately spawning activity ceases. This sounds very simple but more often than not the fish spawn when no one is around, (I have had several spawnings start at around 10 p.m. and continue during the night). If any quantity of eggs are to be saved, I suggest using large amounts of fine leaved plants (cabomba or hornwort for example) or several large spawning mops unless, of course, you can guarantee to be available when spawning finishes.

Eggs hatch in 24 to 30 hours (at 80°F) and the fry can be seen wriggling amongst the plants. At this stage the fry consist more of egg-yolk than of fish. Until this yolk sac is fully absorbed no feeding is necessary, in fact introducing food too early can mean a total loss of the spawning due to pollution. I usually begin feeding the fry when they become free-swimming (5 or 6 days after hatching). Between hatching and free-swimming, the fry can be seen clinging to plants and to the sides of the tank, and will often be seen swimming jerkily then slowly falling to the bottom. (Do not mistake this for free-swimming).

The first food for the fry should consist of *infusoria* or a well-known prepared liquid fry food. After a couple of days feeding this, the fry will be large enough to tackle day-old brine shrimp. The *infusoria*-prepared fry food should be continued until all the fry are taking the brine shrimp, (their stomachs should bulge and appear pink). Once the fry are taking the brine shrimp other foods can be introduced, such as microworms and dust-fine dried foods. After about a fortnight the fry band together into a school and there is no more interesting sight than six or seven hundred Black Widows moving with military precision around a large tank. The fry grow quickly and should be ready for sale when 6 to 8 weeks old.

There is a long-finned variety of *Gymnocorymbus ternetzi* sometimes called the Polish tetra after the country where it first originated (apparently one long-finned fish was found in a spawning and was subsequently developed). They are just as hardy and just as suitable for community tanks as their shorter finned relatives.

GOLDWATER QUERIES

by Arthur Boarder

I have a fairly large tank with a fair amount of water plants. In it I have a few medium-sized Perch. I feed them on live foods and they appear quite healthy and active. However, they have lost their lovely colours and are quite pale. What am I doing wrong?

I think that your trouble is that there is too much light getting to the water. It is well known that if a fish is taken from a pond for exhibition, once it has been in a show tank with quite clear glass, it loses its colour. I remember when I was exhibiting over thirty years ago I caught a Green Tench from my pond for showing. It was a lovely dark greenish-bronze colour but after it had been in the show tank for an hour or so, it became quite washed out and insipid looking.

Your remedy is to cut down the lighting for the tank. Black out the back and ends first and see that you have plenty of water plants. See that too much natural light does not reach the tank and only have your overhead lighting on for a short period each day. You may find some water plants will not thrive with this lack of light, but do not despair, get plenty of Hornwort (*Ceratophyllum demersum*). I realise that I am often recommending this plant, but it is because I have found it so useful. It will thrive in deep dark water where most other plants would fail. I have grown it well in deep cold water cisterns. It is very long lasting and I still have plants from my original supply and must have grown sackfuls since then.

I am very fond of the water plant, *Hottonia pallustris*, but I cannot succeed in growing it. My plants soon fail and rot away. Have you any advice on growing it?

The plant is not a tropical one as you surmise but a native British one. It seems that the best way to plant it is to use single cuttings with underwater stem with roots attached. It must not be packed tight in a bunch. It should then get established well.

I recently saw a peculiar shaped fish in a dealer's tank. It was shaped like a goldfish and was gold with some silver markings. However, the dorsal fin was a strange shape, being well rounded like that of a Tench. What is this fish and should I try to breed from it to establish a new strain?

From your description and sketch, I have no doubt that the fish is an ordinary goldfish which has developed

an abnormal dorsal fin. When several types or varieties of goldfish are bred together in a pond, it is almost certain that among the young ones will be many different shapes. It is amazing what can turn up from a spawning from an excellent pair of fancy goldfish. I remember that in the late forties, the tropical fanciers used to look down on the breeders of fancy goldfish, but having tried both I have no doubt that it is far more difficult to breed a number of good fancy goldfish than it is to breed most tropicals. I found that with the species of tropicals I bred the young turned out like peas in a pod. If one could get 10% of really good specimens from any spawning it was all that could be expected when breeding fancy goldfish.

Do you think that it is possible to cure a goldfish of fungus disease by using the salt bath method?

My opinion is that it all depends on how badly the fish is infected. If the disease was well established before the trouble was noticed, it is not easy to effect a cure. This is especially so if the disease has reached the gills of the fish. In such cases I do not think that a cure is possible. Having said that I must state that to effect a cure with the bath treatment, it must be carried out correctly.

A shallow container should be used for the treatment, such as a washing-up bowl, and only enough water is used to cover the extended dorsal fin. The shallow water is so that the maximum amount of water is exposed to the air to keep it well oxygenated. Once the fish is in the bowl sea salt should be added at the rate of a tablespoonful to the gallon of water. This can be Tidmans sea salt or failing that, cooking salt, Table salt should not be used as this contains magnesium carbonate to keep it free-running. The salt should be added gradually over an hour or two so that the concentration is not too sudden. It should not be stirred in but allowed to dissolve gradually. The container should be placed in a warm place and if a temperature of about 70°F. can be provided, this will hasten the cure. Do not feed the fish while under treatment. If the water appears to become foul, it should be changed to a fresh solution of the same strength. Once the fish is cured the strength of the solution should be decreased over a day or two, and the return to the original temperature can be gradual.

I have a tank, 18 in. x 8 in., with about six inches of water. I have two mussels and my

Bitterling spawned on 16th November and the parents were removed. On 24th December, one youngster appeared but since then no more have been seen. Can I expect any more?

It is generally about six weeks after the spawning before any fry are seen. As one fish has been seen it is rather doubtful if any more will appear now. I suppose that the method of breeding is so unusual that it is rather a hit and miss business. The eggs when laid may not be properly fertilised and then what goes on inside the mussel must be a very hazardous procedure. You are using a very small tank and I think that you are rather fortunate to be able to keep your mussels alive with only a gravel base. These creatures do prefer to have a good layer of mud on the bottom or at least some very fine sand. If no more fry are seen within about ten days, you could try the parent fish again in the tank.

Would you please tell me if aluminium is harmful to goldfish if used in a pond?

I do not think that this would be harmful. The very dangerous metals in water for fishes are: copper, brass and, to a lesser extent, lead. However, one must use common sense about any metals as it is the concentration which matters. A little metal in a large pond may have no ill effect on fishes, whereas a large amount in a small pond would have the opposite effect. I do not know what piece of equipment you have in mind, but if you must use it then to make it quite safe, rub it down with emery cloth and give it two coats of bitumastic paint. Give it a good rinse and it will then be safe.

I have bred from a pair of red-cap orandas and had twenty young ones in a tank. However, they have gradually died off and I do not know the reason. The water comes through copper pipes, but I do not think they are the cause of the deaths as I have a good condition tropical tank which is supplied with the same water.

I am always doubtful about the use of water which comes through copper pipes, but yours appears to be safe. However, I would only use it for a tank after some had been run off so that that which had been in contact with the copper was not used, that is the water which had been in the pipes for some time. Your loss of the fry may have been because they had insufficient swimming space in the tank and you will have more success if you use some warmth. I suggest that a temperature of 70°F. will help you to raise more fry in future. This keeps the youngsters feeding well and so encourages good growth. These fish are not born with the red caps but these develop as the fry change colour from their original dull colouring. You must not expect that all your fry will turn out to be perfect red caps. Many may

never look much like their parents and the number of mis-fits can be considerable.

I would like to breed some red Ramshorn snails. Can you give me any advice please?

This snail is usually kept in tropical tanks and so you will be more likely to succeed if you can provide some warmth, say about 70°F. As you will be using a separate tank you can avoid any young ones being eaten by fishes. The food consists of soft decaying vegetation, and so you must provide some cooked spinach, cabbage or other green vegetables. Do not give too much of this food at a time or the water will become filled with *infusoria* and the state of the water can be upset. Snails require a pure well oxygenated water in which to thrive.

Which is the easiest type of live food to breed in sufficient quantities to feed young fancy goldfish?

Without doubt I suggest that you use white worms (*Enchytrae*). Once you obtain a small quantity as a start you will need no more in your life time. I started with a few in 1946 and they have never run out. They are quite easy to breed. All you need is a box, a plastic one will do. Three quarters fill it with damp peat, provide a glass cover just less than the area of the surface of the peat and all is ready. Place the small bunch of worms in a slight hollow in the peat and lay a small piece of damp bread on them. Cover with the glass and then another full cover to keep out the light. The box should be kept in a cool place and once a good supply of worms are seen they may be used as food. I used small concrete seed boxes I had made and I had several, one on top of the other so that they took up no more space in the garage than one box. Be careful not to put too much bread in at a time as what is not soon eaten can go mouldy.

Worms can be scraped from the glass but I found an ideal method of collecting. I placed a half inch cube of cheese in a hollow in the peat and after three or four days the worms had gathered round the cheese so that there was a solid roll of worms about half an inch thick round the cheese. Hundreds of worms could then be taken off with tweezers. After a year or two the peat can become foul and that is the time to start a fresh box. Take half of the old peat and place it in a fresh box with new peat in the other half of the box. Feed in the new peat and after a few days the old peat can be thrown out, as the worms will have left it for the fresh food. I found that I was never without live food for my young fish summer or winter and I never found any ill effects from feeding with these worms. I even experimented with a few young fantails by feeding them exclusively on white worms for six months, and they remained in perfect health and grew well.

A GEM OF A LIVEBEARER

by Bob Purdy

THIS SPECIES was first discovered by Regan in 1908 and was described by him and named as *Gambusia rhabdophera*. After a number of complicated changes the species eventually found its way into the Genus *Brachyrhaphis* and has remained there in company with about seven other species. Specimens were first found in Costa Rica and the species is now known to inhabit both the Atlantic and the Pacific slopes of the central mountain ranges usually in fairly fast-flowing, clear streams. To my knowledge, no live examples of this species had ever been imported into this country until early 1976 when Mr. and Mrs. Renton, founder members of the Newcastle Guppy and Livebearer Society, were fortunate enough to import a small number of fishes. All existing examples of *Brachyrhaphis rhabdophera* that are kept in this country today, are bred from these original imports.

Description

Females of this species should attain between two and a half and three inches with the males being somewhat smaller at one and a half to one and three quarters of an inch. The body shapes are very guppy-like in both sexes, with the male showing a slightly thicker caudal peduncle than a male guppy. Fin sizes in the females are somewhat smaller than those in female guppies, the male *Brachyrhaphis rhabdophera* has a rather small caudal fin but a very distinctive fan-like dorsal fin. Coloration is the prime asset of this species as the accompanying photographs show.

The black mark on the anal fin of the female and the black colour of the male's gonopodium makes sexing a difficult process in all but mature specimens.

Continued on page 530

B. rhabdophera (male)



KOI QUERIES

by Hilda Allen

My pond-water is remarkably clear at the time of writing (mid-January) although I have no filtration in my pond. Does this mean that my pond might remain clear during the coming year as by now the water may be "aged" and less prone to turning green?

All ponds are clearer in cold weather; this is a natural result of less sunshine and less protein in the water. The microscopic algae which make water go green thrive in sunlight and water enriched with protein and I do not think you can assume the water will not turn green this year.

You have not indicated the volume of your water or the number of Fish but with some water-changing advised during the summer I do not see how water can become aged to any effective degree.

A filter will prevent the water turning green and one should be put into operation as soon as possible, certainly before the onset of hot, bright weather. Prevention is better than cure and a little work undertaken now should go a long way towards avoiding the "pea-soup" condition encountered by so many pond-keepers. It is important that filters be given a fair chance and it is little use leaving construction until the last moment and expecting them to cope overnight. Late March should see filters in operation in readiness for the long-awaited summer sunshine.

Some of the baby Koi I had in my pond appeared to be all right but recently a few have died and I am at a loss to understand why. Perhaps you can give me the reason for these disappointing losses.

The past five or six weeks have been very difficult for Koi; the weather has alternated between extremely wet and very cold with ice on many ponds. Prolonged cold spells are especially difficult for youngsters who may become weak through lack of food. They do not have the reserves of older fish to rely on and I am sure that long, cold British winters are extremely hard on baby Koi left outdoors. Many Koi breed late in the season with the result that youngsters do not enjoy a long, warm season of good feeding before winter. In such cases it is best to provide indoor facilities for the first winter at least.

If the above does not apply in your case then other reasons may be foul water or very shallow water. Both foul water (caused by decaying or uneaten food and fish excreta) and excessive rainfall reduce the pH of water and this can be critical for baby Koi.

I have recently moved into a new house with

a large exposed garden. The house faces west and the garden is open north, east and south where I plan to make a Koi-pond some 20 ft. x 15 ft. I understand most requirements but would appreciate some advice on the best site for the pond.

There are good reasons for siting Koi-ponds as close to the house as is practicable and these include easy access to supplies of water and electricity, also close proximity to main drainage for disposal of soiled water. Koi should be easily seen from the house at all times and in your case shade from the evening sun will not be too critical.

The main trouble will be from northerly winds and a wall, fence or belt of evergreen shrubs or conifers on the north side will provide shelter. Any of these reduce the chill factor of cold winds and help to hold and reflect the warmth of any winter sun. The depth of ponds is important and an area of about 5 ft. deep is ideal to provide a safe over-wintering retreat for Koi. There is little purpose in going more than 5 ft. down as at greater depths a temperature difference by stratification can occur.

Although our winters are generally longer and colder than the carp family would naturally prefer, Koi do become established and survive. Larger, deeper volumes of water freeze less quickly but the chilling effects of wind create a greater loss in temperature than by radiation alone.

I would suggest that you make your main pond somewhat smaller in order that you can have a smaller, quarantine pond also. Quarantining facilities are a very necessary adjunct to Koi-keeping and failure to allow space for a small pond kept solely for this purpose can lead to a great deal of trouble and expense. Readers should be aware of the very real problems associated with imported fish and the dangers of adding them indiscriminately to established stock. I am not advising you to make your Koi-pond any smaller than is necessary but to allow space for quarantine over a long period.

Both ponds can be equally attractive and I hope both will have adequate filtration according to size. There is no doubt that Koi kept within sight and sound of human activities quickly become tame; in reasonably clear water they are a constant joy. The days have gone when people had to crouch behind the nearest bush peering into murky green water to catch a fleeting glimpse of wary fish. I hope your work goes according to plan and that you enjoy your Koi-keeping.



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 recently set up a tropical marine aquarium (with previous freshwater experience), but unfortunately the initial inmate—a yellow tailed blue damsel—died approx 2 weeks after it was bought. I wonder if you could possibly diagnose the trouble, the symptoms were: swimbladder trouble (usually swimming with its head in the air), the night before its death, half of the fish turned black. However it was probably weakened by an incident the week before, succumbing to the effects of improperly washed coral—after changing most of the water it seemed as though all was satisfactory. I now have one humbug (three stripe) damsel which up until now (3 weeks) has been fine. I propose therefore to add one common clown anemone fish—have you any comments/tips about these very colourful fish which might prove helpful for me? As I am still at school, money is naturally a little scarce—but money willing, what would your advice be for future occupants of the tank—its dimensions are 34 in. × 12 in. × 12 in. What invertebrates, if any, would be suitable? Finally, at the moment I am having a little trouble with unsightly brown algae (punctuated with a few patches of green). What might be causing this trouble (too little light? At the moment my one 24 in. "GRO-LUX" tube is on for about 11 hours a day), and how could I alleviate it?

The trouble with your Saffron-blue Damsel was not swimbladder trouble. When a coral-fish hovers head up, near the surface meniscus of the seawater this is indicative of one of two disease conditions which I list below:—

1. *Oodiniasis*—the fish's gill tissues are infested

with parasitic protozoans of the species *Oodinium ocellatum*. These protozoans thrive in the high ammonia/nitrite high amino-acid "culture medium" which most beginners soon create as a result of their inexpertly-matured filter-beds and marked tendency to overfeed.

The pathognostic symptoms of oodiniasis are a very rapid increase in respiratory rate from the normal 60-90 gillbeats per minute (NB: measured for one gill-chamber only) up to 150 g.b./min within a few hours of the onset, and sometimes hanging with the head near the surface of the water. If untreated this condition normally becomes terminal within 72 hours of onset of symptoms.

2. *Fluke infestation*—the fish's gill tissues become infested with monogentic trematodes (i.e. *Dactylogyrus* flukes) again making it difficult for the fish to breathe. However the important diagnostic difference between this condition and oodiniasis is that fluke infestation does not cause an increase in respiratory rate until some several untreated days/weeks have passed and the fish is approaching the terminal phases of the condition.

Regarding your request for advice on an ideal community of fishes and invertebrates, the possible number of permutations arising from your preferences, and species availability (which in itself fluctuates from month to month) are so great that I think you should seek the advices of a well-experienced local dealer.

Finally, I would mention that since your intention ultimately is obviously to establish a *complete sea aquarium* (i.e. a balanced community of fishes, invertebrates and algae), then your present lighting arrangements are wholly inadequate. In order to be success-

Continued on page 540

continued from page 526

This species is reasonably hardy and can easily cope with a temperature range between twenty-one to thirty degrees centigrade (70-85 F). They will eat any of the foods normally associated with tropical fish of this size and are particularly fond of live foods, especially blood worms (*Chironomus* midge larvae). Fed solely on a diet of blood worms, *B. rhabdophora* males will colour up to a far greater degree than if fed on any other kind of food.

Water conditions do not trouble these fishes at all and providing they are not changed suddenly from one extreme to the other they will be just as at home in hard water as in soft. Floating plants will be greatly appreciated by the hard pressed females as refuges from the males, who are amongst the hardest driving of livebearers. Rooted plants, large stones and box filters, although superfluous, can also be used by the females for the same reason.

B. rhabdophora are, unfortunately, particularly aggressive fish and although certain aquarists report successes with this species in a community tank set up it is far safer to keep them away from the more peaceful and small species. Male fish can be downright spiteful to one another when fully matured and if they are persistently kept together, split and torn fins and even early deaths will be the inevitable results. Mature males are best kept in the same way as Siamese

fighting fish (*Betta splendens*) that is, isolated in small containers that can be floated in an aquarium in order to maintain the correct temperature.

The gestation period is approximately twenty-eight days and because the males are such consistent drivers, fertilization of the females presents little or no problems. This species will breed in almost any kind of aquarium set up and no special requirements are needed at this stage.

As with most livebearing species, the parents are quite cannibalistic so the separation of gravid females is advised if broods are to be saved. The use of floating plants is almost a must for the protection of the fry as the females will rarely tolerate breeding traps and even when they do they often devour most of the fry before they can make their escape. Brood numbers are quite small; a female *B. rhabdophora*, two and a half inches in length, will only produce approximately twenty-five fry whilst a female guppy of similar proportions is capable of producing well over one hundred fry. Because females of this species carry so few fry it is very difficult to judge when one is ready to deliver a brood as they do not expand to any degree and totally lack any sort of gravid mark.

The fry are very easily recognisable because they carry some of the adult markings from the time of

Continued on page 536

B. rhabdophora (female)



CONCEPT OF FILTRATION

by Graham D. Forkes

WATER IN AN aquarium may be sparkling clear but contaminated with invisible organisms or "pathogens." Conversely, it may be completely free from pathogenic organisms, but look so turbid that it would appear to be a dangerous environment for fish.

Water for aquaria must be both "biologically" and "physically" clean. Biologically clean water is water that is free from harmful bacteria. It is obtained by the use of bacteriacides—chemicals which kill bacteria, or by efficient filtration.

Physically clean water is water that is free from "particulate" matter—suspended particles of matter which make the water turbid. Physically clean water is obtained by pumping water from the aquarium through a filter to remove the solids, and returning it to the aquarium clear.

When clean water comes to the aquarium from the filter, it dilutes the aquarium water, making the water somewhat less turbid. If this recirculation is continued, scientific laws of dilution have proved that 95% of turbidity will be removed when an amount of water equal to three times the aquarium capacity has been filtered and returned to the aquarium. We then say that one turnover has been accomplished. Thus if three turnovers per day are accomplished, three days are necessary to remove 95% of suspended matter. These calculations are based upon the use of efficient filters properly operated.

Dirt is constantly being introduced into aquaria by feeding, dust and the fish; experience has shown that a rate of 3-4 turnovers per day is necessary to maintain clear water. It can be seen, then, that the flow rate of water through the filter must be sufficient to accomplish one turnover every 6-8 hours.

Theory of Filter Operation

An aquarium filter may consist of a tank containing some fine grained or closely woven material, such as synthetic wool, charcoal, and recently, sand; it can also be diatomaceous earth. When water is forced through such a layer of filter media, some particles of matter suspended in the water will cling to the grains or fibres and others will be trapped in the spaces between

them. As the spaces or voids become clogged with dirt, it becomes increasingly more difficult to force water through. Either the force used to push the water through must be increased, or the flow rate will decrease, or both. When it becomes too difficult to move water through the filter at an adequate flow rate, the filter must be cleaned and the dirt, and in some filters, the medium, discarded. The filter is then re-charged and put back into operation.

With sand filters it is slightly different; the process here is called "backwashing." Backwashing may be accomplished in several ways: usually the flow of water through the filter is reversed, lifting off all the dirt that has collected, and the reversed flow of dirt and water is run to waste.

Summary

Under normal operating conditions and with an efficient filter, water must be taken from the aquarium, filtered and returned at least three times a day to maintain a clear, clean and healthy appearance.

A filter is a type of strainer which removes dirt as the water flows through. When a filter gets dirty, it must be stopped, cleaned and started again. An efficient filter needs cleaning only once a fortnight, or less, depending on the state of the water when the filter is first installed. With the introduction of highly efficient sand filters, the frequency between cleaning has become even less, with running cost reduced accordingly.

No. of times volume is displaced by filtered water (turnover each 24 hours).	Hours req'd. to filter volume of water (turnover period).	% clarification after equilibrium is reached	No. of days to attain equilibrium
1	24	42	9
2	12	84	4
3	8	95	3
4	6	98	2
5	4.8	99	1

Clarification attained through consecutive dilution using continuously flowing water.

PRODUCT REVIEW

P.P.T. Air Diffuser

'P.P.T. is probably the most efficient and long lasting air diffuser yet introduced to the aquatic world.' So claims the distributor, Barry M. Austin, Aqua House, Oak Avenue, Hampton, Middlesex, of this chemically inert narrow bore porous tube which, in the writer's opinion, is something well worth investing in at 60p a foot for any enterprising and inventive keeper of coldwater or tropical fishes.

With one end of the tube sealed against rapid air-loss (an inch or so of the tube flattened and bent over on itself and tied with nylon thread is as good a method of sealing as any. Alternatively, plug it with a non-toxic stopper) and the other end pushed tight inside a warmwater-softened plastic air line, it can be used to emit a spray of fine bubbles along a length of up to about 5 ft. Just think of it. Shimmering plumes or undulating chains of minute air bubbles rising to the surface along the back and, perhaps, ends of the average sized aquarium. Apart from its practical use, inartistic heating apparatus can be camouflaged behind an ascending sheet of bubbles. Also, the fine bubbles can be used to add to the aesthetically-pleasing effect of a central or off-centre arrangement of water-worn stones; for the tube, you see, is quite flexible and can be snaked in any direction. Again, a tall piece of stone can be ringed at its base with P.P.T. tube, joined at the ends to a three-way or T-piece air connector. It is perhaps not necessary to say that the ultimate in mist aeration is only achieved when this unusual air diffuser is mounted horizontally just above the level of the compost. A few suction cups spaced a few inches apart on the tube, and then pressed tight against a cleaned surface of the aquarium glass, will serve to keep it in place. When the air pump is first switched on, the bubbles are of different sizes. Before a few minutes' are out, and after a little adjustment of the flow of air from the pump (any reputable diaphragm air pump will do) is made, the bubbles become increasingly smaller and very closely packed.

More need hardly be added except to stress the value of this diffuser tube to the breeder of difficult or erratic-behaving cichlids; for clearly, when the moment arrives to separate cannibalistic or neglectful parent fish from their eggs (deposited on the customary leaf of a sturdy growing plant or some fixed object), the tube can be pressed into service as a water circulator and supplier of oxygen around the spawning site. P.P.T. air diffuser tube is coloured a pale shade of blue which blends well with the average aquarium environment.

Controlomat Thermostatic Heater. Made in England by Singleton Bros. (Electronics) Ltd., Penryn, Cornwall. A company in the Armitages Pet Products Group, Colwick, Nottingham, NG4 2BA.

This combined heater/thermostat is superlatively good both in performance and workmanship. The wire element, located in the bottom half of a 12 in. glass tube, is concealed behind a 6 in. aluminium sheath which, pressed tight against the retaining cylinder, ensures a wide distribution of heat. The thermostat, at the opposite or top end of the tube, is plugged and sealed against ingress of moisture by a green plastic cap from which some 42 in. of plastic encased twin-flex emerges for connection to an electric supply point. An adjustable red knob, with an unobtrusive pointer, is set in the middle of the tight-fitting cap clearly marked all round with a raised scale of temperature indicators. It is a matter of seconds to adjust the thermostat to any degree of heat from the sixties to the eighties (°F). (And here it may be mentioned, in parenthesis, that the thermostat control knob is neither loose nor tight but just right for the operator's manipulation). The glass enclosed unit is clothed in a thick skin of translucent green silicone rubber. The purpose of this additional covering is threefold: first, it meets with the electrical safety regulations which consider double insulation of prime importance; secondly, it precludes damage to the heating element and thermostat following any ordinary knock or jolt received inside or outside the aquarium; thirdly, as there are no metal parts in contact with the water there is no risk of absorption by the inhabitants of the aquarium of slow or rapid acting poisons. Thus the Controlomat is well-suited to the freshwater or marine tropical aquarist alike.

A miniature neon lamp glows when the unit is placed in the filled aquarium and the current is switched on. It ceases to glow when the required temperature is reached. A strong-gripping suction disc comes with the unit to attach it to a side of the tank.

The Controlomat is available in a wide range of wattages to suit all sizes of tank. It has another function also: no home brewer of wine or beer should be without a thermostatically controlled heater when the warmer days of summer give way to the colder days of late autumn and winter. The Controlomat is a sensible answer, then, to the problem of a cool brew and improper fermentation.

JACK HEMS.



Serrasalmus nattereri, the Red-breasted Piranha.

KEEPING PIRANHAS

by Steve Pember

I AM SURE many people, while visiting their local aquarist shop, have noticed piranhas for sale at some time or another. The majority of these piranhas are very young ones, usually about the size of a five- or ten-pence piece, silver in colour with black spots on the flanks. This description applies to almost all young piranhas, regardless of species, which makes identification extremely difficult until the fish has reached about three inches in length when it should start to show some adult characteristics.

Even when small, however, the piranha exhibits aggressive tendencies and if kept in the presence of other small fish the fins of the latter will soon assume a ragged appearance. When piranhas are kept together in a tank, there will usually be some fighting and it is therefore a good idea to keep only one fish, or a group of five or six, to prevent any one fish being picked on continuously. A very important point when buying piranhas that are to be kept together is to buy fish of similar size; a large fish will regard smaller brethren as food!

Feeding young piranhas usually presents no difficulty as they will take live *daphnia*, the movement of which seems to stimulate the fish into feeding; the *daphnia* has the added advantage of staying alive if not eaten straight away.

As growth takes place the fish seem to lose interest in smaller foods and such things as live earthworms or freshwater shrimps should be given. However, piranhas may grow to a foot or more in length in a large tank and will require different food types; this does not necessarily mean live fish, of course, a point which may put people off. Thin strips of meat or fish, falling through the water, will usually be taken. If this fails the meat can be impaled on a knitting needle and waved about to simulate liveliness. Our own piranha which is now eight inches in length will take pieces of cod as they fall through the water. We believe this fish to be a *Pygocentrus piraya*, a species that is not often seen as most imported piranhas are either the red-breasted or white species.

When feeding the fish there are two main points

to consider. The first and most important being that all uneaten food is removed as piranhas in general will not pick up food from the bottom of the tank. The second point is that in the wild state piranhas frequent rivers and streams and are constantly using energy swimming against the current. This energy is replaced by eating at regular intervals whenever possible. In a tank, however, a piranha will spend a great deal of time in one place and consequently use less energy, which means that food may only be required at three or four day intervals, especially for a fish that has finished growing. There is nothing worse than forcing food upon a fish that is not hungry, for it is more likely to scare the fish and pollute the water.

Ideally, piranhas should be kept singly in a tank of at least two feet in length which should be well filtered. Plants may be included but only strongly-rooted varieties such as Amazon swords should be used because piranhas tend to be nervous fish and panic easily when startled so a large piranha would soon create havoc among tender plants as it dashed about.

Regular syphoning of the tank floor is essential when fish that are mainly protein consumers are kept as they tend to be very messy feeders as anyone who has kept Oscars will know. A twenty-five to

fifty per cent water change per week is also a must as nitrites tend to build up quite quickly and can be debilitating, especially for young growing fish.

There will inevitably come a time when you have to catch the piranha for transference, treatment, or similar reasons and if the fish is only a couple of inches long, a strong net should suffice, but if a larger fish is involved, then forget the net unless, of course, you are planning to increase the mesh size.

The best method is to place a suitably sized plastic container into the tank, place it in position (not with your hands for obvious reasons), and then with a sheet of glass the width of the tank, gradually drive the fish towards the container until it is enclosed. The fish can then be removed quite easily.

If glass-tubed heaters or thermostats are to be used in the tank with a large piranha they should be protected in some way. A nervous fish could easily smash one against the side of the aquarium in a mad rush; this has happened to me, and I think it is a point to remember when large fish are kept as a very dangerous situation could develop.

I hope this has outlined what is basically involved in keeping an interesting and rewarding fish such as a piranha which will always create interest, especially among non-aquarists who have heard of their fearsome reputation.

A GEM OF A LIVEBEARER continued from page 530

their birth. Particularly striking are the black barred markings in the caudal peduncle area and the black stripe on the anal fin which is manifested in both sexes. The anal fin markings make early sexing of fry almost an impossible task and even quite large fry are difficult to sex because of the lack of a gravid mark in the female.

The fry of *B. rhabdophora* grow quite slowly in comparison to the fry of other livebearing species. They seem to do best on a mixture of live and dried foods; micro worms and micro cels are readily taken along with such things as powdered flake foods, infusoria and algal growths. Larger fry readily accept such things as grindal worms, small *daphnia* species (such as *Daphnia pulex*), tubifex worms and half grown mosquito larvae. Flake foods can be fed at all stages of growth but lack of live foods slows down the rate of growth quite considerably and can permanently stunt the fishes. It will take an average of nine months or so for fry of this species to reach maturity (not necessarily full growth) although females will produce fry at seven months or so. Combined with the difficulty of sexing out females at an early age this makes it almost impossible to selectively breed *Brachyrhaphis rhabdophora* and I hope this will not lead to a loss of size, colour and vitality in this species.

This species is probably one of the most attractive

livebearing fishes to be kept by British aquarists for quite some time now. Although they have a tendency to nip fins and fight amongst themselves, *B. rhabdophora* are a very rewarding species to keep and to breed.

During the past six to eight months certain doubts have been voiced about the identification of these fishes. As the original stock was obtained from a most reliable source and was identified by experts in this field I, for one, would be unable to accept any other identity until it was proved in the conventional manner. Details of the methods of identification used to place this species include such things as vertebra counts (back bone sections), shapes of gonopodium (compared microscopically) and counts of all teeth present including pharyngeal teeth. Gill rakers are often used for identifications as well as chromosome counts and internal examinations and comparisons.

Because of the foregoing it comes as something of a shock to learn that this species has been identified as *Neoheterandria unbratilis* on no more than a mere superficial glance into a show tank. In conclusion I can only say that such incidents as this bring nothing but confusion to the hobby and that this species is *Brachyrhaphis rhabdophora* until proved otherwise in the correct manner and by a qualified ichthyologist.

From a Naturalist's Notebook

by Eric Hardy

The main factor restricting marine life in the London Thames is low salinity, not pollution now. From Bankside, just above London Bridge, the London Natural History Society records 12 crustaceans from shrimps, abundant at West Thurrock and prawns, to the increasing North American alien inhabitant of our waterways, *Crangonyx pseudogracilis*; the 4-winged fly *Caenis moesta*; 2 leeches; 3 pond-snails, a mussel, *Tubifex* and 4 allied worms. Increased salinity in 1976's drought encouraged these brackishwater species to extend their range, including more eelers, smelts, flounders, sprat and sand-eel at the expense of the river's fame for freshwater fish there. The latter were abundant at Blackwall Point, where a few perch, bream and bleak lingered through the brackish conditions in the famous drought. Water-screens at Dagenham power-plant collected 18 marine and brackish fishes compared to only 2 freshwater (roach and 10-spined stickleback). These included a sea-horse, Nilsson's pipefish, a hooknose and a "sea-snail" (a sucker fish). Rockling, red and grey gurnards, lesser weever, transparent goby, great sand-eel, Montagu's sea-snail and brill reached Thurrock power-station. Common gobies were found up to Chiswick and sand-gobies at Chelsea Reach during that summer.

In exceptionally high river-flows, trigger-fish, dory, ballan wrasse, lump sucker and northern rockling have been taken at Thurrock, where the first adult Thames salmon for over 140 years was also taken. Cuttlefish and squid also reached it. Five species of prawn and as many crabs penetrated the urban Thames. Sandhoppers reached Battersea and provided food for young fishes; also 3 Chinese mitten-crabs, aliens only twice before found in Britain—in the Thames at Chelsea in 1935, and Southfield Reservoir, Castleford, Yorks. in 1949. Jellyfish, *Aurelia aurita*, ascended above Barking and many were at the Dagenham power-station. The sea-spider *Pycnogonon littorale* drifted on strands of dead hydroid sea-fern, *Sertularia*, to Tilbury.

In Hyde Park's famous 40½ acre eutrophic (algal-bloom) Serpentine, R. L. G. Lee of Aston University has recorded 12 breeding freshwater fish, especially roach and perch, with good-sized tench, as well as ruffe, a few goldfish, carp and crucian carp, rudd, gudgeon, minnow, non-breeding eel, and 3-spined stickleback, but unfortunately no pike. There's also

a prolific zooplankton for the foodchains, but a poorer flora, while 14 species of parasites infest the fish. Birds, planktonic crustaceans and the few shellfish aid the latter's life-cycles. Frogs also inhabit it. This compares with 19 parasites found infecting fish in Cheshire's famous, deep eutrophic Rostherne Mere. These parasites do not harm the fish which co-exist in an ecological balance, though some outbreaks may control their numbers.

London Natural History Society also keeps records of aquatic plants near the metropolis, with an interesting new site for *Ludwigia palustris* in drying gravelly ponds in Epping Forest. This is not mentioned in a 1973 book on the Forest. It was growing with water-violet (which isn't a violet), nodding bur-marigolds and the rare liverwort *Ricciocarpus natans*. Other British haunts of *Ludwigia* are not confined to the New Forest as the report states, for aquarists introduced it to south-east Lancashire canals. Maybe its only other native haunts are ponds and ditches near Brockenhurst and S.E. of Lyndhurst where royal fern also grows. It has almost bell-shaped fruits, pale yellow with green stripes, red-veined leaves and small petalless flowers with red-edged sepals. It may be perennial or annual, but an attempt to nickname it "Hampshire purslane", a bastard name, confuses people as it isn't a purslane but in the willowherb family.

A number of new locations of the alien pondweed *Elodea nuttallii*, well-known to aquarists probably arise from previous confusion with broader, thicker-leaved common *E. canadensis*, as both are usually sterile here. The former is not confined to Esthwaite Water and Renville in Connemara, as recent botanical books quote unless, as some claim, it is not the same species. The new sites include a ditch on Stone Marshes, west Kent; the River Medway below Tonbridge; the new lake at Thamesmead; in Pen Pond, Richmond Park with hornwort in the Mar Dyke near Aveley in south Essex, and in Brent Reservoir, Middlesex. It grows also in the Cambridgeshire Nene, and the Welland Basin, from south Lincolnshire to Crowland, Cambs.

Access to a formerly restricted pond in the ground of Woolwich Arsenal revealed the rare round-fruited rush, *Juncus compressus*, and brookweed. It is well known that many submerged pondweeds die down in winter, leaving a terminal winter bud. I did not

know how quickly this is effected until this winter, when some Norfolk bladderwort I had under observation in a coldwater tank on my window-sill at my desk, suddenly cleared on the first night's sharp frost in November. The tank was full up of dark green bladderwort the day before almost gin-clear the day after. The famous "Hotties" section of St Helens Church Street Canal, near the town station, may lose its breeding cichlids and other introduced exotic fishes as winter-long maintenance work on the adjoining Pilkington's glass factory cut off the supply of hot ex-cooling water, which maintained its tropical fauna and flora.

Staging an exhibit at the last Belle Vue aquarium festival, a well known enthusiast heard a croaking sound on the floor. It was one of his large catfish which had been stranded high and dry for about 10 minutes. It revived back in its tank. A large range of different catfish were exhibited. One of the strangest members of this extensive group ever introduced to aquaria is the "talking" *Acanthodoras spinosissimus* a whiskery brown nocturnal fish of 4 inches, whose spiky pectoral fins can wound the unwary handler, owing to its violent jerks. It clamps the finger to its side with this fin. Its "talking" is no more than grunting when lifted out in a net, a product of movements in its gill-chamber accompanied by a swollen throat and more jerkings of those pectoral fins. Like nocturnal feeding eels, it can soon be trained to take food by day.

The large Nile catfish, *Clarias lazera*, which also inhabits the Sea of Galilee can survive a few days on dry land (where it makes a cat-like squeak) because its gills do not collapse. It will even cross dry land in its migration to breeding haunts near springs. The American catfish *Ameiurus nebulosus* has been widely established in German and Austrian rivers for 50 years. In a peculiar oral gestation, it churns its eggs about in its mouth then ejects them violently. During incubation, it lies on the egg-cluster, using its ventral fins to work over the developing eggs and like the *Corydoras*, which are also catfish, this habit culminates in their use as an inseminating basket. Common catfish spawn twice in a season after 21°C has been reached, and the young fish, as well as the

eggs, are guarded by the parents during development. They are longlived, the Danube catfish or wels attaining 50 years. The latter also lives in Claydon Lakes near Winslow, Bucks. This is our largest freshwater fish.

Three more new species of South American frog are: *Telmatobius contrerasi* from the northern mountains of Argentine's San Juan, and tongue-twisters *Eleutherodactylus chiastomus* and *E. zeutotylus* from the northeast of the continent. A new leech, *Batrachobdella cryptobranchii* is parasitic on the ozark hell-bender salamander in North America. It was in a close relative of the latter, the eel-like, 3-toed Mississippi salamander the Amphiuma, that Putnam and Sebastian of Davidson College, North Carolina recently discovered a fifth aortic arch from the heart.

Two new blood fluke-worms were found in the heart of the green turtle. An interesting discovery at Western Illinois University is the production of sound in that strange, blind, long, worm-like South American amphibian, a caecilian. The tadpole of the almost ubiquitous North American bull frog has been found to have a predator deterrent, while in Nicaragua, Cornell University biologist Ville found a symbiotic partnership between the frog *Centrolenella fleischmanni* and a *Drosophila* fruit-fly.

In South Africa, young lizards of *Eremias lugubris* mimic noxious beetles in appearance to escape predators. The pattern of some North American snakes' backs has also been found to be useful in antipredator strategy.

Astacology, the culture of crayfish for the lucrative if depleted European market, resulted recently in the introduction of 6,500 young North American "signal" crays via the major Swedish breeders of Simontorp to a fish-farm at Stour Provost, in Dorset. Resistant to the fungus infection which depleted native European crays, this species was introduced to 60 Swedish lakes in 1969 where good stocks of natives formerly bred. Turkish crayfish have also been depleted to supply the Swedish market. Despite utmost care, there will always be a risk of introduced species getting into British waters as another aggressive alien endangering our own.

MARINE QUERIES

continued from page 529

ful with living coral, hydroid polyps, sponges, molluscs, tube-worms—and certainly the anemone which you will need to protect with your *Percula* clown from the assaults of the Humbug Damsel—you will have to provide 2½ feet of fluorescent tubes per each square foot of tank surface area at 12 in. water depth. Now, since the surface area of your tank is approximately three square feet, this means that you will need four 2 ft. fluorescent tubes, of which one should be a

"GRO-LUX" tube and the other three tubes should be plain white "NORTHLIGHT" or "ARTIFICIAL DAYLIGHT." These four tubes should burn for a minimum of 12 hours per day, and I feel certain that you will then find that with the addition of good commercial algal/phytoplankton fertilizer solution to the seawater, your brown algae days will soon be over.

WHAT IS YOUR OPINION?

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

Photographs by the Author



HAVING BEGUN last month's feature with a letter castigating me for my lack of knowledge about the names of coldwater fishes it makes me pleased to be able to begin this month's column with a letter from a well-known expert—Mr. Frank W. Orme—who is P.R.O. of the Associated Goldfish Societies of the United Kingdom. Mr. Orme, who resides at 94 Newman Way, Rubery, Birmingham, B45 9LZ, has the following to say: "It is interesting, when reading your column, to note the apparent increase in letters from those interested in coldwater fish, in particular the goldfish. Maintained under the correct conditions the use of electricity becomes negligible, being used only for hatching eggs and during the early life of the young fish—and this is not essential. From the saving in cost of electricity it thus becomes an attractive alternative to the keeping of tropical fish. In addition the fish itself presents a challenge to those who breed them. The fancy goldfish is continuously trying to revert to its original form; it therefore becomes a contest between the will of Nature and the skill of the breeder. The successful breeder must acquire the skill of selection of both the parent fish, and the ability to select the best fry and young fish for growing on. The show fish is not always the best fish to breed from!

"One way to obtain a basic grounding in the skills of selective breeding is to join a specialist society, where the knowledge of experienced goldfish breeders can be 'picked' and made use of. For the benefit of any of your readers who would like to contact such a group I list those societies that are affiliated to the Associated Goldfish Societies of the U.K. Perhaps I should state that all of this country's major goldfish societies, with one exception, belong to the national organization. Interested readers should write to the respective secretaries, enclosing a self-addressed and stamped envelope for a reply. Visitors can be assured of a welcome from any of the following groups. Association of Midland Goldfish Keepers, meets at Coventry: Mrs. J. Amos, 31 Greenview Drive, Kingsley, Northampton; Bristol Aquarist Society, meets at Bishopston: Mr. V. Cole, 10 Hardwick Close, Brislington, Bristol; Midland Aquarium and Pool Society, meets in Birmingham: Mr. F. Close, 154 South Road, Handsworth, Birmingham; Northern

Goldfish and Pondkeepers' Society, meets in Bolton: Mr. B. H. Rothwell, 4 Whalley Road, Hale, Cheshire; and Ichiban Rancho Society, meets in London: Mrs. E. Davidson, 14 Garnetts, Takeley, Bishops Stortford, Herts.

"It may be that some readers live too far away to join any of the above groups but would like to form their own society. New goldfish societies may apply for membership of the A.G.S.U.K. by writing to the secretary, Mr. V. Cole, who is also secretary of Bristol A.S. Of course, if any reader needs advice about how to set about forming a new, specialist goldfish society I shall be pleased to answer any questions—in so far as I am able."

From 11 Cherry Gardens, Park Street, Credition, Devon, comes a letter from Mrs. Susan Platter who writes: "A year or so ago you published a letter from a Mr. Alf Marsden, of Sheffield, who recommended using potassium permanganate in tanks to prevent infections. I wrote to Mr. Marsden and he was very helpful indeed, giving me loads of useful advice. I now use 'pot'—as he called it—regularly in my coldwater tanks and can honestly say that I have not had to use any remedies on my fish at all—nor have any of them been ill. *Imported coldwater fish:* What strikes me about them most forcibly just now is the bad shape of the fancy ones. Body outline and finnage leave a lot to be desired, while so many of them seem to be undernourished; perhaps that is more the fault of the importer or retailer than the breeder. I have been lucky with my shubunkins, however, as they have just begun to breed—in November!—for the first time this year. After a very long hunt for a female for my handsome Bristol blue, we have lift-off with eight survivors out of sixteen fry salvaged from the tank. A second brood, rescued in the same way, has produced twenty-five which hatched yesterday and during the night.

"*Aquarium pumps:* I have two, but try to use them as little as possible. A small, single-outlet one is aerating my shubunkin fry, while a larger, two-outlet machine is now relegated to the cupboard except when my tanks need 'hoovering' with an air-driven suction cleaner. The reason for my disenchantment is simply the noise these things make. When they are in the living-room with us, I find that the buzzing

whine irritates me, especially in the evening. *U/G filters*: Again, I have two, but have given up using them as they do not seem to have any advantage over plain gravel and plenty of plants. I did not notice any effect on plant growth, by the way. With reference to the previous section, it is also difficult to use a *U/G* filter without a pump!

"*Aquarium shows visited this year*: I attended a show for the very first time on 23rd October—the Torbay A.S. Open Show. I suppose this was quite a small affair really, but there was plenty going on all the same. It surprised me that there were so many people interested in fish; my husband can't understand it and thinks I'm nuts! The local herpetological society had a stand, with some small pythons as hot favourites with the crowd. There were also some fascinating, tiny frogs doing their best to be invisible under some twigs. The National Cactus and Succulent Society made its presence felt with a tempting stand containing many small plants at advantageous prices. I succumbed and bought a *Rebutia haagei* to keep my

summit of the cascade; then coming away looking mystified. Everyone at the show was most helpful and courteous and I found it a very worthwhile visit, even if I did come away with a stoop from trying to read the names on the competition tanks." (Readers are warned that they should not add chemicals—such as potassium permanganate—to an aquarium without taking great care to find out how much should be added to a specific quantity of water; and allowances should be made, in decorated tanks for the amount of water displaced by items such as gravel, rocks, petrified wood, etc. I know of one person who lost most of his fish by confusing grammes, grains and ounces when weighing out potassium permanganate crystals. It should also be remembered that potassium permanganate can leave nasty stains on certain substances that it touches—including human hands!)

Mr. R. Fountain's home is at 64 Chelsea Green, Linslade, Leighton Buzzard, Beds. He says: "In recent months I have become very interested in the lesser known livebearers. My first purchase was two



unnamed *Rebutia* company—well, that's my story! Among the hundreds of competing fish, those that impressed me most were some beautiful Bristol shubunkins and a simply gorgeous silver shark that quite won me over with its gently-harmonious colouring. There was one fish, the name of which I forget, that looked as if it had left most of itself behind at home; it was a real Oxfam advertisement.

"The most spectacular feature of the show was an electrically driven waterfall. This apparent miracle of ingenuity was placed exactly in the middle of a large coldwater tank containing some lovely fantails. The water cascaded down a number of steps into the tank from a height of about three feet; the designer was there, but he was not giving away any secrets about how it was done. People were peering all round it to spy out how the water was lifted to the

pairs of *Xenotoca eiseni*; and since I have purchased pairs of: *Ameca splendens*, olive and blue limias, *Heterandria formosa*, merry widow and *Girardinus metallicus*. Over a period of four months the *Heterandria formosa* have had about fifty or sixty youngsters. I have bred the limias but, unfortunately, lost both the original females. I think the most interesting are the *Xenotoca* and *Ameca splendens*, although I haven't had much luck in rearing their fry; and more than half of the *Xenotoca* were born deformed. These fish I have found very difficult to sex—especially the *Ameca splendens*—and have been disappointed to find my four are all turning out to be males. I have now joined the Newcastle Guppy and Livebearer Society and am hoping to get hold of some different species."

Master Neil Garbutt is 15 years old and writes from

379 Main Road, Bilton, Hull, N. Humberside. "This year I visited, for the second time, the third Yorkshire Aquarists' Festival, held at Doncaster Racecourse. I found the show most stimulating and some of the tableaux entries were very pleasing—especially the York and District A.S. entry of a model of York Minster that showed a very high standard of workmanship. I was pleased to see that both sides of the aquatic hobby were well represented—both tropical and coldwater—and as a member of the G.S.G.B. I was very impressed with the good quality stock of coldwater fish on sale for a sensible price; and I purchased two shubunkins and some bitterling. A fine selection of aquatic plants was on sale and *The Aquarist & Pondkeeper* stand was very well represented, selling copies of this great magazine and binders—which I always buy.

"I really enjoyed the Festival this year and am looking forward to visiting the 4th Y.A.F. next year.



P.S. I would like to make contact with any boy or girl of my age who is interested in the coldwater side of the hobby." (It will be obvious that Neil's letter was written late last year. Like Neil, I always buy binders for copies of *The Aquarist*. The attractive, sturdy binders enable one to store copies neatly on shelves—and as they are in chronological order it is easy to find any particular back number. An advertisement for binders can usually be found near the back of each edition of the magazine.)

Master Patric Baird's home is at 59 Bladon Drive, Belfast BT9 5JN. He writes: "... This letter deals with my attempts at keeping some of the fish not often seen in dealers' shops here in Ulster—although they are probably quite common in some shops in England. The shop that I obtain all my fish from is called Ulster Aquatics and on every visit I make—about once a month—I keep my eyes

March, 1978

open for any species that I have not previously seen; and provided I have the money I usually buy the fish. The fish I see are usually quite highly priced, by my standards, costing up to £3.00.

"The species I have tried my luck with are as follows: the horse-faced loach, *Acanthopsis choiro-rhynchus*; the pygmy chain loach, *Botia sidhimuuki*; the banjo catfish, *Bunocephalus kneri*; hatchet fishes; blind cave fish, *Astyanax mexicanus*; and all-black coolie loach; glass catfish, *Kryptopterus bicirrhis*; a mysterious catfish not yet identified, but sold to me under the name '3-spot catfish'; kissing gouramies; and my favourite fish, the tyre-track spiny eel, *Mastiscobelus armatus*, about which I would now like to tell you.

"I bought him (or her), in October, for £1.20 when he was about 2 in. in length and in poor condition. After I got him home, and after vain attempts at feeding him, I looked through all my copies of

The Aquarist in the hope of obtaining some information on him. Then I found an excellent article, by Mr. J. Hems, entitled *Spiny Eels*, that told me a lot including the fact that my eel would eat only small, live worms. Unfortunately I can rarely obtain *Tubifex*, so the fish had to make do with earthworms from the garden. I used the method of getting them out of the ground that I learnt in biology classes at school: pouring a solution of washing up liquid onto the ground and waiting for the worms to emerge from their burrows. Needless to say, the worms were well washed before I fed them to the eel. Now, some months later, he has fattened and increased considerably in length; and he is at present sharing a cowrie shell with a commune of six coolie loaches."

No. 68 Cavendish Road, Kersal, Salford 7, Lancs., heads the following letter, written by Mrs. B. D. Mason: "I think the *Exchange & Wanted* idea a splendid

543

one and congratulate you on including it in your column. May I launch my little offerings? I will exchange (1) a Golden Bell pump, hardly used and in mint condition, and (2) one 18 in. x 10 in. x 10 in. tank, with digital thermometer clinging lovingly and permanently thereto, for (1) a goodly selection of freshwater plants and (2) make me an offer—though I suggest that only local yokels have anything to do with this item, for obvious reasons. I also have a few pieces of tank furniture, such as a wreck, a water wheel, and a mermaid in a shell that goes like the clappers given a good head of water (?). An offer these would be appreciated too." Mrs. Mason's telephone number is 740-1853. I would suggest that interested parties contact her by telephone before sending items.

I now have a few pieces of Java moss to spare to those who would be interested in doing a swap for either *Cryptocoryne* species, water wistaria or *Hygrophila*. If interested, drop me a line c/o *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex.

Mr. B. Morrall's home is at 45 Bath Road, Parkside, Silverdale, Newcastle, Staffs. He writes: "I have been reading, with fascination, Pete Watson's series on fish houses; and after reading November's article on electrics I was wondering—as an amateur—if the electrical connector could be made safe in a different way. My suggestion is this: first, make sure all bare wire is inside the plastic cover; then, using molten wax, fill all six holes—for two-ply cable; eight for three-ply—with the wax and wait for it to solidify. Scrape off excess wax and the job's done, as I see it, eliminating the need to stagger the connectors or the use of a plastic bag to cover them, thus making it look neater and, I hope, a slight bit safer. I would be most grateful for your and Mr. Watson's view on these points. . . ." (I am not a qualified electrician and, hence, cannot pass a valid opinion on Mr. Morrall's suggestion. Anyone interested in the idea should consult a qualified expert, i.e. an electrician, before making any attempts at putting the idea into practice. Where safety is at stake, one should always be certain before trying any experiments.)

"Having been an aquarist for only one year, and having fully planted four of my tanks, I feel qualified to write about the current quality of aquarium plants on sale to the public. I have sub-divided my opinions into those concerning aquarist shops and those concerning mail-order companies," writes Mr. E. Evans, of 30 Heol Dewi, Brynna, Llanharan, Nr. Pontyclun, Mid-Glamorgan. "I have dealt with two mail-order companies. One supplied me with very small *Vallisneria* that was slimy to the touch; also, red *Cabomba*, *Elodea*, *Bacopa* and *Myriophyllum*. Of the lot, only the *Elodea*, *Myriophyllum* and *Bacopa* survive—and of these, only the *Bacopa* flourishes; or so I thought until I purchased plants from a Cirencester firm. I just purchased some of their plants at

an open show in Stroud and so pleased was I that I have subsequently bought, by mail, many plants including *Cryptocorne* species that have developed into superb plants.

"In my search for suitable, clean fish and plants I have visited all the aquarists' shops in South Wales and in only Top-Trops Aquatics in Newport and Pyle Garden Centre have I found consistently healthy plants. As a matter of interest, I hear that the young boy in Pyle Garden Centre keeps the healthiest and cleanest aquaria in the area. On balance, only the Cirencester company have consistently supplied me with good plants.

"I think that an *Exchange Column* would be a marvellous idea; and I do not believe the minimum rail charge, of £2.16, is too high a price to pay. I should love to obtain any of the many *Apistogramma* species, cardinal and emperor tetras. Can anyone tell me from where?"

It always pleases me when I know that the effort that goes into *W.Y.O.* is appreciated not only in the U.K. but also in many other countries around the world. The following letter comes from a father and son who run an aquarium business in Central America. Mr. Julio Castro Barquero's letter is headed *Acuacentro, Apartado 3843, San Jose, Costa Rica, C.A.*, and both he and his son, Gerardo, have signed the letter. Mr. Barquero writes: "I have been a subscriber to *The Aquarist* only since October 1977, but I was introduced to your column in a July sample copy sent to me by this excellent aquarium magazine. I hope to obtain some more subscribers here in Costa Rica.

"I just have to congratulate you for your down-to-earth, friendly and informative articles. I always read your column first! My son Gerardo, a muscular dystrophy patient, is a fish nut just like me. This hobby has done wonders for this boy. I will tell you more of it in future correspondence. He doesn't read English but I do the translating and he enjoys your column also.

"We have at present five fifty gal. tanks with discus and killifish, and some Costa Rican *Cichlidae* known here as 'mojarras', of which there are about twelve varieties, the largest known as 'guapote'. When young they are pretty, looking like 'little tigers' (with) vertical dark bars on a greenish background with certain faint reddish flashes as they swim along and the light hits the right spot. The bars are replaced by a dark spot on a dark brown background when the fish grows. Of course, there are some visible and slight differences among the species.

"Ours is a lovely, peaceful—so far—country. Climate is just perfect! 70-80°F all year round. At night it falls to 65°F in the place where we live, San Jose, but in the low lands, near the coast, it is of course warmer. We have many rivers with many native fish. We shall let you know more in the future.

If in the future you should have a spare piece of Java moss, send us some inside a letter's envelope. It will be fun and interesting to see if it grows here. It takes five days for an air mail letter to travel from your country to Costa Rica.

"As you may see from our letterhead, we have a thriving aquarium business here in Costa Rica, and we are already in contact with some of your English firms. Your country offers many excellent aquarium products which are unknown in Costa Rica. I like the promptitude used by your businessmen in answering, and the courtesy and good manners employed in sending information. All Costa Ricans who have visited England speak of it as a highly-educated country with friendly people. . . . We like your articles."

Photograph 1 shows an attractive killifish. Please send me details of your experiences with the breeding of any killifish.

My thanks to the many club and society representatives who send me samples of their groups' publications. Lack of space prevents me from giving all of them a mention; however, several received this month (January) merit special mention. I was pleased to receive a copy of *The Humberside Tropicals 1978 Diary & Aquarists Handbook*. As well as being a handy diary, this publication contains a lot of reference information that is useful to have on one's person. I like this kind of diary because it's small enough to carry in one's hip pocket. The usual aquarists' diary, that I purchased in previous years, was replaced this year by a much larger one that was too big for a hip pocket; so instead I bought an ordinary diary and copied into it some of the aquarium facts and figures that I like to have handy at all times. Unfortunately *The Humberside Tropicals Diary* reached me some days after I'd already bought an ordinary diary and filled it with facts, figures, names and addresses. *Humberside Tropicals* is situated at 4 High Street, Caistor, Lincoln, and I can recommend their diary to anyone who likes a smallish diary/handbook that does not require an inside, jacket pocket.

I enjoyed reading most of the first edition of an attractive little magazine published by King's Lynn Aquatic Society. The club's P.R.O., Mr. Alan Freeman, lives at 1 De-Grey Road, Gaywood, Kings Lynn, Norfolk, and he tells me that last year the K.L.A.S. had 80 members, about 45 of whom attended monthly meetings. Membership fees were due in January; and Mr. Freeman says that W.Y.O. seems to be the topic of conversation time and time again when members meet. As a matter of interest, what aquarium club or society in the U.K. holds the record for the largest number of members? Eighty is certainly a high membership figure. Can your club beat it? If so, drop me a line and we'll try to discover the club that has attracted most members.

Mr. Dick Mills, of the F.B.A.S., sent me two of
March, 1978

the Federation's latest publications: Book No. 10—*National Technical Information—Scientific Names and their Meanings*; and Booklet No. 11—*Aquarium Plants—Furnished Aquaria & Aquascape—National Standards and Technical Information*. Both publications are well produced and contain a lot of useful information for handy reference. Dick says: ". . . The No. 10 is a companion volume to No. 9 and we hope it will be of value to the hobbyist; the plant booklet is a new and expanded version of an earlier booklet but contains the information in a more useful manner—particularly the references to other works where more information about plants may be found. . ."

Dick, whose home is at 70 Lee Road, Perivale, Middlesex, sent me an earlier letter concerning letters contained in the September, 1977 issue. He had the following to say: ". . . *Geophagus pellegrini* (Mr. Blackburn, Burnley) is mentioned in Dr. J. Goldstein's book *Cichlids of the World* (T.F.H.) pp. 151-154.



Known as the redhump, which it apparently develops during breeding time, it appears to be a mouthbrooder. It wasn't included in the FBAS Dictionary; like any book, it was out of date as soon as it was published; but I have included it in the updated amendments' sheets, to be published shortly. These will be available from the FBAS Publications Secretary, 150 Ashburton Avenue, Seven Kings, Ilford, Essex, by the time this is read in the magazine.

"Mr. Ellingford, of Norwich, probably has a stone lapper, *Noemachilus barbatulus*. This fish is often referred to in aquatic books and there shouldn't be any difficulty in unearthing further information about the species.

"Mr. D. E. Green (Hyde, Cheshire) obviously appreciates Sterba's *Freshwater Fishes of the World*; but I feel sure that the majority of aquarists would not agree that it is in any way a book on general fishkeeping; it appears to be more of a *Bible* for the showing hobbyist. However, Sterba did write a

companion volume, *Aquarium Care*, unfortunately now out of print, and this is a *fishkeeping* book. Dr. Sterba's new book, *Dr. Sterba's Aquarium Handbook*, is a little misleading if the title is to be believed as the original German title was *Aquarienfische* and the author himself says that the new work was deliberately written in a manner *not* to duplicate either of the former titles. There are many books now available—in a wide range of prices—which cover aquarium management very thoroughly, and it pays to watch the review pages in the aquatic magazines and then badger your local library to stock the new books.

"On the subject of economics and prices within the hobby, it's still a poor man's hobby in the U.K. Recently, while on holiday in France, I saw few fish for sale under 25 Francs (£3.00)! Perhaps overseas breeders/exporters prefer to send their wares to the Continent for more lucrative rewards than to 'poor' Britain, and this may explain why the selection of interesting fishes has fallen during the past year or so in our shops. What is your opinion?"

Photograph 2 shows an Egyptian mouthbrooder. What have your experiences been with this interesting species?

Mr. Jeff Hutchings, P.R.O. for, and editor of, the Fancy Guppy Association's Journal, resides at 107 Woodplumpton Lane, Woodplumpton, Preston, and he kindly sent me a copy of the F.G.A.'s latest Journal, which contains a lot of information of interest to those who breed guppies. In an accompanying letter Jeff had the following to say: "Over the past few months you have posed a number of questions and as P.R.O. of one of the country's leading specialist societies, the F.G.A., I should like to comment on some of them. In the context of providing breeding stock and information one of the aims of the Association is to provide breeding stock for members wherever they live. This does necessitate the use of both the postal and rail services. Whatever the method, packaging is very important. I suggest that fish should be treble-bagged, using only a small volume of water. Light-weight polystyrene boxes are available and provide very good insulation. Provided fish remain warm they should survive for a number of days. Plastic bags will burst at the seams unless they are of a type made and sealed strongly enough for aquatic use.

"One of the problems when providing breeding stock is that the recipient usually expects to receive show-stopping fish. No breeder, however generous, will send show-stopping fish which he has probably taken a number of years to develop. He will send fish from the strain requested and then it is up to the new breeder to produce his own show-stoppers from them.

"I would point out that guppies are notorious for producing the unexpected. Only recently a new colour strain pattern has appeared in a strain of double

swords; it is rather unusual and nothing like the original parents. Careful selection has enabled this guppy breeder to multiply up, and fix, the strain. Similarly, many strains have been developed by out-crossing several times; indeed, a strain of mine produced eight distinct variations of males and females in one generation. The Association produces a monthly magazine full of information about various aspects of fishkeeping—especially subjects related to guppy keeping. Anyone interested in guppies can gain a lot of information from reading the Journal. I can supply a specimen copy if a large s.a.e. is forwarded.

"I should like to move away from guppies to the subject of aquaria in public places. Recently I was asked through a friend to give advice on the maintenance of a tank at a hospital for old folk because the fish in their tank had been dying rapidly. When the tank was planted and re-stocked it attracted a great deal of attention and I realised just how much delight these people got from watching fish. In order that they can continue to enjoy the fish I have arranged to visit the hospital at regular intervals to maintain the tank.

"I wonder how many tanks throughout the country, in similar situations, would provide added enjoyment to others if we hobbyists gave a little time to provide advice and assistance to the staff trying to look after these tanks. I know some clubs already help within their own areas but many more clubs or individuals could provide even more help."

Photograph 3 shows a lace plant. If you have grown this plant please send me details of your experiences.

I must end on that note although I have a great bale of letters left unused. I hope to use more of them in future features. For such features please send me your opinion on any of the following: (a) breeding neon tetras and cardinal tetras; (b) aquarium conditions that suit *Cryptocoryne* species—and the species you find easiest to grow in your tank; (c) the aquarium or piece of equipment that has given you the highest number of years of service; (d) the results obtained from killifish eggs purchased by post; (e) how you were introduced to the hobby; (f) specific people, films, slide shows, taped talks, etc. that can provide an instructive and entertaining club night. (g) Where do you have your tanks sited in your home? (h) Do you have any *Exchange or Wanted* items? If so, send me details on a separate sheet of paper. Please PRINT your name, address and telephone number. You will appreciate the fact that publication cannot be guaranteed in this feature; nor can it be guaranteed in any particular issue of the magazine. Correspondence intended for me should be addressed to Mr. B. Whiteside, *The Aquarist & Pondkeeper*, The Butts, Half Acre, Brentford, Middlesex, England.



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 Newcastle Guppy & Livebearer Society would like to invite anyone who is interested in Livebearing Toothcarps to join them. The N.G.L.S. is an international society, dedicated to the study of Livebearers, and through the newsletter, which is published every two months and contains a large selection of articles on various subjects related to livebearers, identification sheets of some of the rarer specimens, an exchange column and all the coming events of special interest to the enthusiasts, the society is able to offer a corresponding membership and a chance to contact people with a similar interest. Anyone wanting further details about membership can contact the membership secretary, Mrs. J. Renton, 'Halfbeak House', 146, Chillingham Road, Heaton, Newcastle upon Tyne NE6 5BU. (Please enclose a S.A.B. for reply).

A SLIDE SHOW of recent club activities showing items of general interest and featuring some candid shots of members was given to the members of the **Mid-Sussex A.S.** by Mr. D. Soper and Mr. J. Burtles at the January meeting. Fund raising and outside activities for this year were briefly discussed, but it was decided that there could be no definite plans made until after the annual general meeting.

During the evening Mr. D. Soper judged the table show and awarded the prizes as follows: Class O—Male Guppy; 1 and 4, L. Pinney; 2, A. McKenzie; 3, P. Levine. Class P—Female Guppy; 1, L. Pinney; 2 and 3, P. Levine. Class N (open) Sexed Paired Guppy; 1, E. & T. Tester. Further details regarding the society can be obtained from Mr. B. Slade, Sandown, Bolney Road, Anstey. (Phone H.H. 53747).

OFFICERS elected at the annual general meeting of the **Bridgewater A.S.** were: chairman, R. Free; secretary, B. Mason, 302 Bolton Road, Worsley, Manchester; treasurer, D. Mason; show secretary, M. Burgoyne; librarian, W. Chapman; magazine editor, D. Bold. Committee members: W. Edwards, K. Buckley and D. Newman.

At the annual general meeting of the **Bristol Tropical Fish Club** the following officers were elected: chairman, L. Littleton; vice-chairman, R. Toose; secretary, Mrs. M. Littleton, 9 Little Stoke Road, Stoke Bishop, Bristol BS9 1HQ; treasurer, Mrs. B. Sellick; programme secretary, I. Sellick; reporting secretary, C. Cowles; assistant secretary, D. Chinn.

Meetings will be held monthly at the "Black Horse" West Street, Old Market, Bristol, at 8 p.m. on the following dates: March 18, April 20, May 18, June 15, July 20, August 17, September 21, October 19, November 16, December 21. At the March meeting Dr. Ford of "Aquarian Foods" will talk on Foods generally.

MEMBERS of the **Kings Lynn A.S.** saw a slide show on Fish Photography and Livebearers at the January meeting. Although attendance was lower than normal due to the very bad weather and floods, the programme was interesting and the members were pleased to hear that once again Dr. Ford would be the guest speaker for the February meeting. Meetings are held at 7.45, on the second Thursday of every month, at the North Star

Public House, Kings Lynn, and new members are always welcome.

CHANGES of officers and committee at the annual general meeting of the **Macclesfield A.S.** were as follows: chairman, B. Goddard; vice-chairman, J. Sutherland; hon. secretary, Mrs. C. Campbell, 3 Pool Street, Macclesfield; hon. treasurer, Miss S. Goddard; hon. show secretary, B. Campbell, 3 Pool Street, Macclesfield. Committee: W. Tomlinson, Mrs. D. Goddard, B. Morton, D. Tomlinson and W. McCruken. The Society has had a very successful year and wish to thank everyone who attended the open show. They are hoping to have an interclub this year and wish to hear from other societies who would like to come.

THE Midland Aquarist League held their Annual General Meeting at Bedworth, Nr. Coventry in January, where a successful 1977 season was reported. However, the delegates at that meeting expressed a desire to increase the membership of the league by inviting all interested Societies in their region with an interest in showing fish on a league basis to attend their meetings and shows. Further information can be obtained from the Secretary, F. Underwood, 10 Hyde Road, Kenilworth CV8 2PD, Warwickshire.

Final League positions for 1977: 1, Leamington & D.A.S., 113 pts; 2, Nuneaton & D.A.S., 108 pts; 3, Coventry Pool & A.S., 105 pts; 4, Loughborough & D.A.S., 93 pts; 5, Unit 59, 78 pts; 6, Rugby Fishkeepers, 46 pts. Top individual placings: 1, S.M.I.N., 26 pts; 2, T.S.F.N., 23 pts; 3, Mr. & Mrs. Chamberlain, 20 pts; 4, T. Parry, 14 pts; 5, J. Booth, 13 pts; 6, Mr. & Mrs. Underwood, 12 pts; 7, Mr. & Mrs. Cox, 11 pts.

JUNIOR members are a welcome addition to any Society and when they are as keen as those at **Longridge and District A.S.** it must auger well for the future. Their enthusiasm was proved at the last meeting when five juniors benched more fish in the table show than the rest of the Society put together. The meeting was the first one in the Society's new headquarters in the Townsley Arms, Berry Lane, Longridge and despite atrocious weather there was a good turnout. The evening ended with a talk on techniques of aquarium photography.

Show results: Characins: 1, G. Holden; 2 and 3, D. Garstang. Barbs: 1, D. Garstang; 2, B. and B. Durham. A.V. Livebearer: 1, 2 and 3, B. and B. Durham. A.O.V. Egg-layer: 1 and 3, R. Clint; 2, B. and B. Durham. Junior Livebearer: 1, D. Garstang; 2 and 3, P. Durham. Junior Egg-layer: 1, P. Durham; 2 and 3, M. and J. Bradshaw. Top positions in the Society Show Leagues (after two shows): Senior League: 1, B. and B. Durham, 24 pts; 2, D. Garstang, 12 pts; 3, R. Clint and R. and S. Holden, 11 pts. Junior League: 1, D. Garstang and P. Durham, 6 pts; 3, M. and J. Bradshaw 4 pts; 4, G. Holden, 2 pts.

RESULTS of the Open Show of **Newbury and District A.S.** were—Class A: 1, Mrs. Rushbrooke (Reading); 2, Mrs. Raynor (Newbury). Class B: 1, Mrs. Cruikshank (Ealing); 2, Mrs. Stover (Newbury); 3, D. Sheridan (Newbury); 4, T. Frazer (Basingstoke). Class Ba: 1, E. and T. Tester (Mid Sussex); 2, R. F. Adams (Salisbury); 3, M. West (Kingston); 4, Mrs. Cruikshank (Ealing). Class C: 1, N.

J. Miles (Kingsclere); 2, K. Hillier (Newbury); 3, E. and T. Tester (Mid Sussex); 4, M. Dore (Reading). Class Ca: 1, A. Feast (Tonbridge); 2, N. J. Miles (Kingsclere); 3, P. K. Raynor (Newbury). Class Cb: 1, M. Dore (Reading); 2, Mrs. Lambourne (Garthth Assoc.); 3, Mrs. Feast (Tonbridge); 4, P. Parry (Gloucester). Class D: 1, D. Luker (Newbury); 2, R. Canning (Newbury); 3, F. May (Newbury). Class Da: 1, R. Canning (Newbury); 2, D. Luker (Newbury); 3, P. Finchett (Nailsea); 4, P. Cripps (Newbury). Class Db: 1, M. Strange (Basingstoke); 2, F. Cripps (Newbury); 3, Mr. and Mrs. Bebb (Bournemouth); 4, J. Humphries (Abingdon). Class Dc: 1, 2 and 4, W. A. Knight (Gosport); 3, S. Pitcher (Salisbury). Class E: 1, M. West (Kingston); 2, K. C. Curtis (Newbury); 3, S. Broome (Reading); 4, D. Elliott (Newbury). Class Ea: 1, A. Hart (Newbury); 2, E. Jennings (Petersfield); 3 and 4, I. Lyford (Newbury). Class F: 1, R. Howe (Newbury); 2, D. Jackson (Salisbury); 3 and 4, J. Jackson (Basingstoke). Class G: 1, M. West (Kingston); 2, K. Hillier (Newbury); 3, Mr. Woolly (Saracens); 4, C. J. Richards (Sudbury). Class H: 1 and 2, D. Luker (Newbury); 3, K. Hillier (Newbury); 4, Mr. and Mrs. Bebb (Bournemouth). Class I: 1, Mr. and Mrs. Bebb (Bournemouth); 2, A. Feast (Tonbridge); 3, T. Frazer (Basingstoke); 4, D. Parry (Gloucester). Class K: 1 and 3, P. Lawrence (Reading); 2, T. Frazer (Basingstoke); 4, W. Heather (Kingston). Class L: 1, A. Feast (Tonbridge); 2, R. Collier (North Wilts.); 3, R. F. Adams (Salisbury); 4, D. Parry (Gloucester). Class M: 1, R. Canning (Newbury); 2, Mr. and Mrs. Bebb (Bournemouth); 3, J. Jennings (Petersfield); 4, C. and J. Richard (Sudbury). Class Ma: 1, R. Tubb (Bournemouth); 2, D. Sheridan (Newbury); 3, N. J. Miles (Kingsclere); 4, D. Parry (Gloucester). Class NoT: 1, I. Sellwood (Newbury); 2, A. Tubb (Bournemouth); 3, M. Thomas (Aberdare); 4, Mr. and Mrs. Prall (Basingstoke). Class NBM: 1, D. Blundell (Abingdon); 2, Mr. Mackay (Kingston); 3, D. Goss (Reading); 4, M. Bourne (South East London). Class O: 1 and 3, Mr. Woolly (Saracens); 2, K. Hillier (Newbury); 4, I. T. Tester (Mid Sussex). Class P: 1, Mr. and Mrs. Bebb (Bournemouth); 2, A. Feast (Tonbridge); 3, Mr. Woolly (Saracens); 4, J. Jennings (Petersfield). Class Q: 1 and 2, R. Collier (North Wilts.); 3, A. Tubb (Bournemouth); 4, Mrs. Cruikshank (Ealing). Class R: 1, N. J. Miles (Kingsclere); 2, D. Luker (Newbury); 3, Mrs. Cruikshank (Ealing); 4, F. May (Newbury). Class S: 1, Mr. and Mrs. Bebb (Bournemouth); 2 and 4, R. Canning (Newbury); 3, M. Bourne (South East London). Class T: 1, M. Strange (Basingstoke); 2, Mrs. Cruikshank (Ealing); 3, K. Hillier (Newbury); 4, T. Frazer (Basingstoke). Class Uad: 1, J. Jude (Gosport); 2, Mrs. Stover (Newbury); 3, Mr. Mackay (Kingston); 4, I. Lyford (Newbury). Class Ubc: 1 and 2, E. Binstead (Portsmouth); 3, F. May (Newbury); 4, P. Pinder (Kingston). Class V: 1, 2 and 3, T. Longstaff (Kingston); 4, Mr. Mackay (Kingston). Class W: 1, F. May (Newbury); 2, K. Hillier (Newbury); 3, F. Pinder (Kingston); 4, B. West (Kingston). Class XB-M: 1, A. S. Gibson (Reading); 2, A. Campion (Reading); 3, D. Elliott (Newbury); 4, B. Young (Newbury). Class Xo-T: 1 and 3, C. Hew (Newbury); 2, P. Fitchett (Nailsea); 4, M. Strange (Basingstoke). Class Xu-N: 1, 2 and 4, F. Pinder (Kingston); 2, T. Longstaff (Kingston). Class Y: 1, E. T. Tester (Mid Sussex); 2 and 3, L. Dacosta (Newbury).

The following officers were elected at the annual general meeting of the **Petersfield and District A.S.**: chairman, L. Yates; secretary, Miss Ann Jennings, 24 Larkwhistle Walk.

IN AQUARIUM OR POND
BE SAFE
WITH
halamid
Hillside Aquatics London N12

Leigh Park, Hants.; treasurer, Mrs. F. Yates; committee, Messrs. G. Barkham, N. Harrison and E. Jennings. Officers for open show as follows: show manager, W. F. J. Crookford; show secretary, G. Stacey; committee, Messrs. G. Barkham, D. Jennings and Mrs. M. Jennings. F.B.A.S. delegate, W. F. J. Crookford; A.S.A.S. delegate, G. Barkham.

The chairman proposed a vote of thanks to the retiring secretary for the work put in during the last three years of office. Highest points gained at table shows: L. Yates. Highest Pointed Fish: G. Stacey. Champion of Champions: G. Stacey. New members are very welcome to the meetings which are held every Tuesday fortnight at 8 p.m. in St. Peter's Hall, St. Peter's Road, Petersfield, Hants.

THERE was a very good attendance at the January meeting of **New Forest A.S.** The main item was a talk and demonstration by a lady from a local aquarist shop on how to set up and furnish a fish tank. The junior members went home afterwards with many ideas for their tanks at home.

Table show results—Gourami: 1, 3 and 4, P. Norup; 2, J. Menhennett. Guppy: 1, R. Travers; 2 and 3, P. Norup; 4, J. Menhennett. Tropical Catfish: 1, S. Harmon. Corydoras and Brochis: 1, J. Menhennett; 2, A. Moore. The secretary will be happy to welcome new members at monthly meetings, which are held on the third Monday of each month at 7.45 p.m. at Lymington, Hants.

THE South London Section of the **Fancy Guppy Association** held its annual general meeting in January, and Mr. H. Vinnall was re-elected as chairman. Mr. N. Clark of 121 Burwood Road, Wilton-on-Thames, Surrey was elected secretary and will be only too pleased to give further information about the Fancy Guppy Association.

The South London Section meets every third Sunday of the month at 3 p.m. in the Bede Centre, Abbeyfield Road, Rotherhithe.

RESULTS for last year show of the **Thornton A.S.** were—Egglayers: 1, R. Mayhew; 2, A. Phillips; 3, V. Pickett. Livebearers: 1, R. Mayhew; 2, N. Howes; 3, A. Thompson. Coldwater: 1, A. Thompson; 2, L. Boyle; 3, R. Mayhew. Pairs: 1 (joint), W. Robertson and P. Mayhew; 2, N. Howes; 3, A. Mackintosh. Club champion, overall winner: 1, R. Mayhew; 2, N. Howes; 3, A. Thompson.

AT the well attended annual general meeting of the **Accrington and D.A.S.** the following members were elected to the committee: chairman, F. Foote; secretary, I. Howorth, 82 Plantation St., Accrington; show secretary, J. Harding, 146 Dowry St., Accrington; treasurer, W. Webber; editor-P.R.O., J. Loftus.

CHANGES in committee of **Aberdare and District A.S.** are as follows: chairman, A. Pearce; secretary, B. George; show secretary, M. Cooper; asst. show secretary, R. Roberts.

COMMITTEE changes of the **Norwich and District A.S.** are as follows: chairman, R. Watts; secretary, N. Keeler, 11 Onley Street, Norwich NR2 2EA; treasurer, R. Reed. Other committee members: J. Harmer, B. Williamson, J. Waring, S. Lowe, D. Harmer, R. Watts, M. Culyer. Junior: I. Briggs.

OVER 130 people attended the founder meeting of the **Thorpe and District A.S.** The meeting was formally opened by the Sheriff of Norwich Mr. Russell Grimmer and was followed by a lecture by G. Purcell on the

"Ecology of the Home Aquarium." The evening was completed by a fish auction.

Thirty-five people have so far enrolled and a full programme for the coming year has been arranged. Meetings are held on the first Wednesday of the month at the Canary Public House, Heartsease, Norwich, at 8 p.m. Family and junior members are particularly welcome. Table shows will be held at all future meetings and an impressive selection of trophies has been presented to the club for presentation at the end of the year.

OFFICIALS elected at the annual general meeting of **St. Helens A.S.** were as follows: chairman, M. Lawson; secretary, M. Collins, 26 Vicarsage Drive, Haydock, St. Helens, Merseyside (tel. St. H. 22522); show secretary, B. W. Carter, 52 Robbins Lane, St. Helens; treasurer, D. Algie.

THE new committee elected at the annual general meeting of **Aylesbury and District A.S.** was as follows: chairman, J. Pipe; secretary, P. Leedale; asst. secretary and publicity officer, T. Dansey; treasurer, D. Harris; show secretary, G. Sale; librarian, D. Ellis.

It was decided at the meeting to instigate more contact with other clubs with matches and open shows. Also a membership drive is under way. Anybody wishing to join should contact T. Dansey on Thame (Oxon) 5121. The meetings are held every second and fourth Mondays each month at Quarendon Community Centre, Aylesbury.

MEMBERS of the **David Brown A.S.** have just completed a very successful year. Having competed in home and away Inter-Society Table Shows against **Halifax A.S.** Over the last twelve months, members have been competing in "The Members Table Show," seeking on a show league basis. The total number of entries received in fifteen classes was 126. The final result was: 1, J. Sykes; 2, Mrs. J. Hardy; 3, A. G. Copp.

During November, "The Winter Table Show" was held and the results were—Livebearers: 1, J. Hardy; 2, A. Copp; 3, J. Sykes. Egglayers: 1, J. Hardy; 2, E. Schindler; 3, J. Hardy. Pairs: 1, J. Sykes; 2, G. Sirwick; 3, J. Caldwell. Breeders: 1 and 2, J. Sykes; 3, D. Owen. The Best Junior Trophy was won by Master D. Owen and the B. Foden Trophy for Best Plant was won by J. Hardy. All the trophies won by members were presented at the annual dinner dance.

The Society is now looking forward to a busy agenda for this year with four Inter-Society matches, and possibly another match on the books. In addition there is the Society's second Open Show. With slide shows, lectures, quizzes and many other activities, the members are hoping for a good year. Anyone interested in joining this go-ahead Society can get details from the Secretary A. G. Copp, 14 Sutton Avenue, Dalton, Huddersfield. Telephone (0484) 43398.

IN January, **North Wilts A.S.** held their annual general meeting and the following members were elected on to the committee: chairman, I. McGinley; vice-chairman, T. Monk; secretary, P. Taylor; asst. secretary, Mrs. J. Ward; treasurer, A. Daniel. Committee members: Mrs. J. Culver, Mrs. M. McGinley, M. Still, M. Hookin, T. Francombe. Meetings are held every other Tuesday. New members welcomed and more information may be obtained from Secretary P. Taylor, 7 Ridgeway Road, Stratton, Nr. Swindon, Wilts. Telephone 4114.

THE January meeting of the **Nailsea and District A.S.** was the annual general meeting at which the following officers were elected for the current year: chairman, W. J. Holland; vice-chairman, P. Fitchett; secretary, C. Brewer, 26 Valley Gardens, Nailsea. (Phone Nailsea 2433); treasurer, J. Walters; programme officer, D. Kenwood; P.R.O., M. J. Ellick. Committee member: I. Dibble. After the annual meeting the usual general meeting was held at which Mr. P. Fitchett gave a talk entitled

"Some thoughts on setting up and running a fish house."

THE **Bradford and District A.S.** meets at 8 p.m. every second and fourth Thursday in the month at Room 5, Textile Hall, Westgate, Bradford. New committee members for the year are: show secretary, J. Cornforth, 15 Weymouth Avenue, Allerton, Bradford, tel. 8fd 493105; secretary, B. K. Isaacs, 22 Wyndham Avenue, Kings Park, Bradford.

OFFICERS elected at the annual general meeting of **Nuneaton A.S.** were as follows: president, K. Jones; chairman, M. Hall; secretary, G. Hayes, 35, Gwendoline Ave, Hinckley, Leics; treasurer, Mrs. I. Cox; show secretary, M. Short, 8 Greenhill Road, Stoke Golding, Nr. Nuneaton; assistant show secretary, G. Cox; librarian, Miss A. Cox. Committee members: A. Rodden and J. Salisbury.

The Society meets on every third Tuesday in the month at the **Clarks Sports Club**, Anker Street, Nuneaton, at 8 p.m. Old and new members are always welcome.

THE **Taunton A.S.** annual general meeting was held in January when the officers elected were: president, D. Fleetwood; chairman, D. Fox-Spencer; vice-chairman, M. Trutt; secretary, A. Marlborough, 92 St. Augustine Street, Taunton; treasurer, E. Pallant; show secretary, D. Curry; P.R.O., S. Beale; club judge and show manager, M. Bray; species control officer, A. Cavill; social secretary, D. Gilbert; club trophy secretary, R. Elliott; committee member, R. Bailey.

THE officers of the **Catfish Association G.B.** for the coming year are: chairman, R. Goodson; secretary, D. Sands, 12a Moorland Road, Boxmoor, Hemel Hempstead, Herts; treasurer, Mrs. P. Lambourne; P.R.O., Mrs. G. Sandford; show secretary, D. Lambourne, 7 Wheeler Court, Ploagh Road, London SW11 2AX.

The Convention held in November was very well attended. Members and guests listened to a lecture on the breeding of *Serrasalmo mosanensis* and *Rivulicaria fallax* by D. Allison. This was accompanied by some excellent slides and a cine film made by R. Allison showing the development of the eggs and fry of *R. fallax*. The second lecture was by G. Howes of the British Museum (Nat. Hist.) who spoke about the blind catfishes. Although we may never see these fish as aquarium specimens they proved to be a very interesting group. The third lecture was given by B. Robbidge who gave us his thoughts on the genus *Corydoras*. His lecture provoked a great deal of discussion and was greatly appreciated. The thanks of the Association must go to everyone who made this Convention possible, and especially to the three lecturers who willingly gave their time to that members might learn from their experience.

AT the annual general meeting of **Chesterfield and District A.S.** the following officers were appointed: chairman, K. Fletcher; secretary, Mrs. M. Wood, 27 Flamsted Crescent, Chesterfield, Derbyshire S41 7DU; treasurer, D. Taylor; show secretary, P. Dack.

AFTER the election of officers of the **Bristol A.S.**, Mr. F. Spence showed an interesting film of the Society's visit to Compton Acres, some shots of a members table show and also of winning fish at some local shows. Table Show winners 1977: 1, Miss H. Morgan; 2, J. Day; 3, M. Price.

This year's officers are as follows: presidents, S. Lloyd; vice-president, H. C. B. Thomas; treasurer, Mrs. I. Dfy; reporting secretary, Mrs. J. M. Thomas; secretary, V. Cole, 10 Hardwick Close, Brislington, Bristol BS4 4NL (0272-71288). Committee members: Messrs. J. Day, W. Ham, F. Spence and C. Summers.

THE following officers were elected for this year for **Goole and District A.S.** at the annual general meeting: chairman, P. Shipley; secretary, Mrs. M. Kirby, 35 Fifth Avenue, Goole, North Humberside DN14 6JD; treasurer, J. Scarff; show secretary, P. Hutton, 9 Hood

halamid IN
WHITE SPOT OUT
Hillside Aquatics-London N12

Grove, Goole; programme secretary, J. Scarff; catering secretary, Mrs. M. Shipley.
A provisional booking has been made at Bartholomew Middle School, Goole, for the Open Show on the 14th May.

AN interesting talk and slide show was given to the **Corby and District A.S.** by Mr. J. Fuller, on the many various *Corydoras* catfish. The table show was judged by Mr. D. Page from Milton Keynes, and the results were as follows:—Class H: 1, 2 and 3, R. Elliott; Class L: 1 and 3, R. Elliott; 2, P. Hand. Juniors: 1 and 3, M. McGilvray; 2, S. Sanbrook.

The society meet on the first Wednesday of each month and all who are interested in fish-keeping are most welcome. Details from N. F. Campbell, 26 Viking Way, Corby, Northants NN18 9DU.

IN February **Thorpe and District A.S.** held their second meeting when over one hundred people were entertained to a very good lecture on "The Fish House" by P. Watson of the Gt. Yarmouth A.S.

The table show results were as follow: Class One (Tetra): 1, L. Newby; 2, D. Cooper; 3, K. Appleton. Class Two (Guppies): 1, T. Driver; 2 and 3, C. Fearley. Juniors (combined class, Guppies and Tetra): 1, 2 and 3, I. Briggs.

Membership of the club now stands at 75 and new members are still very welcome. Meetings are held on the first Wednesday of the month at 8 p.m. at the Canary Public House, Heartsease, Norwich.

Any members of other clubs who would like to receive a copy of the club magazine or would like to exchange magazines should contact the magazine editor, K. Appleton, 57 Belmore Road, Thorpe-St.-Andrew, Norwich, telephone (0603) 29823. All membership enquiries to the membership secretary, T. Cork, telephone (0603) 405176.

The Ilford and District Aquarist's and Pondkeepers' Society held their annual dinner dance and prize awards recently when some 90 members and their guests spent an enjoyable evening.

The society holds its meetings on the second Monday monthly at the Churchill Rooms, Wanstead Library at 7.30 p.m. where new members and visitors are welcome.

In March there will be a talk by Mr. Pearson on pond building and construction in addition to the monthly table show.

OFFICERS elected at the annual general meeting of the **Castleford A.S.** in January were:—chairman, B. Craven; secretary and show secretary, Miss B. Stansill; 4 Milnes Grove, Airedale, Castleford WF10 2EZ; telephone 559615; treasurer, Mrs. L. Barrett; committee, A. Barrett, Mrs. Chadwick, T. Harrison, M. Price, A. Ramsey and K. Starbuck.

Meetings are held on the third Tuesday of the month at the British Legion Club, Powell St., Castleford at 7.45 p.m., new members welcome.

AT the annual general meeting of the **Midland Kol Association** the following were elected as officers for the year:—chairman, R. A. Cleaver; secretary, R. Causer, 8 Swinburne Road, Hinckley, Leics.; treasurer, K. Sale; P.R.O., Mrs. S. Hunter; librarian, T. Osa; Newsletter, P. Northover.

CHANGES in officers made at the annual general meeting of the **Kingsclere and District A.S.** were as follows:—chairman, E. Mousley; secretary, R. Codd, 86 Mullins Close, Oskridge, Basingstoke, Hants. RG21 2QZ; treasurer, M. Cooke; club shop, M. Shore.

New members are always welcome. Meetings are held every other Tuesday at The Crown Hotel, Kingsclere, at 8 p.m. For full details please contact Mr. E. Mousley, tel: Kingsclere 298748.

AFTER the business of the January meeting of the **Goldfish Society of Great Britain**

had finished, the members who attended saw two films, both in colour. The first film which lasted for 20 mins. explained the spawning behaviour of the stickleback. While the film was being re-wound, a short discussion was held on points of interest that had been shown in the film and it was surprising to hear so many members had bred these fish.

The next film was from Anglia T.V. Survival series by Peter Scott called the Trout and Mayfly. This film told of the breeding habits of both the Trout and Mayfly and how their lives cross during those two weeks in May when the Mayfly emerges as a fly and is greedily snapped up by the Trout. The film also contained shots of Bullheads breeding.

After tea, Mr. J. Linsale gave a talk on the conditioning of Goldfish prior to spawning. This talk was mainly for the new members, but judging by the amount of questions asked, both old and new members found the talk most interesting.

DUE to the huge success of last year's show the **Irish Federation of Aquarist Societies** are very seriously exploring the possibilities of a much larger show with the inclusion of trade stands, specialist societies, etc. The venue, it is hoped, will be a new Leisure Centre on the fringe of Belfast City centre. The show is scheduled for the first or second week in August.

COMMITTEE members elected at the annual general meeting of the **Scunthorpe and District A.S.** were:—chairman, K. Berry; secretary, K. Plaskett, 26 Salisbury Close, Scunthorpe, Sth. Humberide, tel. Scunthorpe 67025; treasurer, G. Martin; show secretary, P. Smith, 22 Whitman Road, Scunthorpe; entertainments secretary, Mrs. Smith; Advertising secretary, B. Piddell; committee member J. Baker.

ON the 3rd February **Shelley High School A.S.** celebrated its first year as an aquarist society. Shelley High School A.S. caters for young people interested in keeping fish. The average age of members of the society is sixteen years and anybody under sixteen is always welcome.

The members would like to offer their thanks especially to:—A. G. Copp, David Browns A.S. and S. Moorhouse, David Browns A.S., for their help during the past year, and to the officials: chairman, R. Evans; treasurer, A. Shaw; secretary, A. Copp; president, N. Noble. The membership fee is £1. Anybody wishing to join please send a postal order made payable to A. Shaw, treasurer, Shelley High School A.S., c/o Mr. A. J. Copp, 50 Parkside, Flockton, Wakefield.

DETAILS of the officers and committee of the **Torbay A.S.** for this year are as follows:—chairman, J. Corner; vice-chairman, G. Thompson; secretary, F. J. Denning; treasurer, M. Poole; show secretary, F. Orman; Assistant show secretary, D. Mayo; magazine editor, M. Matthews; committee, Mrs. R. Matthews (also trophy secretary and librarian); B. MacLean, Mrs. Lofthouse and M. Endacott (junior representative).

AT the annual general meeting of the **Leamington and District A.S.** the new committee elected was as follows:—chairman, C. Chamberlain; treasurer, C. Bilham; show secretary, M. Burridge; assistant show secretary, H. Brown; editor, P. Thomas; social secretary, T. Viner; librarian, B. Hyde; lay member, K. Russell; secretary, A. Misfield, 23 Durblane Drive, Leamington Spa, CV32 7TJ. Meetings are held on the first and third Tuesdays of each month at 7.45 p.m., Trinity Hall, Trinity Street, Leamington Spa. New members very welcome.

THE following were elected at the annual general meeting of the **Irish Tropical F.S.**: president, Professor J. N. R. Grainger, B.A., M.Sc., Ph.D.; vice-presidents, H. Wright and P. Naismith; chairman, J. Dunne; secretary, S. Mulhall, 30 St. Laurences Grove, Chapelizod, Dublin 20, tel. 364722; treasurer, S. Mooney; committee, J. Russell and D. Tate.

THE British Killifish Association is forming study groups to study in detail various specific aspects of the hobby and species of Killifish. Anyone who is interested in joining a group should write to B. P. Tate, vice chairman B.K.A., 4 Sherwood Close, Bingley, West Yorkshire. A general meeting is to be held in Bury, Lancs., beginning at 11 a.m. and lasting until 7 p.m. there will also be an auction of members' surplus fish and eggs. For details, send s.a.c. to B. P. Tate, publicity officer B.K.A., 173 Parr Lane, Unsworth, Bury, Lancs. BL9 8JN.

THE following officers were elected at the January annual general meeting of the **Cheltenham T.F.C.**: chairman, N. Bieding; vice chairman, G. Emptage; treasurer, J. Hawkins; committee member, V. Sullivan; secretary, R. P. Coote, 123 Alstone Lane, Cheltenham, tel. Cheltenham 35371.

OBITUARY

Members of the **Hiracombe and District A.S.** regret to inform friends of the death, on 12th January, of their president, Alec Bligh. As a founder member, in 1970, he was made life president of the society, and has undoubtedly done and given more since than than any other member toward its success. Known to many acquaintances in the South and West of England, Alec was a very successful but equally modest exhibitor, and a willing source of advice and practical help to less experienced colleagues. He was a proud wearer of an Aquarist Gold Pin award. Members extend their sympathy and support to his widow, Pat.

FANCY GUPPY ASSOCIATION

The Association has progressed over the past year and is now poised for further expansion. Two new sections have just been formed, one in the North East, the Tyne and Wear Section and the South Wales Section.

The Tyne and Wear Section is based in Gateshead and further details can be obtained from R. Hill, 45 Deptford Terrace, Sunderland. The South Wales Section will meet in the Merthyr area. Details from R. Francis, 110 Cemetery Road, Aberdare.

The Association has been helped during the year by advertisements placed in the Journal by major aquatic companies. This has enabled the production of a regular sixteen page magazine each month which currently contains articles on fish houses, fish diseases, guppy breeding and feeding. A specimen copy and details of the Association may be obtained from J. Hutchings, 107 Woodplumpton Lane, Woodplumpton, Preston (enc. large s.a.c.).

As in previous years the major show will be the F.G.A. National Guppy Show to be held in Birmingham on Sunday, 28th May. This is the largest guppy show in the United Kingdom. Last year well over 600 exhibits were on show including some from Berlin and Austria. This year it is expected that this number will be increased.

Many of the new members were able to obtain, during the year, breeding stock of all types. This is the way of ensuring that the objective of the F.G.A., to further the breeding and showing of the guppy, is carried out.

The F.G.A. standard shapes are now being used by many judges. Copies of the F.G.A. Standards Handbook are available from J. Hutchings for 35p.

For further information of the F.G.A. activities please write to S. Croft, 85 Planks Lane, Womborne, Staffs.

BRITISH DISCUS ASSOCIATION

The aims of the Association are to remove

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

some of the mystique which surrounds the Discus and to encourage aquarists to keep this beautiful fish. The Association also intends to improve the stock held in the U.K., both in quantity and quality.

Anyone wishing to join the Association which publishes a quarterly Newsletter containing letters and articles on water conditions, filtration, breeding techniques, etc., should write to the address below. Membership costs £2.50 for the first year and £1.50 thereafter. The secretary is looking forward to hearing from aquarists who would like to join this band of enthusiasts. L. Dann, hon. secretary, British Discus Association, 52 Beech View Road, Kingsley, Warrington, Cheshire, WA6 8DG.

NEW SOCIETIES

A society has opened in Darwen, Lancashire, and has been named the **Darwen Aquarist Society**. Club meetings are held every three weeks at the Albion Hotel, Railway Road, Darwen. The society has been active for over six months. Any prospective new member wishing for further information please contact Mr. M. Jones, 16 Eaton Street, Darwen, BB3 3J5.

A new club has been formed called the **East Kent Aquatic Study Group**. It meets at St. Peter's Methodist Church Hall, Canterbury on the second Tuesday of the month, but prospective members are asked to get in touch with the secretary, Mr. J. N. Gilbert, 1 Highfield Cottages, Street End, Canterbury, as some meetings in the first year are on the third Tuesday. Other officials are: chairman, R. Spoor; committee, A. Hazelden, L. Hovenden and D. Warren. New members will be made most welcome. The club started in January 1978 and already has thirty members.

A new society has been formed called the **Wyke Show Society**. Its aims are to encourage the showing side of the hobby. All aspects of showing will be catered for. Anyone in the Hull area wishing for more information please ring Mr. A. Frisby on 850272 or 445543 or Mr. K. Richardson on 216891. Officers elected at the inaugural meeting were as follows: hon. secretary, A. Frisby; assistant secretary, T. Tolhurst; hon. treasurer, K. Richardson.

SECRETARY CHANGES

Petersfield and District A.S.: Miss A. Jennings, 24 Larkwhistle Walk, Leigh Park, Hants.

Fancy Guppy Association (South London Section): N. Clark, 121 Burwood Road, Walton-on-Thames, Surrey.

Norwich and District A.S.: N. Keefer, 11 Onley Street, Norwich NR2 2BA.

Nailesa D.A.S.: C. Brewer, 26 Valley Gardens, Nailesa, Bristol, Avon.

Bradford and District A.S.: B. K. Isaacs, 22 Wyndham Avenue, Kings Park, Bradford.

Longridge and District A.S.: D. Matthews, 5 Sylvan Grove, Bamber Bridge, Preston, Lancs. Tel: Preston 311428.

Taunton and District A.S.: A. Marlborough, 92 St. Augustine Street, Taunton.

Leigh A.S.: H. N. Lawless, 6 Maple Avenue, Lewton, Warrington. Phone Leigh 604077.

Newbury and District A.S.: Mrs. G. Barrett, 38 Digby Road, Speen, Newbury, Berks.

Kingsclere and District A.S.: R. Codd, 86 Mullins Close, Oakridge, Basingstoke, Hants. RG21 2QZ.

Huddersfield T.F.S.: Mrs. M. K. Harrop, 18 Butternab Road, Beaumont Park, Huddersfield. Tel: Huddersfield 651892.

Show Secretaries: D. Hill, 30 Celandine Avenue, Salerside Nook, Huddersfield. Tel: Huddersfield 650437.

Toxby A.S.: F. J. Denning, 297 Teignmouth Road, St. Marychurch, Torquay, Devon TQ1 4RT. Tel: Torquay 38404.

Wolverhampton A.S. (formerly Oxley & District A.S.): A. C. Thompson, 27 Hatherton Street, Cheslyn Hory, Walsall, W. Midlands. Show secretary: J. Carrier, 2 Ingentre Road, Fordhouses, Wolverhampton.

Priority A.S.: E. Brown, 18 Prestbury Road, Chilton, N. Shields. Tyne & Wear.

Doncaster A.S.: New show secretary: B. Hommer, 67 Carrview Avenue, Halby, Doncaster, Yorks. Tel: Doncaster 61238.

CHANGES OF NAME

Formerly Oxley and District A.S., the society is now called **"Wolverhampton A.S."** They meet at the "New Hampton" public house in Richey Street off Tettenhall Road, Wolverhampton on the first and third Fridays of every month. New members will be made most welcome.

Also later this year they are holding their first open show at Oxley Community Centre, Marsh Lane, Wolverhampton, the date is yet to be finalised.

In January Rolls-Royce Tropical Fish Section changed its name to **South Cheshire A.S.** and the new meeting place is at the Kings Arms Hotel, Crewe. Meetings are held on the last Friday of the month. The secretary is T. Beoster, 62 Chetwode Street, Crewe, Ches.

CHANGES OF ADDRESS

Gosport and District A.S.: Secretary and Show secretary. Details now are: G. R. Arnold, 83 Quintrel Avenue, Portchester, Hants.

David Brown A.S.: A. G. Copp, Secretary. New address: 14 Sutton Avenue, Dalton, Huddersfield HD9 9SY.

Cheltenham T.P.C.: R. P. Cooke, 123 Abstone Lane, Cheltenham. Tel: Cheltenham 35371.

VENUE CHANGE

Longridge and District A.S. now meet at the Tosenley Arms, Berry Lane, Longridge on the second and fourth Wednesday in each month at 8 p.m.

CORRECTION

The telephone number of Mr. R. Wellams, Secretary, Hounslow and District A.S. which appeared in the January issue should now read 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. Netheresi, 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: Workshop Aquarist & Z.S. Open Show to be held at the Lady Margaret Hall, Holbeck, Nr. Workshop, Notts.

12th March: F.N.A.S. Annual General Meeting and Council Meeting, 2 p.m., at the Osram Social Club, Refuge Street, Shaw, Nr. Oldham.

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. Peter's School, Church Road, Farley, Reading. Ample car parking, only 5 mins. from M4. Schedules from P. C. Rushbrooke, 34 Melrose Gardens, Arbofield Cross, Berks. Phone 760303.

19th March: Retford and District A.S. Annual Open Show, Town Hall, Retford.

20th March: Midland Aquarist League Delegates Meeting. All welcome. Bedworth Working Men's Club, Bulkington Road, Bedworth. 8 p.m.

26th March (Provisional date): Don Valley A.S. Open Show Cancelled. To be held later in the year.

26th March: Stockton-on-Tees A.S. Open Show at Kiers Hall Community Centre, Roseworth Estate, Stockton-on-Tees. Details from R. Wood, 67 Victor Way, Thornaby, Cleveland. Tel: Stockton 762295 or 617050.

26th March: Hyde A.S. 9th open show at The Hattersley Community Centre, Hattersley Road, East Hattersley via Hyde Cheshire. Benching is from 12 noon until 2 p.m. prompt. Further information and show schedules can be obtained from Show secretary K. J. Sherwin, 14 Lime Grove, Denton, Manchester. Tel: 061-336 0574.

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

2nd April: Warrington A.S. annual open show. The venue will again be the Parr Hall, Palmira Square South, Warrington. Details are available from Mr. G. Millman, 101 Lousbers Lane, Warrington, Ches.

2nd April: Malvern and District A.S. open show at St. Joseph's Parish Hall, Newtown Road, Malvern. Schedules available from Secretary, B. E. Curston, 27 Elgar Avenue, Malvern, Worcs.

4th April: Aireborough and District A.S. Spring Mini Show and Auction at Greenacres Hall, New Road Side, Rawdon, Nr. Leeds. Schedules from P. J. Smith, 10 Wyndford Rise, Leeds LS16 6HX. Tel: Leeds 675712.

8th April: Catfish Association Great Britain Open Show at St. Saviours Church Hall, Cobbold Road, London W12. Schedules: Open Show Secretary, Mr. T. Cruickshank, 82 Stanley Avenue, Greenford, Middx. Tel: 01-578 0104.

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. Caldwell, 5 St. Martins Road, Scawby, Beigg, 5th. Humberdale 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.

16th April: Morley A.S. First Open Show to be held at Newlands Junior School, Wide Lane, Morley. Schedules available from Sheila Gear, Tingley Tropicals, Bradford Road, Tingley, Wakefield.

16th April: Reigate and Redhill A.S. Open Show at Bletchingley Village Hall, Bletchingley, Surrey. Schedules from Gina Sandford, 5 Victoria Road, Earlswood, Redhill, Surrey. Redhill 69339.

16th April: British Killifish Association general meeting to be held in Bury, Lancs. Beginning at 11 a.m. and lasting until 7 p.m., there will be a general meeting and an auction of members' surplus fish and eggs. For details send S.A.E. to B. P. Brown, Publicity Officer B.K.A., 173 Parr Lane, Unsworth, Bury, Lancs. BL9 8JN.

16th April: Taunton D.A.S. Open Show at Corfield Hall, Taunton? Schedules: Mr. M. Bray, 11 Whitehall, Taunton, Somerset. Tel: 74150.

23rd April: York and District A.S. Open Show at the Liversock 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 Fenice Grove, Leigh, Lancs. WN7 5HU. Tel: Leigh 054675.

23rd April: Halifax A.S. Spring Show at Forest Cottage Community Centre, Cousin Lane, Ovenden, Halifax. Schedules S.A.E. from Show secretary J. Shackleton, 12 Chevinide Crescent, Exley, Halifax.

29th April: Bristol T.F.S. annual show will take place at Church hall, Newton Street, Bristol.

20th April: Aireborough and District A.S. Open Show at West Park High School, Open Lane, West Park Ring Road, Leeds. Schedules for auction etc., from Show secretary P. J. Smith, 10 Wynford Rise, Leeds LS16 6HX. Tel: Leeds 675712.

30th April: Midland Aquarist League Open Show, Nuneaton. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth CV8 2PD. Tel: 59280.

30th April: Nuneaton A.S. M.A.I. and Open Show to be held at the Friary Youth Centre, Abbey Street, Nuneaton, Warwickshire. Benching from 12 noon till 2 p.m. Show will be run to M.A.A.S. Rules and Standards. Further information available from Show secretary, Mr. M. Short, 8 Greenhill Road, Stoke Golding, Nr. Nuneaton, Warwick. Tel: 59280.

7th May: Oram A.S. Open Show.
13th May: Port Talbot A.S. open show will be held at the Talbot 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. Fournace, 3 Cross Street, Velindre, Port Talbot, West Glamorgan SA11 1AZ. Tel: 5752.

13th May: The British Aquarist 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. "Toothbrush of the New World." Tickets £1.25p members, £1.50p non-members from W. Goodwin, 14 Dawson Drive, Devon Park, Bedford.

14th May: Gloucester A.S. open show at the Chequer Bridge Leisure Centre, Painwick 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 Ostalls 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.

14th May: Goolle and District A.S. Open Show, Bartholomew Middle School, Goolle (Provisional booking).

14th May: Wynnstay A.S. Annual Open Show at Bryn Goed Hotel, near Ruabon. Secretary, D. Lloyd, 26 Bran, Plas Madoc, Acrefair, Clwyd.

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.

28th May: Yorkshire Koi Society A.G.M., Wetherby Motor Hotel, (Harewood suite) beginning at 2.30 p.m. A limited amount of time will be spent on business which will be followed by two speakers and an "Any Questions" panel. All welcome.

21st May: Merseyside A.S. Annual Open Show at the Rainhill Village Hall, Rainhill, Lancs. Hon. Secretary, J. Bailey, 11 Auburn Road, Liverpool L15 8JL.

29th 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: Leyne Aquarists open show, St. Paul's Parish Hall, Scottforth, Lancaster. Details from Mrs. J. A. Hodgson, 8 Hall Garth Gardens, Over Keilten, near Carnforth, Lancs.

28th May: Yorkshire Koi Society Open Spring Koi Show, Fishlake Water Gardens, Fishlake, near Doncaster. Schedules from Mr. S. E. Bent, 20 Oakwood Road East, Rotherham, Yorks.

31st May: Midland Aquarist League Open Show, Leamington. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel: 59270.

4th June: Sudbury A.S. Open Show at the Wasps Rugby Ground, Repton Avenue, Wembley, Middx. Schedules from L. J. Brazier, 66 Ormsby Way, Kenton, Middx. Tel: 01-204 5374.

4th June: Loughborough and District A.S. Open Show at Burling College, Thorpe Hill, Loughborough. Schedules from J. S. Purdy, 10 Cleveland Road, Loughborough, Leics., LE11 2SP.

10th June: Llanwit Major A.S. "Silver Jubilee" Open Show to be held at the Town Hall, Llanwit Major. To celebrate 25 years of continuous activity we offer superior plaques for 1st, 2nd, 3rd and 4th places in 32 classes judged to F.B.A.S. standards. Schedules available, early May, from J. J. Edwards, "Glanafon", Mill Park, Llanblethian, Cowbridge, South Glamorgan, CF7 7BG.

11th June: St. Helens A.S. Open Show will be held at the same venue as last year's show, Rainhill Village Hall, Rainhill, Nr. Liverpool. Schedules are available from the secretary at a later date.

11th June: Cheltenham T.F.C. Open Show at St. Marks Community Centre, Brooklyn Road, Cheltenham. Schedules available soon.

11th June: Salisbury and District A.S. Open Show, at the Activity Centre, Wilton Road, Salisbury, to F.B.A.S. Rules and Recommendations. Over 40 classes, including six children classes. Show schedules, available in April, from Hon. Secretary, Mr. R. F. Ailans, 26 Empire Road, Salisbury, Wilts. S.A.E. please.

17th-18th June: Aberdeen A.S. Open Show at Music Hall, Union Street, Aberdeen. Full details and schedules from show secretary Mrs. G. Forbes, 10 Craigmartins Gardens, Altens, Aberdeen. Tel: Aberdeen 821170.

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

18th June: Swillington Open Show. More details at a later date.

24th June: Nailsea and District A.S. Fifth Open Show at Holy Trinity Church Hall, Church Lane, Nailsea. Details from show secretary, Mr. P. Fitcher, 2 Woodland Road, Nailsea, Bristol, Avon.

25th June: Dunlop Aquarium Keepers Society Open Show to be held in Factory Canteen, Speke, Liverpool. Further information can be obtained from either, Show secretary K. Sen, 31 Bray Road, Speke, Liverpool 24 or Hon. Secretary T. Griffiths, 19 Helper Street, Liverpool 19.

2nd July: Brighton and Southern A.S. Open Show at Portladye Town Hall, Victoria Road, Portladye, Sussex. Show secretary, M. Rooney, 66 Portladye Villas, Hove, Sussex. Tel: Brighton 411131.

2nd July: Blackburn Aquarist Waterlife Society Annual Open Show in the Windsor Hall, Blackburn. Schedules will be available shortly from the secretary, J. Gidcorn, Highridge, 4 Mellington Road, Blackburn, Lancs., BB2 6JG.

2nd July: The Chard and District A.S. will be holding its Fourth Annual Open Show at Furnham School, Chard, Somerset. Details from Mr. A. Griffin, 24 Thornton Road, Yeovil, Somerset. Tel: Yeovil 23231. Show schedules available end of April.

2nd July: Midland Koi Association Open Show at the Whitley Abbey School, Coventry. Schedules and further information from R. Casner, 8 Swinburne Road, Hinckley, Leics.

7th, 8th and 9th July: Three Rivers Fish-keeping Exhibition to be held this year in the shopping complex Eldon Square, Newcastle-on-Tyne. Further details, contact Show manager, G. T. Liddle, 17 Palmerston Avenue, Walker-gate, Newcastle NE6 4RD. Tel: 655794.

9th July: Lytham A.S. Annual Open Show to be held at Lytham Baths, Dicconson Terrace, Lytham, Lytham St. Anne's. Benching from 11.00 a.m. to 2.15 p.m. Further details and show schedules from: Show Secretary, P. Ham, 1 Wyndene Grove, Freckleton, Preston, PR4 1DE. Tel: Freckleton 633182.

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.

20th August: Stroud and District A.S. next open show at the Subscription Rooms, Stroud. Show manager, J. Cole, The Hill, Randwick, Stroud, Glos. Tel: Stroud 4504.

27th August: Long Eaton A.S. Open Show to be held at Gregory's Rose Gardens, Toton, Nottingham. Schedules available later.

27th-28th August: Great Yarmouth and District A.S. Exhibition 78. Tropical and Coldwater fish plus Society Tables. Hopton Village Hall (on A12 between Great Yarmouth and Lowestoft).

27th August: Long Eaton A.S. Open Show. Secretary: Mrs. C. A. Simpkins, 47 Pinfold Lane, Stapleford, Notts.

28th August: Petersfield and District A.S. First Open Show at the Town Hall, Heath Road, Petersfield, Hants. Show Secretary, Mr. G. Stacey, 6 Highfield Road, Petersfield, Hants.

3rd September: Bridgwater A.S. Open Show at St. Georges Community Centre, Kenyon Way, Little Hulton, Worsley, Manchester. Details from Show Secretary, M. Burpoy, 15 Pansy Road, Farnworth, Bolton, Lancs. Tel: Farnworth 792283.

3rd September: Castleford A.S. Open Show, Castleford Civic Centre. Secretary: Miss B. Stanall, 4 Milnes Grove, Airedale, Castleford WF10 2BZ. Tel: 559615.

9th September: Hounslow and District A.S. Open Show at Hounslow Youth Centre, Cecil Road, Hounslow, Middx. Schedules obtainable from show secretary, Mr. A. Constantine, 77 Sparrow Farm Drive, Feltham, Middx. Tel: 01-751 0340.

9th September: Kingston and District A.S. Open Show. The venue will be The Raynes Park Methodist Church Hall, Worpole Road, Raynes Park, SW20. Judging will commence at mid-day.

10th September: Longridge and District A.S. second open show at Longridge Civic Hall, Willow Park Lane, Longridge, Preston, Lancs. (15 minutes from the M6). Details available later.

10th September: Provisional date for Huddersfield Tropical Fish Society open show. Venue: Deighton Youth Centre. Show secretary, D. Hill, 11 Westfield Drive, Skelmanthorpe, nr. Huddersfield.

10th September: Huddersfield T.F.S. Open Show. Venue: Deighton Youth Centre. Show secretary, D. Hill, 30 Celandine Avenue, Salendine Nook, Huddersfield. Tel: Huddersfield 650437.

17th September: Whiby & D.A.S. Third Annual Open Show will be held at the 'Spa Pavilion', Whiby. Schedules will be available at a later date from the Show Secretary.

24th September: Midlands Aquatic Study Group Open Show at the Cannock Community Centre, Avon Road, Cannock, Staffs. 37 classes. Judging to FBAS standards. Schedules available May from I. Fuller, 38 Cambrian Lane, Rugeley, Staffs WS15 2XH. Please enclose s.a.e.

1st October: Eboracum A.S. Open Show at Nunthorpe School, Scarcroft Road, York. Judging starts approx. 2.15 p.m. Show secretary: M. L. Nobler, 6 Bellhouse Way, Ainsty Park Estate, York.

1st October: David Brown A.S. Second Open Show. Held in the Works Canteen, David Brown Tractors, Meltham, Nr. Huddersfield. Schedules available July onwards. For details send s.a.e. to the show secretary, Mr. J. Sykes, 27 Penistone Road, New Mill, Nr. Huddersfield. Or telephone (0484) 43398.

1st October: Midland Aquarist League Open Show, Loughborough. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.
 29th October: Midlands Aquarist League Open Show and Last Inset-Society Show of the Year, Rugby. Schedules: Mr. F. Underwood, 10

Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.
 5th November: Halifax A.S. Open Show at The Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Thirteen livebearer classes, plus eleven coldwater. Furnished aquaria, plants, etc. Schedules sent

only on request. S.A.E. to: D. Shields, "Cobblestones," Gainsel, King Cross, Halifax, HX2 7DT, or ring for details Halifax 60118.
 18th November: Goldfish Society of Great Britain general meeting, 2.30 p.m., Conway Hall, Red Lion Square, London, W.C.2.



Everglades Aquatic Nurseries

Baunton, Nr. Cirencester, Glos.

Tel: Cirencester 4656

Bunch Plants

Alternanthera roseaefolia	15p each
Alternanthera sessilis	15p each
Ambulia heterophylla	30p
Ambulia—Giant	15p each
Bacopa amplexicaulis	30p
Bacopa amp' New-Variagated	10p each
Bacopa moniera	25p
Bacopa caroliniana	25p
Cabomba caroliniana	30p
Cabomba pulcherrima	30p
Cardamine lyrata	25p
Ceratophyllum submersum	30p
Elodea densa	25p
Gymnocoronis spilanthoides	20p each
Hygrophila polysperma	25p
Hygrophila salicifolia	20p each
Hygrophila species—Blue	20p each
Hygrophila lacustris	20p each
Heteranthera zosterifolia	40p
Heteranthera—Green	10p each
Heteranthera—Red	10p each
Ludwigia malferi	25p
Ludwigia arcuata	25p
Myriophyllum proserpinacoides	25p
Myriophyllum verticillatum	25p
Myriophyllum scaberratum	10p each
Myriophyllum hippocoides	30p
Nomophila siamensis (blue)	20p each
Nomophila stricta	20p each
Rotala rotundifolia	25p
Rotala indica	10p each
Sagittaria natans	25p
Sagittaria casoni	10p each
Sagittaria pusilla	10p each
Sagittaria chilensis	25p each
Sagittaria latifolia	20p each
Sagittaria platyphylla	25p each
Synema triflorum	20p each

Per 5

Telanthera violaceum	20p each
Utricularia neglecta	30p
Vallisneria spiralis	30p
Vallisneria torta	30p
Vallisneria torta giant	10p each
Vallisneria "contortiooid"	10p each
Vallisneria gigantea	25p each
Vallisneria gigantea rubra	35p each

Miscellaneous Aquatics

Blyxa echinosperrum	20p
Nipa Palms	20p
Spathiophyllum species	20p
Syngonium podophyllum	20p
Blyxa japonica	20p
Fan Palms	20p
Umbrella Fern	15p

Dwarf Plants

Acorus pusillus	20p
Cryptocoryne willisii	20p
Cryptocoryne wendtii	20p
Cryptocoryne nevilli	20p
Cryptocoryne beckettii	20p
Cryptocoryne lingua	25p
Cryptocoryne affinis	20p
Eleocharis vivipara	20p
Eleocharis acicularis	20p
Eleocharis singua-Giant	25p
Hydrocotyle verticillatum	20p
Hydrocotyle leucocephala	25p
Hydrocotyle vulgaris	25p
Houttuynia cordata	25p
Marsilea quadrifolia	25p
Echinodorus tenellus	20p
Echinodorus pusillus	20p
Vesicularia dubyana	25p

Per Each

Floating Plants

Azolla caroliniana	15p
Limnobium stoloniferum	15p
Salvinia auriculata	15p
Pistia stratiotes	20p
Eichornia crassipes	40p
Trapa bispinosa	50p

Per Each

Specimen Plants

Acorus gramineus	25p
Acorus gramineus variagata	25p
Aglaonema simplex	20p
Aponogeton crispus	20p
Aponogeton undulatus	20p
Aponogeton monostachyus	20p
Caladium bicolor	25p
Ceropteris thalictroides	20p
Dracaena sandieriana	50p
Cordylone terminalis	50p
Barclaya longifolia	50p
Cryptocoryne aponogonifolia	15p
Cryptocoryne balansae	25p
Cryptocoryne ciliata	25p
Cryptocoryne griffithii	25p
Cryptocoryne neriifolia	25p
Cryptocoryne petchii	25p
Cryptocoryne pumila	30p
Cryptocoryne spiralis	30p
Crinum thainum	40p
Echinodorus paniculatus	30p
Echinodorus brevipedicellatus	30p
Echinodorus radicans	50p
Echinodorus martii	50p
Lagenandra laucifolia	15p
Nymphaea species (Thai lotus)	25p
Lobelia cardinalis	35p
Ophiopogon japonicum	30p
Nuphar lutrum	41.00
Nymphaea stellata	25p
Saururus cernuus	25p
Samolus floribundus	20p
Microsorium pteropus	75p

All the above prices include V.A.T. Post and Packing 50p extra. Most plants are grown in our own tropical houses and visitors are invited to inspect our stock. All plants are guaranteed to arrive in perfect condition.

Fully illustrated catalogue and price list including garden pool plants, 50p including postage and packing.

We also carry a full range of tropical fish housed in some 130 aquaria, plus everything for the aquaria including decorative bogwood.

Our 2-acre water garden offers a wide choice of plants and ornamental coldwater fish including Koi carp. As our nursery is built on the banks of the River Churn our fish are kept in cool clear running water for perfect health.

WHOLESALE TERMS AVAILABLE FOR FISH AND PLANTS. PLEASE WRITE FOR PRICE LIST