

The AQUARIST AND PONDKEEPER

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Editorial

AN occupation that has always had its attractions for us is that of collector of ant's eggs. On bright sunny days in particular, when we yearn for the open-air life, our thoughts turn to this quiet and peaceful activity. Nothing, it has seemed in reverie, could be more restful and freer from worry.

There would, of course, be the times when demand would exceed our rate of collection or when production by the ants would fall behind, but this would mean only a move from one pleasant country district to another with more and better nests of ants. On wet days we have pictured ourselves comfortably settled in a warm hut, supervising the drying of yesterday's harvest or carefully measuring out little packets of our wares ready for the hungry goldfish market. No hurry, no bustle and no great toil involved.

But all this is a dream that has been sadly shattered for us since we read a recent Law Report, in *The Times*, from the High Court of Justice. Ant's eggs, it appears, are an import to Britain from Finland, so that before one sets up as a collector here it is necessary to consider that Foreign Competition exists. Worse, perhaps, is the discovery that the marketing of ant's eggs is hedged about with export licences and is subject to the control of the Ant Egg Exporters' Association.

To be true, the latter is a Finnish organisation, but it is due to this body's refusal to agree to the granting of an export licence by the State Board of Licences to a firm of ant's egg sellers, because the firm was not a member of the Association, that the law suit reported has taken place. We now know that if we were to enter or start the ant's egg trade in this country, merely in the hope of a peaceful life, it would not be long before a Union for the Prevention of Robbery of Ants' Nests (UPRAN) or the Ant's Egg Collectors' Association (AECA) would appear, to demand dues and otherwise complicate our simple trade. Even the ant's egg collector's lot is not a happy one.

Where Does the Common Frog Live?



Common frog photographed under water with a mass of frog spawn behind it

“THE frog can live on both land and in water. At first it lives in the water. Later it comes out on land and spends all its life there. It returns to water only for the breeding season in the early spring.” This is not a quotation. It is a paraphrase of many quotations. It expresses what can be found in many text-books. But is it true?

I write from my own limited experience. I constructed a very small pond in my garden. It contained at most just over 33 gallons of water. I stocked it with tadpoles. Should they have been local-bred? Should they have been Essex natives? They were not. I could not find any locally. It happened that there had been a drought in the early spring, and the nearby ditches and ponds were dry. I brought these 14 tadpoles from Manchester, in a Kilner jar. They seemed happy enough when placed in the water, which by this time had become nicely balanced, with water plants and snails doing their necessary work. Two small goldfish were contentedly swimming about.

There were some casualties, as one might expect. But a few of the tadpoles reached the frog stage, and could be seen swimming about in the pond, or sitting by the side, or on the water-lily leaves. One by one they disappeared, evidently doing what the text-books had told them to do. They were going on to the land for the rest of their days.

But one remained. He came out of the water, of course, and spent much time in the garden. But his home was the pond, and most of his time was spent in the water. Even in the winter time, when by custom and tradition he should have been embedded in the mud at the bottom of the pond, or hidden away in some damp place above ground, he could often be seen. He would be a couple of inches below the water surface—seemingly asleep: sometimes with eyes closed, sometimes not. Occasionally he came out of the water.

The next spring my two girls brought me a supply of tadpoles, 86 of them: far too many for my little pond, but I accepted them and put them into the pond. I had now 86 tadpoles and one adult frog. The mortality rate was very high. My wife would find some of them wriggling feebly near to the surface, some with damaged tails. This con-

by WYNFORD G. WHITTAKER

tinued until she discovered, captured and removed a two-inch specimen of the dragonfly larva.

Probably eight or ten of these tadpoles reached the frog stage, and again, one by one they disappeared to make their way on land. But two remained in the pond. So the frog population of the pond was now one adult and two adolescents! All three made journeys abroad, sometimes being away for nine days or more. It was their habit to wander away during heavy rain, and to return to the pond during a spell of dry weather. Their experiences included being played with by the next-door cats: and on one occasion one of them was actually taken from the mouth of a cat. It seemed not to be damaged, but had great difficulty in climbing out of the pond on to the surrounding stonework. Once or twice I helped him out by lifting him and placing him on the rockery, where he at once leapt away!

The point I am making is that these frogs lived in the pond and not on the land.

Now we come to the spring of 1956. The first frog, now two years old, turned out to be a female. The other two, one year old, were males. I observed one afternoon that the female had been clasped by one of the males, by means of his forelegs, and under her forelegs. They swam about, sometimes under his power, sometimes under hers: sometimes both swimming together. One cannot keep observation night and day, but I am stating that these two remained clasped together for exactly 31 days. They were first observed on 25th February; they spawned in the early morning of 27th March. I regret that the actual spawning was not observed.

All three frogs were now to be seen separately. The one not engaged in spawning was quite lively. The other two were mostly at rest, very thin, and in fact, deflated. During the time the two were mating, the third was observed to be puffing himself out and croaking; sometimes above water and sometimes under water. He would answer to an imitative croak of mine. This third frog, in the afternoon of the spawning, was seen to have clasped the female who had that day deposited her eggs. She was lively enough to throw him off. I estimated that 500 tadpoles emerged from the mass of spawn. As far as I know, not one tadpole came to maturity.

The three frogs remained in the pond or on the edges until the very wet weather of early August, when all three disappeared. During the dry and warm spell in September, one of them came back, and is now in and out of the pond. I think he is one of the males: fat and plump and well-fed. But he is somewhat timid, and shows no desire to have his back stroked, or to be picked up. And all three were previously willing to enjoy these refinements of civilised life.

My assertion is that if constant observation were kept, it might be seen that even in country ponds, “where nature is left alone,” frogs would be seen all the year round. The statement that they take to the land, and stay there for the rest of their lives except for the mating season, is not factual and proven.

Cyclops in Production

by ERIC V. GRAVE (New York)

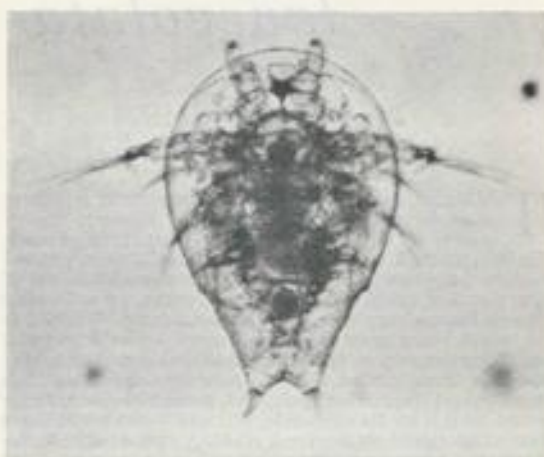
(Photographs by the Author)

IF you take a jar of water from any pond, ditch, or lake and hold it against the light, there is a good chance that you will see little dots moving back and forth, up and down. Among them there are likely to be some little animals which, through a hand lens, seem to be especially active and fast-moving. They are *Cyclops*, little creatures with one eye. They are named after a terrible race of one-eyed giants who, if we can believe the Greek poet Homer, gave much trouble to Ulysses on his way back from the Trojan War.

Cyclops are very prolific animals. They have to be in order to survive, because they form an important link in the food chain. Feeding on Protozoa, diatoms and desmids, they are themselves food for all kinds of small fishes. It has been calculated that a single female would give rise to three million offspring during one year if there were no losses among the many generations. The females exceed the males by a great margin. Some species reproduce all the year round but especially in spring and summer.

The female starts laying eggs shortly after mating. The eggs come out of two oviducts on the sides of the abdomen and are fertilised as they pass a seminal receptacle into which the spermatozoa have been deposited during copulation. A gelatinous matter is secreted to form a sac in which the eggs are held together. During her lifetime a female may produce up to 13 pairs of ovisacs, each consisting of up to 50 eggs. In general, the spermatozoa in the seminal receptacles are sufficient to fertilise all the eggs laid by the female during her lifetime.

Cyclops undergoes a long and complicated body change.



Greatly enlarged view of a *Cyclops* nauplius. This is an early stage and will undergo 11-12 moults before becoming an adult

The newly hatched larva, each called a nauplius, looks very different from the adult animal and was for a long time considered a different genus, though as early as 1699, Anthony van Leeuwenhoek, the Dutch microscopist, suggested their relationship. The larvae undergo eleven and in some species twelve moultings. When the young animal hatches, it is oval and has three pairs of appendages, which later develop into two pairs of antennae and the mandibles. The appendages in the nauplius stage serve as swimming organs.

After successive moultings more appendages appear, the

(Continued at foot of next page)



Left: a female *Cyclops* with egg sacs; in the right sac the first nauplius is beginning to emerge. Centre: several nauplii are to be seen near the female's egg sacs. Right: a young female *Cyclops*, which may later produce as many as 500 eggs during her lifetime

Anubias *lanceolata*

by JACK HEMS

THIS plant, which has been called the water aspidistra because of its resemblance to the favoured house-plant of Victorian England, hails from French Guinea, where it was discovered not above 22 years ago.

About the time of the Munich crisis a small number of the plants were offered for sale in London by a Tooting dealer, but the supply was soon exhausted, and World War II, which broke upon an uneasy Europe a year or so later, quickly put a stop to further importations coming into this country from abroad. Now, however, the plant has appeared on the market again, and, though the price being asked for it is on the steep side, it is well worth practising a few economies to obtain, for it is ideally suited to life in the decorative home aquarium.

In the first place, it is distinctive in appearance, and makes a most attractive centrepiece or feature plant. Secondly, it is slow-growing, and the leathery leaves remain shiny green and without blemish for a very long time. Another point in its favour is that owing to their toughness, the leaves are not easily damaged by either snails or fishes, and, like the *Cryptocoryne*, to which the plant is closely related, *Anubias* will flourish exceedingly well under ordinary electric light or in shady places. It is, however, a purely ornamental species and has no value as an oxygenator.

The leaves of the plant arise from a rhizomatous tuber which when firmly established produces plenty of fibrous roots. When grown in a completely submerged state the leaves measure about six inches long by about two inches across at the widest part. The leaves are held upright in the water on stout stems or stalks, which themselves attain a length of several inches.

A. lanceolata settles down best in old water with a marked acid reaction. The tuber should be buried just beneath the surface in deep coarse sand, or better still, in a pot filled



with a mixture of peat, heavy fibrous loam and crushed horticultural charcoal topped with grit to preclude the fishes stirring up the compost and so clouding the water. Any temperature between 68° and 85° F. seems to suit it.

Given time, the plant will become surrounded with stems and leaves, and, if the aquarist feels so inclined, he may uproot the tuber and cut it into several pieces, each with a stem or two and portion of roots attached to it. These pieces may then be replanted elsewhere in the aquarium or in other aquaria.

If *Anubias* is grown in soil in very shallow water it will throw up much more magnificent stems and leaves, and like some of the *Cryptocoryne* it may be treated as a marsh or bog plant and used to decorate a moisture-laden tropical vivarium or heated fish house.

A. lanceolata has been known to produce flowers in the aquarium, and they are typical of the aroids; that is, they are borne within spathes standing well above the surface of the water. There are about thirteen species of *Anubias* known, and all of them are found in West Africa.



At the top of the page a rooted rhizome bearing leaves is shown. The flowers of *Anubias* (left) are of separate male and female types, which reach maturity at different times on the same plant so that self-fertilisation is not possible

Cyclops in Production

(continued from the preceding page)

swimming feet. These later enable this little animal to shoot through the water with surprising speed. The hind end develops, dividing the body into two parts, and finally the adult stage is reached. The animal is then a streamlined, elegant creature, about one millimetre in length from eye to tail.

At high temperatures the development from the fertilised egg to the moment of hatching takes as little as twelve hours. In winter, five days were observed to elapse. The metamorphosis as well depends greatly on temperature.

Beacon or Head- and -Tail Light Fish

(*Hemigrammus ocellifer*)

ORDER:—Ostariophysi, from *ostarion*—a little bone, and Greek *physa*—a bladder.

FAMILY:—Characidae, from Greek *charax*—a sea fish.

SPECIES:—*Hemigrammus*, from Greek *hemi*—half, and Greek *gramme*—a mark or line; Latin *ocellus*—a small eye, and Latin *fero*—to bear.

OF the two popular names for this South American gem I must admit a preference for "head-and-tail light," for that appellation accurately describes the appearance of the two light-reflecting areas of the fish.

So much do they appear self-luminous that upon more than one occasion I have been requested to turn out all lights so that the onlooker could see the little lamps moving about in the aquarium. And what a disappointment when the request was acceded to and with the lights switched off it was found that the fish had also switched off!

In recent years the attractions of this fish have been overshadowed by those of showier close relatives, but it still holds its own in almost any collection of mixed fishes, and is indeed worthy of a place. If given a periodical feed of live food head-and-tail lights are peaceable enough, but if deprived they may indulge in a little sly fin-nipping. After all, their teeth were made to "tear to pieces" like those of the *Hyphessobrycon*.

Sexing is easy enough in a good light, for the anal fin of the males then shows a whitish mark which is absent in the females. Generally, too, the body of a well-fed male remains a trifle less deep than that of a well-fed female. When the females are filled with roe, there can be no possibility of mistakes.

Conditioning is achieved by liberal helpings of live foods. If difficulty is encountered in supplying these, a proprietary dried food can be mixed into a crumbly paste by the addition of pulped earthworm, and small pieces dropped into the aquarium. The fish cluster round, and very little of the mixture is uneaten once they have acquired the taste for it.

Temperature for normal purposes can be maintained from the high sixties to 74° F. When spawning is required this should be raised to a minimum of 75° and kept between 75° and 80° F.

Fine-leaved plants such as *Ambulia*, *Cabomba* or Indian fern are preferable to *Vallisneria* or broad-leaved *Cryptocoryne* in the spawning tank, which should be large enough for the fishes to move freely about. A tank 24 in. by 12 in. by 12 in. is good enough for a single pair.

With this species the female often reaches ripeness before the male, and should she find after one or two attempts that he is unresponsive, she may well bully him. It is for this reason that room must be given for him to take refuge if required.

When both fish are of like mind they chase each other into and out of the planted areas, and often dive right down under the lowermost leaves. Each time the female releases a small number of eggs the couple separate and rest awhile.



A male head-and-tail light fish

Then once more there is a flurry of fins. This may go on for two or three hours until the female is quite spent. Now is the time for swift removal of the breeding pair, for, left to their own devices, they will seek out and swallow all the eggs they can find.

The eggs are only slightly adhesive, so that removal of the plants upon which they have fallen is of little use. Most of the eggs will be dislodged by the movement of the plants and fall to the bottom of the tank.

Eggs hatch within 24-36 hours, depending upon the water temperature. The higher the temperature the less the period of incubation. Many aquarists consider a short incubation an advantage, but this is a question that might well be investigated. As far as I can see, the advantage, if any, lies in your eggs hatching before the other fellow's. It has yet to be proved that the alevins are stronger or better in any way.

The baby fishes are minute and almost invisible. The best chance of spotting them, and of knowing with certainty that the eggs have hatched, is to use a low-power magnifying glass, and carefully inspect the plants for signs of movement. Gentle shifting of the plants will cause the alevins to release their hold on them and swim in jerky fashion to a quieter spot. Frequently they will rest upon the front glass of the aquarium.

If you fail to see any fry, do not clean out the aquarium immediately in preparation for another spawning. If you do, a fine hatching may well go down the sink. Restrain your impatience for at least ten days, feeding Infusoria, green water and powdered yolk of egg to what may seem an empty tank.

If nothing has shown up within the limit of ten days it is fairly safe to assume the spawning has been lost. It might be as well, if this is so, to consider what might have happened. If the eggs were laid and the parent fish removed, the possibility of pests cannot be overlooked. Come down one night after dark—several hours after, and switch on the light over the aquarium. Look closely at the front and side glasses.

If any greyish or black worm-like creatures are seen sliding out of sight, it is pretty certain that your aquarium is harbouring planarians—avid egg-eaters and fry-swallowers. Chemicals do not appear to have much effect upon these creatures, nor does starvation. The safest and only way to get rid of them is to empty the tank, scour thoroughly, wash several times with water almost hot enough to crack the glass, and then dry, refill with fresh tap water, new compost and thoroughly vetted plants.

You may not suffer from these pests, of course, but they are wider spread than is commonly supposed. Should you find any creatures that could possibly be the cause of a spawning failure, I shall be pleased to have them identified upon receiving specimens (preferably alive, but if dead preserved in 2 per cent. formalin) sent to "Pisces," c/o The Aquarist.

Fancy Goldfish Breeding—I

THIS series of articles is intended not only for the specialist breeder of exhibition fishes but also as a guide to successful breeding for the beginner. All aspects of breeding will be considered, and all fancy types will be described and the showing of them will be dealt with.

Goldfish kept to-day are considered as "fancy" if they vary from the common goldfish. All types have been evolved from this latter fish, a point which must be borne in mind by the prospective breeder. This means that all types can interbreed and so produce many runts and cross-breeds which are not worth the food they eat or the space they take up. The fancy goldfish bred in this country nowadays are, in order of popularity and possible numbers: Bristol shubunkins, veiltails, fantails, London shubunkins, moors, comets, orandas, nymphs, lionheads, celestials and bubble-eyes. This order is only my estimation, based on the numbers I have encountered during visits and whilst judging at various places. The numbers may vary in certain districts but on the whole the estimates will be found to be fairly true. There are, of course, several variations among those named, as for instance varied-coloured veiltails, scaled or not visibly scaled, pearl scales and pom-pom varieties.

Unless one has plenty of space for a number of tanks, and perhaps a fish house, it is not a good plan for any one aquarist to try to breed too many varieties. The average aquarist has only the accommodation for the successful breeding of one variety, and this will enable him not only to concentrate and make a special study of the one type, but will also make it easier to house the fish, there being no

1. Breeding Aquaria, Ponds and the Fish House

necessity for segregation of various types. A point which will influence the number and type of tanks required will be whether the aquarist wishes to breed a few fish as a hobby for his own enjoyment, whether he needs to exhibit and so concentrate only on show specimens or whether he requires numbers of fish for commercial purposes.

For the first-named it may be only necessary to have two or three tanks of a fair size. This size I consider to be 24 in. by 12 in. by 12 in., and for the purpose of these articles I shall refer to this tank as the "standard size" to avoid repeating all the measurements. Any tank smaller than this creates unnecessary trouble, but larger ones are often an advantage if they can be procured and housed. The depth, however, need never be more than 12 in. for all the requirements of breeding and rearing.

The necessity of an outdoor pond will depend on the type of fish it is intended to breed. To be successful at breeding hardy pond types it is essential that the fish have the use of a pond in which to winter. For the purpose of these articles the hardy types are: comets, London shubunkins, Bristol shubunkins, fantails and nymphs. The others are not sufficiently hardy to withstand winters out of doors in all parts of the British Isles. Where any of these types mentioned are bred, unless the parent fish have cold winter quarters the strain may lose its hardiness. Therefore the choice of a type can depend on whether the aquarist has a pond or not. Although all types can remain in the outdoor pond from late April to late October, only those mentioned

First of a series of articles by
A. BOARDER dealing with the
breeding, rearing and exhibition
of all types of fancy goldfish

should be subjected to winter cold, for the extra fin development of the others will make them very prone to damage in the pond from fungus attacks and fin congestion. The pond is not a very safe place for moors as the eyes can be damaged.

Besides the pond the breeder will require hatching and rearing tanks. Their numbers will depend on the number of fishes he wishes to breed. Also to be considered is the method he wishes to adopt. Fancy goldfish can be bred either in a pond, and the eggs taken out for hatching elsewhere, or by pairing special fish separately from the other stock. The last-named method is the one most favoured by the specialist breeder, especially where the more tender types are concerned. The commercial breeder will do very little good unless he has a good-sized fish house with numerous tanks and outside ponds.

For the novice breeder a standard tank will be necessary to house the breeders for most of the time all the year round. A glass partition can be used to separate the sexes or to keep the parent fish away from the eggs once they are laid. With this method only one female fish and one or two males are needed. The single-tank method will mean that only a very few fish can be bred and reared. If another container is available some of the water plants with eggs thereon can be removed from the spawning tank and placed in the hatching tank.

Most goldfish types will eat their own eggs once they have finished spawning. They will also eat the tiny fry as soon as they are hatched. It can be realised from this that few fry are likely to be reared in a tank if the eggs are left with the parents. The hatching tank can be an ordinary washing-up bowl, as these containers have opaque sides and a shallow depth with a large surface area. These points are very important for the hatching possibilities of a clutch of eggs. All-glass tanks are not so suitable for hatching as the sun can affect these adversely at times.

For the specialist breeder a fish house is a great advantage, as he must have a number of standard tanks if he is to hope for any success. Many tanks could be kept out of doors, provided they were emptied when the possibility of severe frosts occurred. If a fish house can be obtained it is a good idea to have small ponds at or below ground level running the length of each side of the house. These ponds need not be more than 9 in. deep and they will do well for growing on the fry once they are about three weeks old. Before that age it is better to have the fry where they can be seen more easily, and so a range of tanks of the standard size can run along each side wall above the ponds, and at one end as well, if required. If the tanks are all of one size their substitution at any time will be made much easier.

The breeder's fish house need not have special heating all through the breeding season, for if there is a fair amount of window space it will be found that the glass will attract all the heat that is required. For the winter, all that may be necessary is to provide a small heater to prevent frost from getting at the tanks. To save expense a number of old coldwater cisterns can be used as rearing tanks, but it is safer to wash these over inside with a mixture of one part of cement to one part of fine sand. Wash them out well before use.

Plant Propagation in Polythene Bags

by MASON SMITH

I WOULD like to outline a method of aquarium-plant propagation which I think might be useful to aquarists who live in flats and are unable to instal a tank specially for plant growing and propagation. Many of us have, I am sure, been given unrooted cuttings from aquarium plants by some well-intentioned fellow aquarist. On arriving home we have carefully planted them in the community tank, only to find to our dismay that they have, over a period of time, gradually rotted away, or else the plants have developed very small leaves widely spaced on stringy-looking stems.

Aquarium plants, to grow and thrive under aquarium conditions, must of necessity have a good root system. To grow roots the cuttings should receive a fair amount of sunlight and the compost that they are planted in should be of a fairly rich nature. But, of course, the problem is how to give these requirements to the cuttings in a community tank without also getting a good growth of algae.

One plant I have in mind, of which although a common enough species one rarely sees good specimens, is *Ludwigia mullertii*. Well-rooted plants of this species are most attractive and if given sufficient light and nutriment the



Photos:

E. G. Solney



Polythene bag suspended with tray in place at its bottom. The photograph to the left shows a bag cut open to expose *Hygrophila* cuttings (six weeks after planting)

undersides of the leaves turn a beautiful shade of red. Unfortunately, this plant, when put directly into the aquarium as a cutting, usually sheds all of its lower leaves and only the top starts to grow. Very often the stem of the plant, where it has been pushed into the compost, also starts to rot away.

The method of plant propagation with which I have been experimenting, and with which I have had varying degrees of success according to the type of plant, is as follows. A packet of polythene bags is bought from one of the multiple stores or chemists. These bags cost about 1s. 6d. for a packet of 12. The 6 in. by 12 in. size is the best for our purpose. The other requirement is a few clay pans such as are used for standing plant pots in. These should be of about 4 in. diameter if the 6 in. by 12 in. bags are to be used. John Innes potting compost, plus 50 per cent. of good quality loam, is the propagating medium, and the clay pans are filled to three-quarters of their depth with this. The compost is then well watered with old aquarium water.

The next step is to take some cuttings about 2 in. long from various plants. It is best to keep each species in a different tray. Those plants which I have found to propagate most easily are: *Ludwigia mullertii*, *Hygrophila polysperma*, *Cryptocoryne* (most species) and *Bacopa*. You will notice that all of the plants listed are semi-bog plants, and it is with this type that the best results are obtained.

Of the plants listed, *Hygrophila* is definitely the most

easily propagated. If a length of *Hygrophila* is cut into small pieces and planted it will be found that half of the number will root themselves and form into individual plants.

When the cuttings have been planted deeply into the compost the clay trays are then put into the polythene bags in the way shown in the photograph. The bags are carefully filled with old aquarium water to a depth of one inch above the top of the compost. The tops of the bags are now tied with string so that they can be suspended in front of a window, which preferably faces south. Every night the bags should be taken from the window and stood in the warmest room available. This is to prevent the cuttings being chilled by the cold night air.

After four or five weeks the cuttings should have developed a good root growth. The plants must now be care-

fully taken out of the compost, care being taken not to damage the roots. I think it is best to take the plants from the trays with a certain amount of compost surrounding them and then put them into a dug-out depression in the aquarium gravel, any compost showing being carefully covered over with gravel. With this polythene-bag method it will be found that leaf growth is not very great, but that a good rooting system will have developed from the plants.

Unfortunately, this system of propagation can, for obvious reasons, be used only during the summer months. I am not suggesting that the method is the most satisfactory way of growing aquarium plants, but it is a method for the aquarist who is limited for space and tanks to grow enough plants to meet his needs.

The Chocolate Gourami (*Sphaerichthys ophromenoides*)

by RODNEY YORKE

LET me say at once that the chocolate gourami (*Sphaerichthys ophromenoides*) is a fish which is very rarely seen in dealers' tanks and it is always expensive. I have only seen it offered for sale twice in the last two years, once in London and once in Cheshire, and the price in both instances was 25 shillings for fish about one inch in length. Fully grown, it measures about 2½ inches, but is capable of breeding when much smaller, but only in its natural haunts. Coming from Malaya, it enjoys high temperatures and requires 80°-86° F. It is very peaceful and is probably best kept on its own and certainly not with fin nippers or really boisterous or nervous types of fishes.

There are two schools of thought about the chocolate gourami, one side holding that it is very easy to keep and stands no end of rough treatment (my own view from observation), the other that it is very delicate and quickly dies on its owner. The answer is that when small it is delicate (like many other anabantids), and it must be provided with quiet surroundings, soft (solids under 40 p.p.m.) and very acid water, say pH 5.8 or even lower, has been recommended.

Stanley Weitzman (*The Aquarium Journal*) considers very acid conditions essential because he kept five of these fish at pH 6.8, and their fins took on a greyish cast, their eyes bulged and treatments proved ineffective. Two of the fish died, the survivors being removed to a tank with *Cryptocoryne* planted in peat moss and treated with an acid plant food. Hardness was 30 p.p.m. and pH was 5.8. Two days later the fish began to improve, their fins cleared and food was accepted. However, it took three weeks for the eyes to become normal. He points out that both *Rasbora heteromorpha* and *R. maculata* require similar conditions and are both found in the same wild haunts. However, H. R. Axelrod (U.S.A.) states that the pH for the chocolate gourami must be between 7.6 and 7.8, which is quite at variance with the foregoing.

Dr. Ladiges states that this fish is found in low lying swampy outpools in grassy regions where the water is very acid, with temperatures between 82° and 86° F. The water is 2 degrees D.H. (about 35 p.p.m.) but he feels their water-hardness requirement is an unknown factor.

The fish are diffident about food, have very tiny mouths

and do not go out of their way to find food, also an irritating habit of the angel and the discus. Unlike most labyrinths this fish does not dash up to the surface very often. Although it enjoys well-planted tanks and privacy it is not at all scary. It enjoys *Daphnia*, *Tubifex*, mosquito larvae, brine shrimp and the usual dried foods, but is particularly partial to small insects, insect larvae and the like. Under suitable circumstances it should live at least two years and even double this period. The only fish diseases which seem to bother it are fungus and velvet, no doubt arising in unsuitable conditions, and these can quickly be cleared up.

Sexing has never been easy, as male and female seem to be identical. However, it is thought that males show a small yellow patch immediately before their dorsal fin. Breeding this fish has proved almost impossible and I have not heard of anyone in Britain who has succeeded. Two very experienced northern aquarists (Mr. C. H. Blake of Rochdale and a colleague) tried for several years with a number of these fish under varying conditions but nothing happened.

Maurice Rakowicz (*The Aquarium Journal*) reported this fish as a mouth breeder, basing this on native information and also because he found young in the mouth when preserving and dissecting specimens. Writing in *D.A.T.Z.*, a German breeder (W. Bahr) indicates that these fish are bubble nesters. The bubbles join to form one large bubble about two inches across underneath a floating leaf. The male guards the nest for up to six days but must be removed once the fry hatch.

The chocolate gourami offers something of a challenge to the more experienced aquarist and it is to be hoped that more specimens will become available. It is a very pretty fish with its chocolate-brown colour tinged with olive, flecked with yellow and with several silvery yellow irregular vertical bars. When in a tank with *Vallisneria* it is really quite hard to see.

The scientific name refers to it being spherical (which it isn't) and its ability to track by smelling. It was sold under the title of Malayan airship fish some years ago. A similar variety is *Sphaerichthys vaillanti* from Borneo.

Cacti in the Fish House

SOME aquarists place cacti on the top of their tank glass covers, but if this is done there should be a saucer underneath, in which some gravel can be placed. This will ensure that the drainage hole of the pot is not clogged up, and that surplus water can drain away easily and quickly. Really wet conditions at the roots will kill a plant quicker than anything.

Even a Secretary Must Eat!

by CONSTANCE GORDON

IF the above title is regarded as facetious, let me say at once that it is not meant to be. I am a business woman and a busy one, with little time to be facetious. Just at meal times I may relax a little and reflect upon my leisure-hour duties as the secretary of an aquarist society. It is in these reflections that I find my appetite waning, for, as a secretary, and I hope, a conscientious one, I am haunted by the spectre of a falling membership.

I am not of a pessimistic nature, rather the reverse, but this dwindling of members is a real worry, and I cannot sit by complacently and tell myself that it is merely a passing phase and that soon everything will be back to normal with a full membership again. I know that it won't, and I am astonished at the complacent way the situation is being accepted in other areas. Clubs are closing their books for the last time and disbanding. Others continue to function with a mere skeleton of their former body, yet it is being accepted with a shrug of the shoulder and no attempt made to remedy the position.

I read with consternation the report of the Federation of Northern Aquarium Societies meeting held last year, where it was stated that weaker societies had disbanded and many aquarists who had taken up the hobby after the war for the purpose of making money had dropped out, and the hobby was the better for it. Am I wrong in thinking that this is complacency of the most dangerous kind? Destructive comment at any time is risky, but with the hobby in its present condition of needing to retain all its experienced adherents as well as the societies to which they belong, surely the call was for constructive observation. Would it not be infinitely better to attempt to find a means whereby these weaker societies could be assisted to maintain their existence; should that not be one of the purposes of collective club organisations? If not, then the days of the centralised club body are very limited, for weaker societies are becoming the rule rather than the exception.

Counter-Attractions

Again, any aquarist who disposes of any fish for cash could come under the stigma of one who joined the hobby for the purpose of making money. The unfairness of such a label is obvious. Surely any aquarist who succeeds in breeding a good and saleable type of fish is entitled to re-imburse himself for all the money he must, without doubt, have lavished upon his hobby. Alternatively, the people who have made money from this source are few indeed, and, I shrewdly imagine, are still with us.

But I am not unduly concerned with all this. My concern is with my club and whether it is possible to bring it back to its former standard, and, in doing so, perhaps point the way for others to follow, if that does not savour too much of conceit. It is, I know, easy to adopt the role of an arm-chair critic. To read others for their apparent lack of action along the lines of what one thinks should be done to remedy the position. How much more difficult to find the remedy! So much so in these days of powerful opponents such as television. This looms ominously ahead of all hobbies, its

attraction is a constant threat to all aquarists who possess a set.

I know personally many aquarists of standing who have closed their fish-house doors for the last time and gone to sit before their T.V. screen, and the hobby is the poorer for their going. But in this, at least, I am optimistic enough to think that it will not last; I cannot bring myself to believe that an active man will be content to squat before a T.V. screen all his leisure life. There is still the flavour of novelty about it and I am sure that when this has evaporated many will return to the pleasure derived from the keeping and breeding of fishes.

The garden, too, is another factor in the seduction of the aquarist from his tanks, although, often enough, the garden and aquaria are in harmony. Many prominent aquarists owe their initiation to fish keeping to the fact that their garden needed a fish pond to complete its attraction, and in the seeking for information to maintain the pond and its occupants, discovered a new love. But gardens do need constant attention, especially in the spring and summer, and all a man's leisure time may be required there, to the detriment of his tanks.

Society Events

These are but two of the causes of the meagre attendances on club night. There are others, of course. Every club which has a junior section knows the sudden drop in attendance on club night among the juniors when evening classes commence. But what of the attractions within the clubs themselves, are they sufficiently attractive to counter the appeal of the various "opponents" to club aquaria? Most clubs cater for a social side of their activities and it is a wise club indeed which keeps this aspect well to the fore, for many owe their survival to social amenities. Periodic trips by coach prove to be an ideal welder of good fellowship and friendliness. Particularly so if well organised, with little cause for grumbling in the matter of quality and service of meals.

Agreeable discussions and debates bring out to an amazing degree the pleasant side (and hitherto unsuspected knowledge) of some members previously regarded as "unfriendly," or at least, reserved. Visiting lecturers are an asset, of course, but encouragement should be given at every opportunity to a club's own members to get up and speak, if only for a few minutes, on his or her experiences, either successful or the reverse; the latter often proves the more interesting and humorous. The result of this experiment is sometimes astonishing and many a fine lecturer is discovered amongst a society's own members, and who proves infinitely more entertaining than the visiting speaker who charges a guinea or more for his or her services. We have proved this fact in my own club, much, I may say, to our wonderment, and, recalling some of our visitors, with mirth.

All clubs promote table shows at periods during the year and they do provide a healthy competitive spirit and are the measuring stick for the beginner, who should be encouraged to enter his fishes, quality notwithstanding. Tactfully handled, his lack of success can be the spur to better things. The judge can be of very considerable assistance here, if he will go to some length explaining to beginners what is required in the make-up of a good fish.

It seems almost silly to mention jealousies and cliques, but, unfortunately, they do exist in some clubs, but they should be avoided like the plague, for they are the dry rot in the club's structure and will result inevitably in its collapse. Happy the club who can report their non-existence!

New members should be cared for from the moment they join the club's ranks, for here, I think, lies the remedy to my secretarial worries. New members provide the infusion of the life-giving blood of which clubs everywhere are in sore need. But do clubs recognise this fact? I am extremely doubtful of it. Too often they attend one or two meetings in a fever of that early enthusiasm, and then drop out and are forgotten. On them is pinned the title of "transient aquarist." But what makes them "transient"? Why do they drop out?

Is it because they encounter the usual beginner's snags, lose their fish—and their enthusiasm proving unequal to the shock of such a catastrophe—they decide to cut their losses and leave the culture of fish to more experienced people? Or is it that, having joined the club, they feel the horrible sensation of being "outsiders," coming into the club room and seeing the better-acquainted members standing in groups joking and laughing, they feel left out and unwanted? We are all merely grown-up children, and most of us can recollect very clearly the horrors of that first day at a new school; only the "brassy" ones of us can push our way into these groups and force ourselves to be observed.

If either of those explained causes are the reason for the dropping out of the new members, then it is a tragedy, for I am sure the clubs could do something about it. The second cause could easily be overcome, and I do not have to explain how, but the first is, of course, quite a problem. However, it is not without remedy. It would not be a difficult matter for a club to maintain a "pool" for this purpose. Most aquarists of experience have a few fishes to spare at times and could contribute to the pool. The difficulty would lie, I imagine, with the new members themselves. Many accept their losses and quietly drop out without the club being aware of what has happened. It is only when the member has missed two or three meetings that questions are asked, and then it is usually too late to do anything about it.

But if a few of the more experienced members took the

"new boy or girl" under their wing, discussed their "teething" troubles, casually making known to them the existence of the "pool" and its object—pointing out that they too, eventually, would be expected to contribute when they had acquired more experience and, consequently, more stock. In this way, the implication of being "given" something would never arise. They would not have that unpleasant feeling of being under an obligation, of charity, to put it bluntly. It is then reasonable to assume, that having survived his early losses and established a friendly basis with other members who have given him, besides good advice, that pleasurable feeling of "belonging," the seed of *esprit de corps*, which is, or should be, an essential part of the make-up of any club, will have been sown. The new blood would be saved to the club and would remain to become a valuable asset to the hobby as a whole. But the onus must be on those members undertaking this job.

It is a big temptation to appear knowledgeable in front of new recruits, to converse knowingly of *Hyphessobrycon flammatus* instead of flame fish, or *Hyphessobrycon imani* instead of neons. Please don't do it! I can well remember the terrifying thoughts when I had just started in the hobby and encountered this; it almost drove me out altogether when I was faced with the task, as I thought, of having to remember such impossible names. So please refrain from these technicalities. The member will remember and respond to your friendliness. He will also remember, with gratitude, how easy you made it all sound.

Well, I have made known my worries and eased my mental stress, but whether I have found a cure remains to be proved, but if I have only set club officials thinking, then I have achieved something, for out of that thinking may come the idea which will result in the rejuvenation of aquatic clubs and bring them back to the conditions of full membership and the glories we once knew. Then, who knows, I may even recover my appetite, for, as I said before, even a secretary must eat!

FRIENDS & FOES No. 53

COLEOPTERA

PREVLUM:—Arthropoda, from Greek *arthron*—joint, and *podos*—foot.

CLASS:—Hexapoda, from Greek *hex*—six, and *podos*—foot.

THE word Coleoptera is probably derived from the Greek *koleos*—a sheath, and *pteron*—a wing, referring to the fact that the flying wings of beetles are covered by the elytra. The name "elytra" comes from the Greek *elytron*, which means a cover. The elytra are actually hardened wings, the first pair, which have undergone considerable modification to serve as a protection for the large, soft, many-folded and beautifully delicate second pair. A beetle has few claims to beauty, its flying wings and its large compound eyes are the two best.

There are a great many species of aquatic beetles, and an almost equal number of special adaptations to fit the species to their watery environment. No known species carries out an active existence on land; they leave water only to find another pool. Even in drought, some species bury themselves in the soft mud to await the return of the water rather than take to the air. However, when draining a pond for cleaning, many specimens will rise from the mud and zoom past your ears with the noise of an aeroplane.

The majority of species are carnivorous and can wreak considerable havoc among other inhabitants of

Water Beetles



A medium-sized water beetle (*Agabus sturmi*); seen with a 4 in. objective and $\times 5$ eyepiece

their patch of water. The larvae are even more ferocious, many of them destroying fish fry, tadpoles (both frog and newt), snails, insect larvae, crustaceans, worms, leeches and, if food becomes exhausted, their brothers and sisters.

They are themselves eaten in large numbers by fishes. Do not put them alive in fish tanks, however, or you will almost certainly rue the day of your indiscretion. They make fascinating pets, if kept in covered jam jars, and much of their habits can be learned in this way.

C. E. C. Cole

AQUARIST'S Notebook



by

RAYMOND YATES

SOME time ago I decided it was about time I had a rest from lecturing to aquarist societies, and from then on I politely declined all the requests for my services. Having lectured a great deal in this line for years I felt the need for a complete rest, and as I was really ill at the time, it was not such a hard decision to make. It is high time that some of our younger enthusiasts did a bit of public speaking . . . there is plenty of talent and the knowledge is there. What is lacking is the will. How many club members have given even a five-minute chat to their own club?

With the years one gets quite hardened to the wiles of club secretaries, who are past masters at putting together really pitiful, pleading letters asking you to "help them out" or even sending you five-line telegrams a few hours before they want your body. I well remember one such instance when I got a wire at midnight and duly turned up the next day to find I was "stand-in" for a reptile expert, and a large audience arrived expecting to see the alligators, pythons and what have you, only to find me as an anti-climax.

On my first visit to one club I could not find their headquarters. When at last I tracked down the likely locals only Boy Scouts and the local amateur dramatic society were in evidence. On enquiring where the aquarists held their meeting I was greeted with "What are aquarists . . . what do they do?" Have you ever tried to answer a question like that without losing face? Later I saw what looked like a fish-type hanging about furtively with a quart Thermos jar, so I asked him if he belonged. It turned out that he hoped to join that night and "thought" they met somewhere near where we were. Hours later some enthusiasts did appear, when it transpired that the caretaker had gone to the pictures—with the key.

Arriving once in mid-winter I found myself expected to climb thirty steps covered in thick ice after a burst. After three attempts to climb complete with heavy baggage and falling down each time, I finally managed to get in through a downstairs window! One club asked me along for 7 p.m. but at 9.30 p.m. they were still talking club business. True I still spoke for an hour and had to go along to their next meeting to complete my talk.

Being met at the station is a horrible experience, as the person expected (complete with copy of *The Aquarist* in hand) is never in sight. You wait about for half an hour and when, at last, you arrive at the club footsore and weary, the individual concerned swears he was there all the time. The big problem is getting home, and at times this is a nightmare. It is always foremost in the lecturer's thoughts but not with the club members, who couldn't care less if he were to miss his train so long as every question is answered.

I remember once agreeing to talk on for another hour on the understanding that the chairman would run me home in his car (about 16 miles). At the close we discovered a pea-soup fog with visibility nil. Motor transport was impossible so, after hot coffee, I was left at the station with three minutes to wait for the 11 p.m. train. Long after midnight this duly arrived and I got home at an unearthly hour feeling a very poor fish. On another occasion a club member drove me to the station with ten minutes to spare for the last train. Somehow I got mixed up with the departure platform and had the mortification of seeing the last train pulling out of a side bay and leaving me behind, 30 miles from home. On this occasion I found a mail train which

made an unscheduled stop three miles from home, and it duly dropped another form of male about 1 a.m., but I still had a three mile walk.

The society headquarters in which one finds oneself are surprisingly varied. Some are really palatial, with a nightly rent of several pounds, and at the other end of the scale one I visited was little better than a hay loft. I have been in just about the lot: town halls, political clubs, Y.M.C.A.'s, church halls, public houses, cafés, schools and so on. One turned out to be the local school clinic and I delivered my talk on "Fish Diseases" in the pungent odour of disinfectant. Often I have arrived first, long before any members of the club. In this way one meets first the caretaker, who gives you the "low-down" on aquarists as he sees them, often both refreshing and rather illuminating views. Sometimes you have blackboard and chalk all set out, sometimes not even a drink of water. At least one club cannot begin a meeting until everyone has a pint pot in hand.

Some clubs have really grand, informal meetings, whilst others go to the opposite extreme, and at least one hides the lecturer from the public view until he is due to speak, when he is ushered in like a judge. Some clubs expect you to stand, others prefer you to sit; nearly all liked my method of sitting informally on the edge of the table. The sea of faces which swims before your eyes is much the same, comparing one club with another. Most of these faces betray no emotion whatever so that you are in constant doubt as to whether they know it already, are mentally far away, really interested or just without a clue about what you are talking about.

Experience shows that most members are really quite interested but feel that the lecturer is so much more well-versed than they that they just sit in silence and dare not ask a question. Of course, there is always the chap who never agrees; he usually sits at the back, half smiling and shaking his head, and there is nearly always the one who jumps up merely to ask catch questions. The worst are those who never open their mouths until the lecturer has just three minutes left to catch his train, and then want chapter and verse and look pained when asked to "write to me." Of course, the really experienced lecturer, like the experienced judge, can never be caught out. When you are asked a question you can't answer, don't try to bluff it out—why should you? Just say "Frankly, I don't know, but I'll look it up and tell you later."

Chairmen of aquarists' societies vary greatly. Some are charming, well-mannered and efficient, some just brusquely efficient, some "hail-fellow-well-met" types, and some right-down unsuited for the job but have to hold on to a position nobody else will take. Sometimes you find yourself the sole occupant of the table (which is preferable whilst you are talking), but often you share it with about ten other notables (mostly unknown to you), rather like a political meeting layout. Sometimes you get notes passed to you which can be quite disturbing. At one club, after talking a short time, I got such a note which read "Five minutes more," when I had expected at least another hour! I hurriedly said in five

minutes what should have taken 55 and found myself bundled into a corridor, weighed down with cup of tea and cake and the information that they had to deal with some most important club business immediately, which would mean a frightful row and which, naturally, they did not want any well-known visitor to see. "Did I mind?" Lecturers, like sailors, don't care, and events like this roll off them like water off a duck's back. It all adds spice to the thought in every lecturer's mind: "Whatever will happen next?"

Club secretaries have a thankless task in fixing up speakers, but some go about it the wrong way. I have never yet met a lecturer who cared to receive a circular letter through the post asking when he would be able to address such and such a club, or alternatively asking him to mark off dates (up to a year ahead) when he might be available. If a secretary cannot send out a personal letter of invitation to a guest speaker he must not be surprised if his letter is consigned to the waste-paper basket. Then again, few secretaries bother to send out a stamped addressed envelope for reply purposes, which is the least one might expect. A few send out dictatorial letters which more or less order the lecturer to attend their club meeting and then wonder why lecturers are hard to get. The worst type of all tells you exactly what you are to talk about; I always told these gentlemen that I regretted that I knew absolutely nothing about the subject they wanted and hoped that they would be more fortunate with some other speaker.

My own experience, however, is that no matter how much you play "hard to get" they keep on trying and are not easy to discourage. I often found myself appearing in place of some other speaker who had cried off at the last moment, but for myself, I never cancelled an arrangement once made and clubs soon learn which speakers can be relied upon and vice versa. There was one horrid occasion when (owing to errors at both ends) I was due to speak at two clubs on the same evening and these clubs were 90 miles apart. The memory still hurts.

Perhaps what I have written seems rather cynical at times, but these instances are the exceptions which occur. By far the great majority of talks to clubs are great fun for all concerned. Personally I have enjoyed very many happy hours with large numbers of really enthusiastic hobbyists all over Britain. I have been entertained lavishly and from these aquarists I have learned a very great deal. The worst aspect of lecturing is the travel, in particular the late-night journey home, which can become very wearisome.

Considering how popular the hobby has become in recent years and the huge increase in clubs it is surprising how few club members have felt the urge to tell their experiences to others. Are you, reader, one of those who would like to stand up and yarn before your own members for five or ten minutes but haven't the courage as yet? Have a go next club night and you will soon find yourself a fully fledged speaker. Good luck.

In his fascinating book *The Lost World of the Amazon*, Franz Eichhorn gives some interesting data about the piranha. He relates that blood alone emptied into the river will excite these fish to frenzy, but that they are not interested in carrion. Food must be fresh and bleeding to be acceptable. The fish themselves are remarkably tasty to eat. Underwater photography in their natural haunts proved difficult, even in a caisson. When the technical difficulties had been overcome it was found that the fish would not eat in front of the caisson window, being scared away by movement or sounds within, as they have keen hearing and extraordinary vision. Efforts to keep specimens alive in a large tank five feet wide and three feet deep were unsuccessful, although 50 carp would have been quite at home therein.

At first rain water was used because piranhas are supposed to be very susceptible to water changes. This was aerated but piranhas introduced dashed madly round for a few minutes and then turned over on their backs and expired. River water used instead of rain water produced the same result, nor was excess of light the reason, for the fish died when introduced in darkness. The tank was furnished with soil, stones and plant life, but the fish died just as rapidly. An attempt was made to acclimatise the fish to captivity by fencing off a section with wire netting and netting river fish into this "pool." Within 15 minutes most of the fish were in great distress, turning over and quivering. Those which were netted and returned to the river were immediately torn to pieces by their wild brothers. A second attempt at partitioning off a backwater section resulted in the hemmed-in fish refusing to eat and dying off within 24 hours.

Aquarists will find this book full of interest, particularly because it gives them a close-up study of the conditions met with in the haunts in which many of our favourite aquarium fishes are found.

Looking at a piranha recently I was struck by the fact that this fish is a plant chewer, even although it prefers a meaty diet. *Riccia* and Indian fern (the only plants present) were munched up on occasion, but the favourite food seems to be the common earthworm. When food is about to be given the piranha looks upwards and there comes into the eye that look of savage anticipation so familiar with black widow fish when they realise small fry are in their tank. A six-inch worm (as long as the piranha itself) disappeared in about six seconds but was not swallowed whole. The fish chewed the worm into about four pieces, eating each piece separately but rapidly. The lacerations on the skin of the worm were most obvious. A nasty customer.

A really splendid "bobby-dazzler" is the variegated sailfin (*Polypterus ornatipinnis*) from the Belgian Congo. This fish, about nine inches long and eel-like, is a mixture of speckled and striped beauty in cream and olive-brown. They have the fault of hiding under rocks and are not really very active swimmers. Very few of these fish have appeared in Britain but I saw some at the aquarium at Belle Vue Zoological Gardens.

It was here that I noticed a colour change in some moonlight gouramies (*Trichogaster microlepis*), which are usually the bright silver of the orfe or ide. An odd specimen, however, had developed an irregular black band down the side, from the gill cover to the tail, ending in a pronounced black spot. The top of the eye was tinged with red.

Mr. R. Brooke, the maker of the well-known all-plastic aquaria, tells me that when he was in Paris he saw the best aquaria he has so far come across. Unfortunately prices were very high and to offer them in this country the retail price would be in the region of 16 pounds, which would limit demand. His own plastic aquaria (made in Ilford) have proved very popular and a Swiss importer has remarked that these are cheaper than anything the Germans can offer him in this line. I asked Mr. Brooke how to deal with a leak in a plastic tank, and he suggests that it be emptied and dried, then a little chloroform should be run along the joint. Black Bostik cement will do the job if applied to the outside of the tank but this might prove unsightly. The clear Bostik cement will give a neater job, this being sold under the trade name of Boscelyn.

Submerged lights in aquaria can be attractive, but many find that these encourage algae to grow, and unless you are cultivating algae this is something of an annoyance.

Feeding for Exhibition Fishes

by AQUARIUS



MANY aquarists are bewildered by the various types of packet foods offered for sale. I advise them to try out different kinds over a period and see which food the fishes take readily and which appears to be agreeing with them the best. It is perhaps a pity that the contents of the packets are not described thereon so that an aquarist would have some idea as to what he was feeding to the fishes, but I suppose that this would not work as it might be giving away some trade secrets.

A very important point to watch when giving dried packet foods is to note the size of the particles. If the food appears to be very dusty it is better to sift it through a silk stocking sieve to remove this dust. Hungry fishes will usually pick up most of this fine stuff when sucking over the sand but this does not so often happen if too much food has been given at a time. The fishes always take the largest pieces of food first, and if they have had enough they are not so likely to search around over the bottom for tiny pieces. This means that the small grains are left to start polluting the water. The movements of the fishes will swirl the fine food to the back or corners of the tank and it will then be neglected.

This fine food can be saved for small fry or fed to the older fishes by itself. The system is to wait until the fishes appear hungry and then to give a little of the dust-like food lightly sprinkled on the surface, or just a little in the feeding ring. The fine particles will float on the surface long enough to enable the fishes to suck in most of it. It is amazing how a fish can stay in one spot at the surface and, by sucking, can draw to it most of the food floating on the top over a wide area.

When feeding tropical youngsters with the ultimate idea of producing a few exhibition specimens it is essential to work to a plan so that they receive as much nourishing food

as they can take. These special fish should be sorted out when they are about half grown. Some kinds can be picked out sooner. You may not be able to pick out a winner at an early age but it is possible to gain enough knowledge in a short time so that at least all those fishes which are not likely to make winners can be sorted out. With practically all the egg-layers except the fighting fish, it is probable that if a dozen of the healthiest and best-shaped fish are taken away from the main brood at a fairly early age and given special treatment at least one exhibition fish will be found. After all, most of the egg-layers will produce fish a fair image of themselves and it is only in the treatment of the growing youngsters that the possibility of getting a winner will arise.

Provided that good well-bred parents are used for spawning, then among a brood of fry it is probable that if a bunch of youngsters are sorted out and well treated several of them should be fit for show. It is not always wise to pick out the largest fish in the brood; the medium-sized ones often turn out the best and it is possible for some of the large fish to become coarse and not so well coloured. When the group of prospective exhibition fish has been chosen they should have a good-sized tank to themselves; a 24 in. by 12 in. by 12 in. allows plenty of swimming space. It must be understood that in producing show specimens it is not only necessary to feed the fish well, they must have plenty of room if they are to be expected to develop into handsome and healthy fish.

The temperature of the water for these fish need not remain at a steady level of 75° F. If it can be arranged for the temperature to drop at least five degrees at night it will be found that the fish will be unharmed, and the fact that the water temperature does vary slightly will ensure that they are kept sturdy and so will not suffer as much if a

sudden breakdown in the heating occurs as they would if they had been kept always at the same temperature. Great care must be taken to see that the water in the special tank is always in good condition and well oxygenated. A good supply of growing water plants should be in the tank, and aeration should not be necessary here as the tank is not overcrowded.

Over-feeding with dried foods is the main cause of foul water and so it is important that only as much is given at a time as can be cleared up within a few minutes. The first feed of the day should be given as early as possible, and this can be artificial food. Some aquarists use two or three kinds of well-known foods and either mix them or feed them on following days. If foods are made up by individual aquarists such foods should contain Bemax or similar cereals, dried shrimp, minced rolled oats, and just before feeding to the fishes a drop or two of cod-liver oil can be added to the amount of food to be given. Do not add the oil to the main mixture but wait until feeding time and then add it to the food to be given. About the middle of the day the fishes can have a feed of live food. This may have to depend on what is available, but the good breeder knows how important live foods are and so should never be without at least one type.

It should be the aim of the aquarist to see that as varied a diet as possible is given. The feeding of youngsters should not follow a rigid line and it is not wise to feed entirely on live foods. Most fishes will take these in preference to dried or artificial foods but if they are fed exclusively on them there may come a time when live foods are not readily available and then if they will not take dried foods trouble may ensue. Even when plenty of live foods can be obtained it is still a good plan to feed at least once a day with a little dried or packet food. This should always be given before any live food is offered.

Daphnia, although readily taken by most fishes, are not always available and garden worms may not be easy to get in the winter or even in very hot weather. *Tubifex* are also difficult to get at times but the one live food which is available all the year round is white worms. Garden worms must be cut up or shredded before feeding to most young tropicals but few fishes about half grown cannot manage a white worm. The evening feed should be given before it gets dark, although in the winter if over-head lighting is available the feed can be given late evening as long as the lights are left on long enough for the fishes to clear up all the food. The amounts of food at each feed must be regulated to ensure that none is left from one feed to the next. It will be found that as long as the water is well oxygenated and sufficient food is given at fairly frequent intervals the exhibition fish will grow apace, and it should not then be difficult to find a few of them worth showing.

A watch should be kept on the fish so that if one appears to develop a fault it can be removed. There may be no need to add another fish from the main brood if this happens, as it is not necessary to have more than, say, half a dozen left after the final sortings have been made, and it will be noticed that the fish left in the tank will grow on better when they are fewer in number. All that is required for a show fish is that it must be as large as possible, and so fishes should not be shown until they are fully grown.

Condition is the next important point; some may put colour first, but colour can only come with condition. If a fish is in the pink of condition its colours will be at their brightest and the fish will show off to advantage. A fish in bad condition cannot show off either its fins or colours and so the necessity of always keeping the exhibition fish fit is apparent.

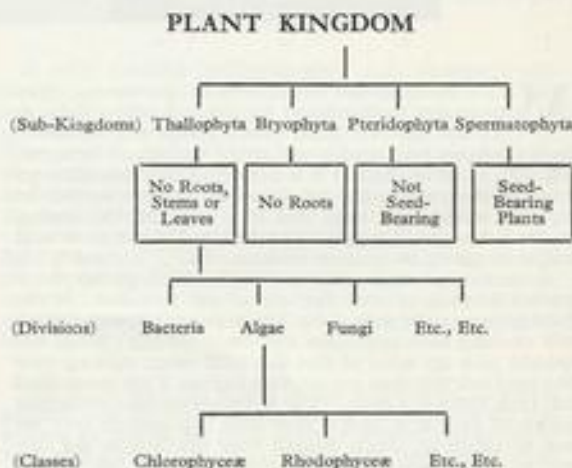
The aquarist who breeds a number of fish and expects to win with at least one of them has little chance in good strong competition against fishes that have been specially bred and reared as described.

Algae

by IVOR W. BRASSINGTON

PROBABLY very few aquarists realise what a tremendous variety is contained in the botanical division Algae, and this is rather surprising considering that we are constantly concerned with some of its varieties in our tanks and ponds. A knowledge of its place in the botanical scheme and an idea of its organisation, helps towards a better understanding of the types which affect us as aquarists.

The plant kingdom is divided into four sub-kingdoms (see the family tree). The Thallophyta, which contains the lowest forms of plant life, is split into several divisions, of which Algae is one. Classification in the division itself has undergone considerable changes in the past few years. Until the beginning of the century there were only four classes. As interest in Algae began to grow and investigation proceeded, some of these classes were rearranged and sub-divided, and whereas in 1904 *A Treatise on the British Freshwater Algae*, by G. S. West, describes six classes, by 1935 eleven classes are mentioned by F. E. Fritsch in *Structure and Reproduction of the Algae* (vol. 1).



This is perhaps unfortunate from the aquarists's point of view, as the early classification was based mainly on colour pigment, which made it easy for beginners to remember and identify the classes, and although a little bit out of date, I think it is still a most convenient method, and certainly a good starting point for anyone who wishes to learn more of the subject. The arrangement, then, was as follows:

Class 1. Rhodophyceae. As the name suggests, these are the red algae. Their colour is due to a red pigment which masks the green chlorophyll. They are among the highest forms of algae, being multicellular, and in fact, are mostly seaweeds, which means that they are of no interest to freshwater aquarists.

Class 2. Phaeophyceae. These are the brown algae

which, again, are mainly marine. Some of these are very large and include the well-known bladderwracks and Sargasso weed.

Class 3. Cyanophyceae. Blue-green algae has representatives which are a little more familiar to aquarists. Apart from appearing on or close to the lighting shades of aquaria, it also occurs in shallow water, moist earth or even on the bark of trees. Some genera also live in symbiosis with higher forms of plant life.

Class 4. Chlorophyceae. The green algae have both marine and freshwater forms and occur everywhere. There were nine or ten natural orders, around 40 or 50 families and sub-families, and hundreds of genera. Several members of this class are well known to fish lovers, including not only the welcome type so loved by black mollies, but also the less-welcome "blanket weed."

It will be seen from this that the class which mainly concerns the aquarist is that known as Chlorophyceae. Although I mentioned earlier that a great many changes have taken place in the above classification, they have affected this class much less than the others, so that most of the orders and genera which appear green (i.e., do not contain a masking pigment) still belong to this class, and the green colour continues to be a good guide to identification, though the other colours do not.

Structure and Reproduction

Most Chlorophyceae are normally motionless, only adopting motility during the period of reproduction, which may be either asexual or sexual. A typical example is the genus *Chlamydomonas*, in which each cell divides into a number of smaller parts, each part having a share of the nucleus. These are called zoospores and are pear-shaped cells which, in turn, become parents and the process is repeated.

In the second method of reproduction (sexual) the parent cell splits into a larger number of zoospores, which come together in pairs (when they are known as gametes), sink to the bottom and unite to form an oöspore, which is a resting spore, capable of withstanding drought conditions and changes in temperature.

This is interesting to the aquarist, particularly if he is anxious to get rid of certain types, as for instance, blanket weed is capable of this kind of reproduction. Very often sexual reproduction takes place as a result of the onset of unfavourable growing conditions, but this is not always so.



"I've finally solved my algae problem!"

(From *The Aquarium Journal*, U.S.A.)

In some cases the method of reproduction alternates from one generation to another, so that resting spores may be present all the time, which means that emptying, drying and refilling a tank may not get rid of an objectionable algae.

In addition to the single-celled and filamentous types, the unicellular algae may very often be found adhering together in clusters, to form a globular colony consisting of hundreds of cells, joined by strands of protoplasm round a central mass of jelly (genus *Volvox*, etc.).

These colonies are very often large enough to be seen with the naked eye; and with a low-power microscope, samples from aquaria and local ponds will present a truly amazing diversity of forms for your inspection and enjoyment.

Tuning in to the Eels

THE Zoological Society of London have just installed in their Aquarium an apparatus which can pick up the direction-finding pulses given out by the two electric eels exhibited there.

These animals belong to a family of South American fishes called gymnotids, and to enable them to find their way about in the bad visibility of the muddy rivers that they inhabit they have evolved special organs in the tail which are able to generate electric pulses up to about 10 volts and at rates varying from one to about 50 pulses a second.

The pulses are emitted only when the eel is moving, and although there is still much to be learnt about the subject, it is obvious that the organ operates in a manner somewhat similar to radar, so that the fish can detect obstacles or other fish in the surrounding water. Unlike the other gymnotids, the electric eel has in addition a much larger electric organ, which is capable of producing a charge of about 200 volts in the water and is discharged if the fish is frightened or when it wishes to stun its prey. Staff moving these animals do so

with great care, for a full "shock" can throw a man off his feet.

In the Zoo's Aquarium, two electrodes in the tank pick up the pulses, which are then converted into audible clicks and relayed to the public hall by a small speaker, so that now the electric eels can be heard as well as seen.—*The Times*.

Market News

MEMBERS of aquarists' societies will be interested to know that if they win the prize of ten pounds offered by Exotic Flakes for a successful slogan or rhyme about this Danish fish food, a further five pounds will be paid into the winner's club funds. This announcement is made by Kenneth G. Hayes Ltd., the U.K. importers for Exotictrade, Copenhagen. The competition is open to all the general public. Each entry has to be accompanied by an empty Exotic Flakes tin. Entries should not be sent to Denmark but direct to Kenneth G. Hayes Ltd., Brassey House, New Zealand Avenue, Walton-on-Thames, Surrey. Competitors are asked to send the name of their usual dealer, too, who may also win a prize.

Microscopy for the Aquarist—27 by C. E. C. COLE

NO single operation in microscopy is more important than the correct use of illumination. The difference between what is seen by an indifferent operator and that which is observed by one who takes a little trouble to arrange things as carefully as he knows how is quite surprising, particularly to the indifferent operator. This is increasingly apparent as we pass the dividing line between the use of very low and medium powers to that of high and very high powers.

The majority of amateur microscopists possess no more apparatus than that already described in this series, which is sufficient for all the work they are likely to undertake, provided that they master the simple technique of correct illumination. This is not at all difficult to do; a little patience, a little concentration, an understanding of the peculiar effects of wrong manipulation and the way to deal with them if they arise, all these can be acquired in a surprisingly short time. As far as I am able I will draw upon my own experiences during a long period of learning the hard way.

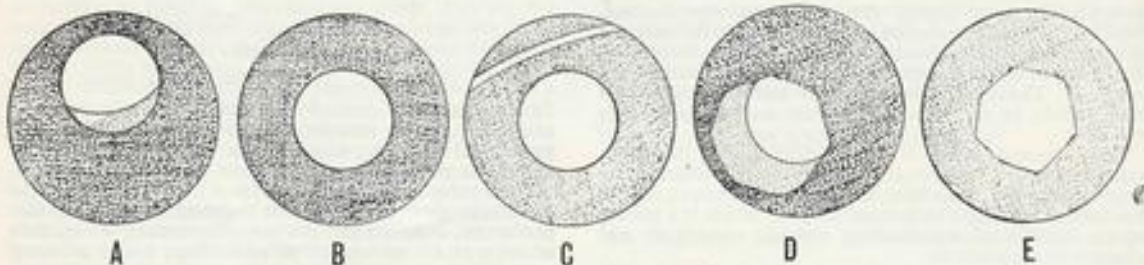
Most difficulties arise because of incorrect alignment of the various items comprising the lighting train, either with each other or with the objective. It would be wise to get out your microscope and check each paragraph of this

article as you read it. This procedure will enable you to see for yourselves exactly what I am talking about.

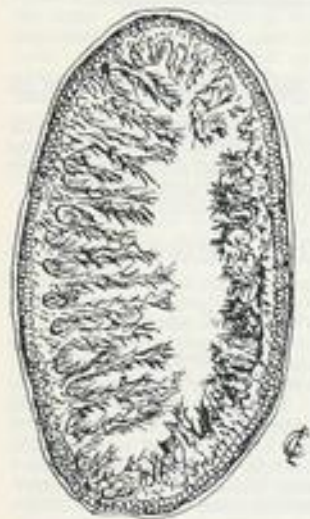
Screw into the nosepiece a 1 in. objective and a $\frac{1}{2}$ in. or $\frac{3}{4}$ in. objective. Swivel the 1 in. into the "ready" position, switch on the lamp and place this about eight or nine inches in front of the stage. Set the microscope to a comfortable viewing angle, and direct the beam of light from the front of the lamp housing towards the sub-stage mirror. The sum of the distance between the lamp and the mirror, and the mirror and the back lens of the condenser (this should be in place), should be in the region of ten inches. The lamp diaphragm should be half-closed.

Look down the microscope tube and tilt the mirror one way or another until a gleam of light appears in the field of view. Move the mirror until this gleam becomes a bright reproduction of the lamp opening in the centre of the field. Focus this opening. (The condenser upper lens surface should be level with the microscope stage during this operation.)

How does it look? It should be a reproduction of the half-closed iris diaphragm of the lamp housing, with the lamp surface evenly and brilliantly depicted through the opening. More often than not, it isn't. The opening is there plainly enough, but the lamp looks like a half moon, or



Appearance of the light field under various circumstances: A, lamp is not in alignment with mirror; B, lamp correctly aligned with mirror; C, edge of sub-stage mirror is visible; D, condenser is not properly centred; E, condenser correctly centred



A single spiracle of the water beetle *Dytiscus marginalis* seen under a $\frac{1}{4}$ in. objective and $\times 8$ eyepiece

even less, whereas the rest of the opening is grey. This is fault number one. The lamp isn't correctly aligned with the mirror. We have to get rid of that grey area!

If this appears in the lower half of the opening tilt the lamp housing down, watching all the time through the eyepiece. The lamp opening will fill with light, but moves away from the centre of the field of view. Bring it back by tilting the mirror away from the microscope. Open the iris to the fullest extent. It may well be that now a grey area reappears. Repeat the adjustment of lamp housing and mirror until it appears full circle in the centre of the field.

It may well be that some of you are using lamps which have the manufacturer's name and the wattage of the lamp printed on the top, and yet this is the very part of the lamp which we are using as our light source. It is better to use an opal lamp, which does not suffer from this disadvantage. When we focus the light source in the same plane as the object we examine, the ideal we shall be aiming at, the letters interfere with clarity of vision and may become rather obtrusive.

At the same time, the letters are useful inasmuch as they give us reliable indication when we have really focussed the light source correctly, for an opal surface is usually free from excessive graininess. A tiny spot of ink will serve the same purpose if placed on the exact centre of the top of the lamp.

Sometimes the field of view will appear as in diagram C,

and not as in B. Although the lamp shows as a perfect moon in the centre of the field there appears an arc of light above or below it traversing it completely. Movement of the mirror causes the arc to move a little as well, but it cannot be moved out of the field entirely.

This arc is actually the rim of the sub-stage mirror, and indicates that the mirror is not in the correct position in relation to the condenser. The only remedy here is the adjustment of the centring screws until the arc of light disappears. Centring the condenser (aligning it so that the light is transmitted correctly into the objective) is of great importance.

We have so far been concerned with focussing the diaphragm opening of the lamp housing, its image having been reflected through the condenser from the mirror. We rack up to focus the image of the diaphragm of the condenser, which should be closed almost to a pinhole. Manipulate the centring screws to bring the opening into the

centre of the field of view. Note that the sub-stage mirror can be rotated without affecting the position of the condenser opening. The mirror should be so adjusted that the light source fills the opening in the condenser diaphragm. It should now be possible to rack down to focus the light source through the opening. The mirror and the condenser are now in perfect alignment with the object glass with which we have been experimenting.

Note, too, that the opening of the condenser seems to increase in size when racked down or up above the point where it is in focus. The image of the light source becomes fainter and larger, still filling the opening, when the condenser is racked down, but plainer and smaller when the condenser is racked up nearer to the objective.

The lamp opening should be sharply in focus when the upper surface of the top lens of the condenser is level with the stage.

Next month we will continue from here.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have a tank 30 in. by 12 in. by 12 in. in which the water is clear but the leaves of the plants are covered with a brown dust-like substance. What is this and will it kill the plants?

The material may be a form of brown algae or it is possible that it is arising from the droppings of the fishes. These droppings will disintegrate in the water, and as the fishes swim about the particles will be swept around and then settle on the leaves. If this is so, then if the leaves are knocked slightly the dust will fall from them. When giving the weekly servicing it is a good idea to run the siphon along the leaves, as this will remove much of the detritus. The deposit may not do much harm to the plants but those with broad leaves may suffer owing to the choking of the pores. Remove as much mulm as possible from the tank when servicing and the trouble should soon clear up.

I believe one of my fishes has gill flukes; it keeps flicking its sides on the leaves of the plants. I tried giving it a bath in half a teaspoonful of Dettol to a gallon of water but it turned over in five minutes and I had to remove it. Do I have to repeat the process?

In the first place the fish may not have been suffering from flukes at all. Just because a fish occasionally flicks against the leaves of plants does not mean that flukes are present. Some fishes do this as a regular habit. If flukes are present there are usually other signs. Some fishes soon go off colour, the dorsal fin droops and the fish goes off its food. It will swim slowly at the surface with the mouth moving fairly quickly, showing rapid breathing. The body is usually at an angle of about 45 degrees to the surface. Later the fish starts to become thin in the body and faint blood streaks or patches may appear on it. If flukes are in a tank for long it is almost certain that all the fishes will become infected. With a fairly strong magnifying glass the flukes may be seen on a fish. They appear as tiny transparent worm-like creatures which can hold on to the fish with either end and they can progress by a looper-caterpillar-like action on the body of the fish.

The fact that the fish turned over is nothing to worry about; this is the usual sign that the immersion has been long enough. Once the fish is removed to fresh water it will recover. Various strengths of Dettol can be used but the effect on different fishes is not always the same. Not only are fishes of differing sizes affected in different ways but certain species are more quickly in trouble than others. That is why I always advise the aquarist, when giving the treatment, either to keep the fish in a net all the time or else to watch closely and remove it from the solution as soon as it turns over. If you had used a solution of one-quarter of a teaspoonful of Dettol to a gallon of water the fish would not

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of fish-keeping being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

have turned over for about 15 minutes. A much stronger solution can be used, when the fish will only stand perhaps about 15 seconds. I consider that the longer period in a weaker solution is safer to use.

Great care must always be taken when giving fishes baths in any other solutions. The maker's instructions should always be carried out most carefully. In certain solutions the fish does not turn over when in trouble but may die soon after removal. The fact that the fish shows no ill-effects when in such solutions must not lead you to keep it in longer than the prescribed period.

I service my tank once a week, taking out a bucketful of water each time, but I still get blanket weed. Why is this?

The fact that you service your tank each week does not mean that you may never get blanket weed. This is a plant which grows under many conditions. It can be removed from the tank by twisting a broken stick among it or by using a special tool on sale at dealers shops. If you remove as much as possible each week it should soon clear up. It is encouraged to grow in a tank where the other water plants are not growing too well. Also, impure conditions caused by overfeeding with dried foods can encourage it.

I have made some artificial rockwork for my tank and used coloured cement. After some of the rockwork was put in a tank the fish did not look too well. Was this because of the colouring?

I do not know what kind of pigment was used in the cement but I am inclined to think that the trouble arose because your rockwork was not seasoned long enough before you used it. It should have been well soaked and then scrubbed two or three times before use. This is to remove any free lime which may have been present. Certain kinds of fishes are soon in trouble if too much lime is introduced into the water and newly constructed concrete can produce a lot of lime. You have to remember that in a tank there is not a great deal of water and so the concentration of lime is likely to be very strong and quite dangerous to fish. If uncoloured cement is used it is surprising how soon this loses its brightness and becomes softer in appearance when in the

I have some goldfish in my pond which have contracted velvet, fungus or tail rot. I have removed them from the pond into a greenhouse where they are in a galvanised bath. How can I cure them and shall I return them to the pond after treatment?

Your pond must have been very foul for the fish to have developed fungus so early in the year. It should be cleaned out thoroughly and disinfected. You should be able to tell the difference between velvet disease, fungus and fin-rot. The first appears as a whitish film over the fish, the fungus appears as patches of cotton-wool-like substance, and looks fluffy on the fish; finrot causes the fins to become frayed at the ends and they often show blood streaks near the affected parts. The salt treatment usually effects a cure if correctly carried out. Many aquarists are too haphazard with this treatment and then say that they have been unable to cure their fish. Provided a fish is caught in time, that is before the gills are affected, the salt cure should be safe. Never use a galvanised bath or container for salt treatment as this can be dangerous.

Place the fish in a gallon of water. Add a heaped tablespoonful of salt to the water and allow it to dissolve gradually. Another half-spoonful can be added the next day. Keep the tank in subdued light and do not feed the fish whilst it is under treatment. The water may turn foul after four days, and if it smells it must be changed for a fresh solution of the same strength. After four days or so the trouble should clear up. Once the disease appears to have been halted the water can gradually be returned to normal either by making a fresh weaker solution, or if the water seems sweet fresh water can be added. Once the disease has cleared it may take some time before the fish is back to normal. A fin which has been eaten away can take weeks to grow again, especially during the cold weather.

Once the disease has cleared try to feed the fish with live foods as often as they will take it. Garden worms, *Daphnia* and white worms are very good for fish in a state of recuperation, but go easy with dried foods unless the fish are in a tank which can be kept at about 55°-60° F. The warmer the water the more food can be consumed and the quicker will the damage be repaired. It must be remembered that sufficient oxygen must be present in the water and so an aerator may be necessary for a time.

I do not think it a good plan to return the treated fish to the pond too soon. They will be rather weak and would be prone to fresh attacks. On the other hand the galvanised bath is not a good receptacle for fish unless it has been treated in some way. The galvanising, if fresh, can be harmful to fish. If the bath is an old one it may have become coated over with lime deposits and so have lost most of its danger. It is always a difficult task to get fish safely through the winter when they have been attacked by fungus in the late autumn or early winter.

One of my tanks containing various fishes is infested with gill flukes. I have tried methylene blue but it does not seem to make any difference. I have no spare tanks, so what shall I do?

It is very difficult to treat your fishes if you have only one tank. Why not use a washing-up bowl for the purpose? This would hold the fishes whilst they are under treatment. Some writers recommend methylene blue as a killer for flukes but it is not an easy substance to use. The quantity is very small and can soon be exceeded by the careless aquarist. The normal dose is two drops of a 95 per cent. solution to a gallon of water. The drops should never be allowed to drip straight from the bottle. Great care must be taken and it is better to drop the blue into a small container with a little water and mix this up first. I have always found the Dettol bath to be a better cure than methylene blue but it does depend on what type of flukes you have. The usual ones are known as *Gyrodactylus* and

potassium permanganate. If you are not sure which kind are on the fishes, it may be necessary to give a bath in the two solutions, making certain that two days elapse between the treatments.

One of the chief differences between *Gyrodactylus* and *Dactylogyrus* is that the former bear their young alive, and the latter lay eggs from which the larvae hatch and are free swimming for a time before attaching themselves to a host. It is probable that the methylene blue in the tank water would be more effective with *Dactylogyrus* by killing the newly hatched larvae. On the contrary the young of *Gyrodactylus* may not be so affected. Of course, it is quite impossible to treat fishes in a tank with Dettol as they must be in it for only a short space of time.

Can you please advise me about setting up a coldwater aquarium, 18 in. by 10 in. by 10 in.? I have kept goldfish successfully and would now like to try some of the fancy varieties. I would like to know how many and which types I can keep.

In the first place I must warn you that the tank is not very large for a mixed collection of fancy goldfish. It will hold only seven and a half inches of fish with safety, and this is the limit, allowing no space for subsequent growth. You could therefore have only three fish two and a half inches long or four fish barely two inches long. Even with an aerator the fish would not thrive, although they may survive if you exceed the limits. I suggest that you plant the tank fairly well with *Vallisneria spiralis* and *Hygrophila polysperma* and have a two inch veiltail, a two inch fantail and a similar-sized moor. This will be quite enough for your tank and you should be able to keep these healthy for some time before they grow too large for their container. With the number of fish stated there should be no need for an aerator.

This year I lost six golden orfe from my pond; they disappeared for a couple of weeks then came up to the top, turned on their sides and died. Now I have a couple of shubunkins behaving strangely. They are quite fat and bloated, with their scales standing out. I believe this is called dropsy but do not know a cure; can you help?

It appears to me that your pond must be in a foul condition. Golden orfe will only die the way you have described if they are unable to obtain sufficient oxygen from the water. A pond absorbs oxygen from the atmosphere, but if there is something bad or decaying in the water foul gases will be formed which are poisonous to the fishes. It is well known that orfe are about the first kinds to feel the lack of oxygen in a pond and would die far more quickly than shubunkins. When you found the orfe on their sides you should have put them into fresh water, when they would have recovered in a short space of time. I have known orfe on their sides, apparently dead, which have been swimming about as if nothing had happened five minutes after water had been played on to them from a hose.

The trouble with the shubunkins does appear to be dropsy and when fishes are so badly affected there is little hope of a cure. I think that the fact that the water was foul had a lot to do with the fish being out of condition. Once this happens their resistance to any disease is lowered and they are then likely to contract any disease which might be around. All that can be done is to remove the diseased fish to fresh quarters where the water is well charged with oxygen and has some salt added; as little as a teaspoonful to each two gallons is a great help.

I have made a pond in my garden with a bog garden on two sides. I have placed six inches of peat in the bog garden and intend to have two inches of water over it. Will plants grow well in this?

I do not think that it was a good idea to put six inches of peat in the bog garden. It would have been better for the plants if you had used a good loam instead. Peat by itself

is not nourishing and it should have had loam, sand and fertilisers with it. Where a vigorous growth of plants is required it is possible to use the John Innes potting soil, as sold by nurserymen. For bog gardens which are not very large it is a good plan to use old turves, placed grass down. The turves would give a fairly lasting food for the plants. As a rule water plants thrive very well, as they never have to suffer from drought, and it is the restriction of their growth which presents problems rather than the lack of growth.

I wish to make a small pond in the garden purely for ornamental purposes with a fountain in the centre. Is it possible to dispense with plant and fish life and at the same time prevent the water from becoming foul?

It is possible to run a pond as you suggest without plants and fish, and if you use all copper pipes for the fountain and its feed it is probable that no algae would form in the water to turn it green. Also few pests would be likely to live in it. The obvious trouble would be that mosquitoes would breed in the pond unless you had some fishes to keep them



BOOK

R E V I E W

Old Fourlegs by Professor J. L. B. Smith. 260 pages. Illustrated. Longmans, Green & Co. 21s.

OLD FOURLEGS is the story of the most sensational scientific discovery in natural history of this century.

It begins with the capture in 1938 of a weird fish near East London, a fish which turns out to be a coelacanth, thought to have been extinct for the last 50 million years. Professor Smith saw this fish and decided that it was a stray, and came to the conclusion that its real home was in East African waters. Thousands of leaflets in English, French and Portuguese were distributed in this area, showing a picture of a coelacanth and offering £100 reward for each of the first two to be captured. Fourteen years later the impossible happened and Professor Smith made his memorable flight in a military plane provided by the Prime Minister of South Africa. Very little went right in this venture; everything seemed to be against success, but in spite of this all turned out well in the end. This book is very thorough and has numerous photographs and sketches.

Very full details of this unusual fish are given which make a interesting reading. The skull is not a single unit but is in two parts. The gills are not soft but bony and hard and bear teeth instead of soft gill-rakers. The scales overlap to form an armour protection over the whole body three scales thick. The fins are curious. The pectorals and pelvis show obvious indications of being used as limbs, and the tail is different from that of any known fish of to-day. The tail of modern fishes comes from two fins, one upper, one lower, which eventually shrank away and left the real tail behind.

The skeleton of the coelacanth is hollow cartilage and its name means "hollow spine." As with most carnivorous fishes the intestine is short and is more like that of a shark than a bony fish. Of all fishes this seems to be the oiliest; for months after capture this oil continues to ooze from the body.

Professor Smith having shown the way, other countries

down. I cannot see what objection you have to a couple of goldfish, even if you did not want plants. One point you must consider is that if you do use copper pipes you might regret this at some later date when you change your mind and desire to keep fishes in the pond.

When making a concrete pond is it possible to make the concrete with sand and cement only, or is the addition of aggregate recommended?

It is always advisable to use aggregate in the concrete mix. The small stones add to the strength of the concrete. You could use three parts of aggregate, two of sand and one of cement. This would work out cheaper and is also likely to be much stronger. The stones should be well washed, and when the mixture is made it will be found that all the space between the stones is filled with the sand and cement, which makes a very strong finish. It should also be quite watertight. Leaks from concrete ponds are often caused by the use of dirty stones, sand with soft, earthy lumps in it, stale cement and insufficient mixing.

have fitted out scientific expeditions, with the result that about 20 of these fish have now been caught, almost all about five feet in length and rising to 150 lb. in weight. Aquarists will find this book fascinating reading indeed.

RAYMOND YATES.

Angel Fish. 24 pages. Illustrated. T. F. H. Publications, Inc., New York, U.S.A.

THIS is the latest of the small T. F. H. American publications which have proved so popular. With 15 photographs and drawings, it is a grand little booklet covering a great deal of useful information. Dr. Leonard Schultz writes on how to identify angels, Mr. W. L. Whitem of Canada, deals with range, habitat, tank and water requirements, sexing, breeding and feeding, and J. and F. Ludwig give chapter and verse on all-black angels. It seems these fish do best if provided with a rather deeper tank than is usually given, a mated pair needing a tank 30 in. by 20 in. by 20 in. For sexing it is suggested that the spines at the base of the dorsal are more jagged and irregular in the male, and also that the lower jaw of the male overlaps the upper, this state being reversed in the female. An excellent little booklet for all interested in this King of the Aquarium.

RAYMOND YATES.

Keeping the Dwarf Sea Horse by R. P. L. Straughan. 24 pages. Illustrated. All-Pets Books, Inc., Wisconsin, U.S.A. (U.K. Distributors: Bailey Bros. and Swinfen Ltd., 46, St. Giles High Street, London, W.C.2.) 4s.

ALL aquarists have a mental list of the fishes they one day hope to keep and the sea horse is usually well up on this record of hope. Mr. Straughan, in the short space of 24 pages and with the help of 12 photographs, makes us feel that keeping the sea horse is simplicity itself. Of the 40 odd species known he recommends the dwarf variety, which rarely exceeds two inches in length. At room temperature they can be kept in a large fishbowl of at least two gallons capacity; several sea horses can be kept in this if aeration is supplied. This latter is a "must." A good idea is to record (with a piece of sticking plaster) the surface level in the globe, for use as a guide when topping up with fresh water, which must reach this level.

Feeding is easy if arrangements are made for a continuous supply of brine-shrimp hatchlings to be available. A "loaded" male can present you with baby sea horses, from 30 to 70, but they must have freshly hatched shrimp as their mouths are very tiny and even day-old shrimp is too large for them. Dry food will never be eaten by any sea horse. Life span is short, about two years, and many of those purchased are already adult. Don't expect too much. Losses are mainly due to lack of food, bad water, low

pipe fish.

When you have read through this grand little booklet you will be converted to the sea-horse fancy, even if restricted to watching their queer antics in public aquaria, and you will be able to give chapter and verse to other viewers with a delightful air of authority.

RAYMOND YATES.

Pet Chameleons by Blanche Greenberg. 24 pages. Illustrated. All-Pets Books, Inc., Wisconsin, U.S.A. (U.K. Distributors: Bailey Bros. and Swinfen Ltd., 46, St. Giles High Street, London, W.C.2). 4s.

THIS fascinating little book is a mine of information on lizard lore. The title is a bit misleading, as the booklet deals with the American chameleon (*Anolis carolinensis*), but some data are given about the Old-World chameleon as well. The method of capture is said to be by a noose on the end of a long piece of grass, the lizard being unafraid of what is to it very familiar vegetation.

The American lizard changes colour as a result of emotional factors, the colour changes being shades of green and brown. Seven inches in length, it catches insects in its teeth, by darting up on them, and not with its tongue. Adhesive pads on fingers and toes allow it to hang on smooth vertical surfaces. Independently operated eyes give it a weird look, particularly as it has a habit of cocking its head on one side. It requires live, moving insects, etc. Worms are never eaten. Ripe banana or grape is accepted but insects, such as flies, plant lice, crickets, caterpillars, moths, and also meal worms, spiders and cockroaches, are essential. They are slow eaters, but gluttonous, and too many blow-flies prove fatal. Moisture is absorbed from dew or sprayed foliage.

Five years of life in captivity is not uncommon but their full life span is unknown. Swamp-like, humid conditions are needed in the vivarium, with plants or leaves available to sleep on. A temperature of 70-75° F. is sufficient. Some practical hints are detailed which are invaluable. Among others, one is advised to provide sunshine and shade, and warm, moist, vegetated housing. This book really does contain a mass of condensed but rich information.

RAYMOND YATES.

Handbook of Tropical Aquarium Fishes by Herbert R. Axelrod and Leonard P. Schultz. 717 pages. 600 photographs and line illustrations, including 180 in colour. McGraw-Hill Publishing Company Ltd., 95, Farringdon Street, London, E.C.4. 75s.

THIS American book is the result of co-operation between an unusual combination of authors—of an aquarist and a professional ichthyologist. They have set out to produce a comprehensive handbook accurate in both practical and scientific details, and this ambitious project has had a successful conclusion.

Over 400 species of fishes are named and described (with scale and fin-ray counts given), and their aquarium requirements and breeding details (where known) are noted. In addition there are sections about fishes in general, the aquarium and its management, fish diseases and about water plants. A glossary of meanings of terms has thoughtfully been included, and is a necessary feature since some of the section concerned with the structures of fishes is heavy going for the non-biologist.

A lot of space has been wasted in the pages dealing with fish species, since one species is presented on a page whether or not the text occupies the whole page area. The large areas of "white" which thereby result are commonplace in American publishing, but the British reader may look at the book's price and wonder. However, apart from this the printing and typography are pleasing.

Considerable pains have been taken with the nomen-

clature, and on the history of ichthyology are included. The authors have turned wholeheartedly towards the use of *Puntius* as a genus name in place of *Barbus*; this despite their admission that "these matters are far from being settled." Until ichthyologists are agreed about such things many aquarists will prefer to use the familiar (and not yet incorrect) *Barbus*.

The photographs and drawings in colour vary in quality and the former in particular are not the best examples of this type of work to be found. It is puzzling to read that for colour illustrations the artist "has freely drawn upon many illustrations in . . . *Exotic Aquarium Fishes*"; surely the artist would have been better employed with his colours in front of an aquarium containing live specimens?

ANTHONY EVANS.

Hygrophila polysperma

A FAIRLY recent plant introduction into this country is *Hygrophila polysperma*, but it is rapidly finding favour with many tropical fish keepers. The fact that it is an ideal plant for the coldwater tank appears to have been overlooked. This fact may be due to its listing under "tropical" instead of "coldwater" as well by the Federation of British Aquatic Societies in their list of recognised plants for furnished tanks. However, tests have proved that this plant is one of the very best for the cold tank. It has not been tried in an outdoor pond but for any cold tank in the house few plants can beat it for attractive appearance, hardiness and ease of control.

H. polysperma is a native of India, where it grows mostly in swampy ground and so, like many other of the water plants used in tanks, it is actually a bog plant. In appearance it resembles a pale-green-leaved *Ludwigia* with no purplish colourings under the leaves. It could be likened to a shorter and thicker-leaved type of starwort. The plant shoots fairly thickly from the base and sends up shoots with pairs of these leaves at regular intervals, about an inch apart when grown in cold water. The bright green of the leaves and stems make this plant an ideal one for the decorative tank and it is hoped that the F.B.A.S. will soon change their minds about this splendid plant and permit its use in coldwater furnished tank shows.

The plant is very easily propagated, as roots are often sent out from the leaf joints and then the top can be nipped off and the roots laid just under the compost. Like all the best water plants this one will soon grow to the top of the water under good conditions, but it is a very simple task to nip off the tops for making fresh plants, and so increasing the tendency for the plant to make fresh shoots from the base. If the plant is in a fairly long tank, say, 24 in. or more, it is possible to layer some of the shoots and so get a succession of plantlets all along the base of the tank. When a stem has grown to the top of the water it can be bent down and held in position by a stone, when roots will soon form and a new plant grow up.

H. polysperma does not appear to need very much in the way of a rich compost for good growth, but if it is being introduced into an established tank where there may be many roots entangled in the compost already it is better to root the plant well in a small container before placing it among the other plants. Once it gets established it is no trouble at all, and the occasional pruning to keep it compact is all that is needed. For use in the average tank it is suggested that the plant occupies an area somewhere near the middle of the tank from front to back and off centre. In front of a dark-coloured plant it will show up to advantage.

A. Boarder

Perch for the Garden Pond

by ALLAN J. YORKE

MUCH literature is devoted to the subject of ornamental fish, such as the goldfish, the orfe and the golden rudd, but little exists on the subject of our common native fishes and the possibilities of these as suitable occupants of the home pond.

But the roach, the perch and the tench will do quite well, you know, provided there are a few rocks and clumps of weeds to supply shelter, and to harbour the insect life upon which the fishes depend for nourishment. Most of our native fishes will live quite happily in such surroundings, and will, in some cases, breed quite happily too. I have singled out the perch for proving how interesting our native fishes are.

The perch is habitually a social creature, and when in natural surroundings, shoals of them can be observed lazily wending their way through the weeds in quiet waters, particularly where the fry of other fish, such as the gudgeon, abound, and upon whom they depend for food. I have observed quite large specimens stalking their prey, fins quivering in anticipation of a juicy snack. With a sudden flurry the perch would make his kill, scattering the gay ranks of the young fish, and then would shoot off into the depths, bearing away some luckless young roach or gudgeon. The swarms of fry, however, would quickly return, unperturbed by the depletion of their numbers.

Suitability for a Pond

You might say that such a fish would be unsuitable in a pond, especially where there are others of a gentler nature. I would be inclined to agree had I not proved for myself the change in behaviour of the well-fed perch in the home pond. I introduced a few fish of this species into my pond a few years ago, and was surprised to find that they immediately became very docile towards other members of the pond, but very aggressive towards each other. Each fish sought for himself a well-weeded nook and remained there, moving only when he must needs do so, in search of food or to battle with a trespasser on the territory he had set up around his chosen abode.

Strangely enough, fishes of other species, even the minnows which populated the pool at that time, seemed to enjoy rights of way in all territories and were never challenged. The trouble only started when two perch met, and both fish would then bristle visibly, spines fully erected, and would set to in a great combat. Each would strive to tear the other's belly with a wickedly spiked dorsal fin, but miraculously the contestants would both emerge from battle unscathed.

One of the perch, I remember, encouraged a lodger, a young gudgeon who took up residence with him beneath a particularly large rock. I have to report that the most cordial of relationships existed between these two fishes, although there were frequent quarrels when a large worm was seized upon by the pair, one at each end. In those instances, a major tussle was averted when the worm separated, so solving the argument.



Photo: Laurence E. Perkins
A brilliantly coloured member of the river fishes of this country, the perch grows to over one foot in length and can attain weights of three to ten pounds. Note the two dorsal fins.

During the breeding season, the perch, at all times a brilliantly coloured fish, becomes more so. The black bars which traverse the body become extremely vivid against an olive-green background, and the fins and eyes are a vivid red.

I remember that the most violent of battles took place between the males, the vanquished usually retiring while the conqueror commenced to woo the waiting female, who had been hovering nearby watching the combat with an impartial eye. Courtship was conducted in an expeditious manner, the male, no doubt, spurred on by the knowledge that the vanquished would soon recover, and would return to challenge his right to woo the fair lady.

Scarf-like Egg Strips

The eggs, laid amongst the reeds in ribbons somewhat resembling a scarf, are left unattended and exposed to the ravages of marauding fishes, such as the gudgeon, who consider them a delicacy. Enough eggs remain, however, to ensure the survival of the species.

I have knowledge of only two attacks on other fishes by perch, and these were against sticklebacks, who being adequately armoured against such events, rendered them both unsuccessful. The perch in both instances retired in defeat. No doubt some of those readers who have read this article will wish to try perch in their ponds this year. I can only recommend that they do so.

Fish of six to eight inches (the ideal size for the average pond) can be obtained at small cost from the many fish hatcheries that abound the countryside.

Why not also try roach and tench, two of the many other interesting fishes to be obtained from the same sources. I am sure those of you who decide to forsake the more ornamental types for the common native fishes will not be disappointed in their choice.

our readers

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.

Sex Changes in Fishes

MAY I thank Dr. Myron Gordon for so prompt and interesting a reply (*The Aquarist*, October, 1956) to my comments.

I will most certainly have my swordtail photographed. It is doubtful whether any "live" photograph, taken under actual aquarium conditions, will be sufficiently detailed to show the exact structure of the gonopodium, but I assure you, and Dr. Gordon, that so far as my knowledge of the anatomy of such organs goes, it is in all visible respects normal and completely functional. The whole organ is frequently exercised by the fish, as is common in livebearers, by swinging it into a forwardly directed position, and when thus directed, it lies almost parallel with the ventral surface.

The distal tip is, so far as my reasonably acute vision enables me to see, differentiated in exactly the same way as a known functional male, and I think that I cannot do better than repeat my original observation that this fish is so obviously a male that nobody would dream of questioning its sex.

Regarding Dr. Gordon's remarks about testicular tissues and male hormones, I think it is fairly conclusively proved that testicular tissue alone cannot produce full masculinisation; otherwise, castration before puberty would ensure repression of all male characteristics, and it is known that this does not occur. I would point out, however, that it may be possible for testicular tissue to be present in parts of the body remote from the normal site, and as one does not know where to look for this, one is extremely unlikely to come across it, except by accident.

My only reason for bringing this up is that way back in my student days, I accidentally found a group of cells, microscopically identical with certain testicular tissues, in the abdominal fat of a young castrated rabbit, and these were so far removed from the normal site that they could not have had any original connection with the testes. I have never found an acceptable explanation, but it is at least possible that they were functional and exercised some slight effect on the metabolism and growth of the animal. The point is that they could never have been found, except by accident, and any hormone action they had may have been wrongly ascribed to other glands.

The fish which I referred to, and which I intend to photograph, is now quite elderly, and I shall be delighted to preserve it and pass it to any competent authority, when it dies. Would Dr. Gordon care to undertake a dissection, in due course? I have not, now, the necessary facilities.

L. WARBURTON, Stockport, Cheshire.



Address letters to The Editor, *The Aquarist*,
The Butts, Half Acre, Brentford, Middlesex

Suggestions for Suppliers

I AM prompted to write this because I frequently see advertised in American aquarists' magazines stainless-steel tanks, though they seem to be non-existent on the British market. I know this metal is quite expensive but surely if a manufacturer put stainless-steel tanks on the market there would be a demand for them, in spite of the expense.

I am certain there must be many aquarists like myself who do not mind paying extra for a good quality article. This would be money well spent, especially for a show tank in a living room where looks are most important. In the long run stainless steel is wise economy in spite of the extra initial expense, because how ever careful a person is an angle-iron frame invariably rusts at the top and paint chips off in various places. Anyhow, if there is a demand for them in America, why not in Britain, but where is the supply?

K. SMITH,
Bradford, Yorks.

Tropical Marine Species

I HAVE been keeping—successfully—several British rock-pool creatures during the past few months, and my thoughts have been turning towards the more colourful tropical marine fishes. I know that attempts have been made to keep these here in England, but I do not think that a great deal of success has been attained. When I first contemplated setting tanks over to the sea-water creatures I was often told that I should have little success, and from my experiences to date I strongly disagree with such sentiments. Therefore I am going to assume that in some way the problem of maintaining tropical marine specimens has not so far been approached properly. I should like the co-operation of my more knowledgeable friends, who may be able to agree with or disprove some of the following points:

Coastal waters of Northern Europe show considerable temperature variations, not only seasonal alterations but also daily or even hourly fluctuations. Such variations have been noted at considerable depths as well as in purely surface waters. In tropical waters the surface variation, even between winter and summer, is relatively slight (in the Philippines not more than approximately 1.8° F.). In northern waters such a slight variation could only occur at great depths.

Tropical marine creatures are more affected by wide variations of temperature than creatures of temperate and arctic waters. A few degrees variation causes a marked

alteration in tropical species, whereas the inhabitants of other zones show little effects in a considerable range above or below normal. Tropical marine animals generally appear to live within a range of approximately 9° F., and this range usually lies between 59° and 68° F. Death occurs at about 90° F.

I should be glad to hear considerations in connection with the above notes.

H. J. VOSPER,
Brockley, London, S.E.4.

Too Much Interference?

I THINK it would be true to say that we often rely too much on chemical aids in treating fish diseases. Perhaps we would often do more good to correct the simpler things first. A few weeks ago one of my angel fish developed angel-fish disease, showing the characteristic "sham" feeding (food was ingested but immediately rejected), followed by refusal to eat, and wasting. I removed the sediment in the tank and within four hours the fish was eager to eat although, curiously enough, it preferred dry food to *Tubifex*—quite the reverse of its former tastes! A few other facts may be of interest—there was no overcrowding since it was the only fish in a 24 in. by 15 in. by 12 in. tank well planted with *Cryptocoryne*. There was no change of water (this being ensured by the use of an air rejector), which remained at pH 7.4.

I realise that it would be unsound to assume, on the basis of one experiment, that the reduction of sediment in the tank was necessarily the cause of the "cure," and that such an experiment would fall far short of Dr. Ghadially's ideal. But such a disease would be difficult to experiment on objectively since it only occurs infrequently (usually when we are least prepared to experiment) and aquarists are not going to be bothered to perform a tedious series of experiments when they have far more interesting things to do.

Surely our only method lies in accumulating similar experiences. If such a disease is frequently "cured" by siphoning off the sediment then surely there would be some grounds for assuming some connection between excess of sediment and angel-fish disease?

D. NOBLE,
London, S.W.19.

Catching Earthworms

I WAS very interested in Mr. Euston's method of catching earthworms (*The Aquarist*, November, 1956). I have never tried permanganate but have noticed that lime water will bring worms to the surface. However, I have tried keeping worms in garden soil with very little success. A small quantity of soil in a tin or jar is liable to dry out very quickly or become waterlogged if water is added. Another difficulty is that of extracting the worms from the soil.

I have found that a mixture of one volume of sharp sand to one of peat moss is very convenient. The moss holds the moisture and the sand provides drainage. Also the mixture is much cleaner to handle.

In the same issue Raymond Yates mentions the possibility of a heater attracting and killing fry at night. Surely here a flexible heater buried in the gravel would be the answer?

I changed to a buried heater and found that the *Corydoras julii* present in my community tank showed itself much more. Previously it had hidden behind the glass heater or even remained perched on top, and had completely avoided the low cold area at the front of the tank. After installing the flexible heater the cold spots were removed and the *Corydoras* became much more active, and also more efficient as scavengers. Altogether there has been no evidence of the bottom heat hurting the *Corydoras*.

B. G. LEWIS,
Catterick, Yorks.

Pelmatochromis kribensis

MR. YORKE in his article (*The Aquarist*, December, 1956) on *Pelmatochromis kribensis* makes the following statement: The eggs hatch in two or three days . . . the young fish dive down into the mulm and hide away . . . for another seven days. All this period they need Infusoria in quantity but often don't get it, hence the high mortality rate.

This is so obviously at odds with the truth that I was surprised to find it printed in your magazine.

In common with most fishes *P. kribensis* fry live entirely on the contents of the yolk sac for a period of some days after hatching, and during this time it is quite impossible for them to take any other kind of food. A glance at any newly hatched cichlid fry will confirm this. Infusoria introduced into the tank at this time can obviously serve no purpose and indeed might very well account for the high losses of which Mr. Yorke speaks.

I find the best method of raising this type of fry is in a small sterile all-glass container with methylene blue and gentle aeration, as is commonly used for the rearing of angel fish. The fry are fed only when they become free swimming, and with *P. kribensis* this happens seven days after spawning at 80° F. The fry are able to take newly hatched brine shrimps as a first food. This method has an added advantage that one can observe the growth and changes in the fry as they happen.

MAURICE A. RACKHAM,
Vice Chairman, Lowestoft Aquarist Society.

"Member of the Year"

FOR some years past this society has held an annual table-show competition, in which points are gained for entering the various classes, etc., with extra points for obtaining a high position. The Society Cup is held by the member gaining most points. Incidentally, various other shields, plaques, etc., are held by those winning special classes (such as cichlids, labyrinths, home furnished-tank competition).

Mr. W. Allen, of this society, presented the club with another cup in 1956 "for use as they saw fit," and this will go to the member making the most outstanding contribution to the hobby. However, in deciding what use to make of the new cup the idea of a "Member of the Year" competition was greatly approved, and the secretary was instructed to gain information from such groups as already held such competitions.

Upon examination of two or three schemes, it is discovered that some quite highly thought-of competitions are, in fact, only our own "cup competition," for they place the accent very strongly on various competitive "showing" schemes, with a few points added for attendance, speaking at a meeting, etc. Surely this is the wrong approach to a "Member of the Year"?

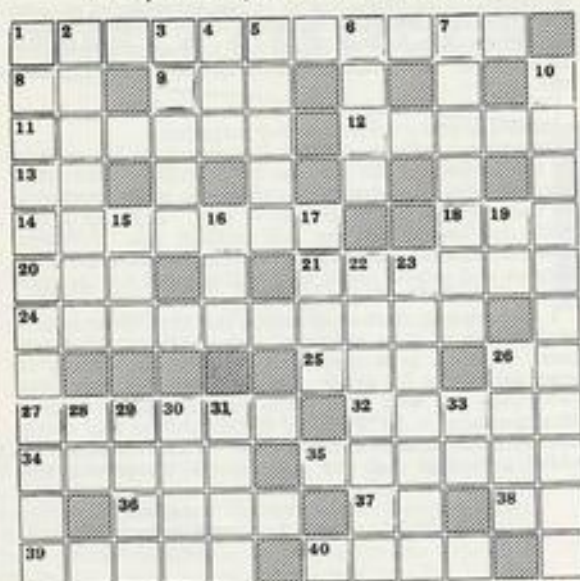
Table shows, etc., have a part, an important part, in society life. Yet in the aforesaid type of competition that part must take only equal prominence with the many other varied activities of club life. Consequently, points available in the Forest Hill scheme are those which any member could reasonably expect to be able to gain; accent is not placed on any single activity and nor can jobs in which only one member participates (such as representing the society at a conference) gain points.

Thus specialisation in "showing" is catered for in the Society Cup and class awards: the "Member of the Year" competition allows others to get an equal chance in gaining a major award. We feel that this is an aspect that might profitably be borne in mind by other clubs seeking to provide opportunities for members who are not "show addicts."

H. J. VOSPER,
Secretary, Forest Hill and District Aquaria Society.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- 1 *Riccia fluitans* (7, 4) 11 Vipers with heads for figures (6)
 8 Call for attention (2) 12 Young eel (5)
 9 On the level less than young salmon (3)

- 13 Qualification of "doctor fish"? (1, 1)
 14 A first principle or essential part (7)
 18 Dark-red transparent resin (3)
 20 Limb but not arm (3)
 21 One way to bash 'um (6)
 24 Pike (4, 6)
 25 Tail of vendace (3)
 26 And head of dace returns (1, 1)
 27 Ginger has this kind of barb in a way (6)
 32 Nearly an idea to return to

CLUES DOWN

- 1 *Stratiomys chamaeleon* (9, 3)
 2 Posers? Trying getting sieves from red silt (7)
 3 Spawen; or, if whale, cachalot (5)
 4 Front end of tarpon (3)
 5 A crime difficult to perpetrate in aquarium (5)
 6 Philistine's name for aquarium plant (4)
 7 *Rivulus*; this is a gift (7)
 10 Zebra fish (11)
 15 Self (3)
 16 Slippery fish (3)
 17 Be silent (4)
 19 In that degree (2)
 22 Al fellows miner for his reward (7)
 23 Beginning to grow (7)
 26 Miss Wynn is cut short by the unknown (4)
 28 Free State (1, 1)
 29 Breathing organ of fish (4)
 30 Prison for Olga? (4)
 31 Ages if you rub out the end only (4)
 33 This is it, all right (2)

PICK YOUR ANSWER

1. Mr. William . . . is the name of a character in *Black House* by Charles Dickens: (a) Barb; (b) Guppy; (c) Trout; (d) Whiting.
 2. The pink ear is the popular name in Australia of: (a) *Melanotaenia nigra*; (b) *Mogania mogania*; (c) *Selenotoca multifasciata*; (d) *Therapon jarbou*.
 3. Which is the smallest of the following species? (a) *Hemigrammus caudocinctatus*; (b) *Hemigrammus marginatus*; (c) *Hemigrammus ocellifer*; (d) *Hemigrammus rhodostomus*.
 4. The approximate number of *Tilapia* species known is: (a) 60; (b) 80; (c) 100; (d) 120.
 5. In *Monodactylus* species the anal fin is always preceded by: (a) 2 spines; (b) 3 spines; (c) 4 spines; (d) 5 spines.
 6. *Nagritaria cristata* is indigenous to: (a) East Africa; (b) North America; (c) South America; (d) West Africa.

G. F. H.

(Solutions on page 259)

News from AQUARISTS' SOCIETIES

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

A copy of *The Aquarist's Directory of Aquarium Societies* will be sent free to any reader on receipt of a stamped, self-addressed envelope.

THE first meeting of **Castleford and District Aquarist Society** was held recently and there was an attendance of twenty. Sufficient junior members were enrolled for the formation of a junior section immediately. The hon. secretary is Mr. B. Stewart, 66, Aketon Road, Castleford, Yorkshire.

AT the last monthly general meeting of the **Ilford and District Aquarists' and Pond-keepers' Society** the subject for discussion was the 1957 programme. The 1956 table show competition was won by Mr. A. L. Stebbing, the second being Mr. T. H. Thomas. New members will be welcomed, the hon. secretary being Mr. V. Price, 1a, Horace Road, Barkingide, Essex.

RECENT activities of the **Guildford and District Aquarists' Club** included an illustrated lecture by Mr. B. Curtis on the electrical heating and lighting of aquaria based on his own experience over several years of fishkeeping. At another meeting members brought along

their favourite fish and gave a short talk why they liked this particular species. Among some of the exhibits were comb tails, pencil fish *Rasbora arifasciata*, golden peistella, glass catfish, sucking catfish and sunspot barb. All the members commented on the interest which this meeting had aroused. The hon. secretary is Miss Doris A. Patrick, 98, Nightingale Road, Guildford.

IN their efforts to further the drive for new members the **Independent Aquarists' Society** installed a show tank in the Marlborough Cinema, Holloway, in conjunction with the film "The Battle of the River Plate"—the theme being that "there is a better way of seeing fish than that chosen by the *Grand Spec.*" The hon. secretary is Mr. L. Dare, 17, Lady Somerset Road, London, N.W.5.

THE **Greenock and District Aquarist Society**, which was formed six years ago, report steady progress with a good average attendance at their meetings. Interest is very keen and

recent successes have been a first and second in the Inter-Club Tropical class and first in the Inter-Club Coldwater at the Scottish Aquarium Society Show at Glasgow in December.

The meetings are held the first Monday in the month at the Arts Guild, Campbell Street, Greenock, where the accommodation is comfortable and well heated. The secretary is Mr. D. O. Carr, 13, Pinnart Road, Greenock.

SOCIAL activities of the **Leeds and District Aquarists' Society** included a whist drive, and a film show is due on the 13th February. The hon. secretary is Mr. L. Grimshaw, 28a, Dawlish Road, York Road, Leeds, 9, and new members will be welcomed.

NEW officers of the **Bradford and District Aquarists' Society** are as follows: president, Mr. G. Taylor; treasurer, Mr. C. R. Wilson; and secretary, Mr. K. Barrett, 68, Moorland Road, Thornbury, Bradford, 3.

THE formation of a new club at Rollis Royce, Glasgow, is announced. The full name is **Rollis Royce Aquarium Club**, and there is a membership at present of twenty-eight. The hon. secretary is Mr. David W. Begg, 6, Caird Drive, Glasgow, W.1.

The annual dance of the **Hampstead Aquatic Society** was held in January. During the evening, Mr. S. Atkins, chairman of the Federation of British Aquatic Societies, presented 16 cups and trophies to successful members. The Secretary of the Royal Free Hospital, Lawn Road, N.W.3, has written expressing his appreciation for the new aquarium recently installed in the Isolation Ward by members of the Society.

At the annual meeting of the **Cambridge and District Aquarists' Society** satisfaction was

expressed by Mr. F. G. Simpson, the president, at the progress made during the year. There had been an excellent programme of lectures covering many and varied aspects of the hobby. Some of the lectures had been illustrated by films and slides.

AT a recent meeting of the **Northampton and District Aquarist Society**, Mr. L. W. Roy spoke of his experience in breeding and rearing cherry barbs. Members' questions were answered in a session of "You are the experts." The panel consisted of Messrs. Suedker, Lyon, Catterall and Passer, with Mr. G. Twinston in the chair.

MEMBERS of the **Streatham and District Aquarist Society** heard a very interesting talk by Mr. J. Searle on cherry barbs and breeding procedure at the last meeting. The new hon. secretary is Mrs. M. Hall, 192, Dumbarton Court, London, S.W.2, and aquarists interested in membership should contact the secretary.

THE annual dinner of the **Grimsby and Cleethorpes Aquarists' Society** was held on the 19th January. At the annual general meeting which was held on the 21st January, Mr. J. Cullum was re-elected president; with Mr. M. R. Mackley, chairman, and Mr. A. E. Parker secretary.

THE following officials were elected at the Annual General Meeting of the **Bristol Tropical Fish Club**: chairman, Mr. M. J. Wallace; hon. treasurer, Mr. V. W. Webster; hon. secretary, Mr. W. E. Ridler, 9, Friendship Road, Knowle, Bristol, 4. The monthly meetings are held at The Old Duke, King Street, Bristol, on the third Thursday of each month at 7.30 p.m. New members are welcome and anyone interested is asked to get in touch with Mr. W. E. Ridler at the above address.

THE 1957 programme of the **Forest Hill and District Aquaria Society** includes lectures, quiz evenings, table shows, etc., designed to cover every aspect of the fish-keeping hobby, and will be of interest to both experts and newcomers. The last meeting included a talk by Mr. H. J. Vosper on "Setting up Tanks for Home and Show."

AT the **Southport Aquarist Society's** annual dinner, the chairman, Mr. J. Taylor, said that the Society had enjoyed a successful year. Mr. Frank Parrar, the Southport Zoo proprietor, stated that the demonstration tanks which had been installed by the Society at the Zoo were one of the main attractions and provided an excellent display. He also paid tribute to the Society members who had worked so hard in equipping the Zoo with tanks and fish, and also maintaining them.

AT the Olympia last month there was a good entry in the Schools' Section for Furnished Aquaria. Peter Woodford of Hendon County Grammar School and a member of the **Hendon Aquatic Society**, won the Federation of British Aquatic Societies' shield. The Hendon club decided upon unconventional furnishing, and the tanks included unusual lighting effects, half-filled and semi-aquatic layouts, bird and flesh-eating piranha tank, hanging rocks instead of base fixtures, tanks within tanks and other novelties.

Despite this departure from the text book, Hendon gained three awards, and gained the Federation Trophy for the highest aggregate points in the show.

Mr. Roy Skipper, chairman of Hendon Aquatic Society, took first prize in the breeders' section, his exhibit being six of his pompadour fish.

THE **Buchanan Aquarist Society** is now the new name of the Glasgow Eastern Aquarist Club as the club is no longer in the eastern side of Glasgow. A new secretary has been appointed—Mr. A. Elliot, 136, Buchanan Street, Glasgow, C.1. Tel.: Central 4861. Secretaries of aquarist clubs are invited to contact the new secretary, who has some interesting news for them.



At the annual dance and social of the **Hampstead Aquatic Society** held last month members were presented with their show awards by Mr. S. Atkins, chairman of the **Federation of British Aquatic Societies**. Above, Mr. Lester Coatman (left) is seen receiving the **Catfish Cup** from Mr. Atkins; the group of members pictured with their cups shows (standing, left to right) Mr. L. G. Lawrence, Mr. W. T. Adams, Mr. Lester Coatman, Mr. P. B. Utten, Mr. R. Tucker and (seated) Mrs. A. Brown and Mr. K. J. A. Pye



AT the Annual General Meeting, held on 17th January, of the **Bexhill and District Aquatic Society**, the hon. secretary read out a resume of the Society's activities over the past year. The balance sheet showed that this has been one of the most successful years in the history of the Society.

The following officers have been elected for the forthcoming year: chairman, Mrs. W. Chissell; vice-chairman, Mr. J. Holder; hon. secretary, Mr. D. R. Miller; hon. treasurer, Mr. P. Norris. Committee: Messrs. D. Bates, D. Barfoot, T. Dadswell, T. McCormack, and a full programme has been drawn up with lectures from the **Federation of British Aquatic Societies**, Table Shows, Auction Sales, etc.

TRIBUTE to the work of two members of **Bristol Aquarist Society**, who have, between them, served the Society for some 50 years, was paid at the Annual General Meeting in January. They were Mr. E. R. Blunsden, a former president, whose name will always be associated with the Bristol shubunkin, and Mr. R. V. Coombs, a former secretary and president, who leaves the Bristol area later this year. Mr. Blunsden did not stand for the committee this year. Members were surprised to hear that he celebrated his 78th birthday the day before the meeting.

Officers elected: president, Mr. S. J. Davis; vice-president, Mr. H. C. B. Thomas; secretary, Mrs. G. Grimston (10, Queens Road, Bristol, 4); treasurer, Mr. Lennox; reporting secretary, Mr. R. L. Vince; registrar, Mrs. M. Davis; librarian, Mr. M. Bellis. Committee: Messrs. V. Jones (immediate past-president); W. Hicks, A. W. Rudge, V. Capaldi, N. Grimstone.

ANOTHER successful year was reported at the annual meeting of the Society's **Keynsham and District Branch**, which continues to meet at 63, St. Ladoc Road, Keynsham. Officers elected for 1957 were: chairman and treasurer, Mr. R. King; vice chairman, Mr. R. White; secretary, Mr. R. L. Vince (8, Vandyck Avenue, Keynsham). Committee: Messrs. R. James and P. J. Raymond.

THE **Kirkcaldy and District Aquarist Society** has extended an invitation to the members of the nearby **East Fife Aquarist Society**, who have no clubrooms, to become honorary members and share the new accommodation acquired by the **Kirkcaldy Society**. News letters issued by any of the English societies would be welcomed, and pen friends may also be arranged. The new hon. secretary is Mr. E. Headley, 5, Dovecot Road, Glenrothes, Fife.

A SATISFACTORY year has been reported by the **Heerne Bay and District Aquarists' Society** despite the small membership. This year monthly table shows have been commenced and members will be competing for a challenge cup. There is no change of officers during the coming year.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: **Colwyn Bay and District Aquarist Society** (Mr. H. Warsop, 8, Abergele Road, Colwyn Bay, Denbighshire). **Southend, Leigh and District Aquarist Society** (Mr. D. E. Connor, 60, Tintern Avenue, Westcliff-on-Sea). **Glasgow Eastern Aquarist Club** now **Buchanan Aquarist Society** (Mr. A. Elliot, 136, Buchanan Street, Glasgow, C.1. Tel.: Central 4861). **Streatham and District Aquarist Society** (Mrs. M. Hall, 192, Dumbarton Court, London, S.W.2). **City of Salford Aquarist Society** (Mr. B. Reuben, 15, Maud Street, Manchester, 8. Tel.: Col 3698). **Southport Aquarist Society** (Mr. M. O. Plant, 177, Liverpool Road, Southport). **Nuneaton and District Aquarist Society** (Mr. N. E. Townsend, "Melbury", 197, Hinckley Road, Nuneaton). **Kirkcaldy and District Aquarist Society** (Mr. E. Headley, 5, Dovecot Road, Glenrothes, Fife).

Crossword Solution

C	R	I	S	T	A	L	W	O	R	T	
H	I	P	A	R	E	L	I	B			
A	D	D	E	R	S	E	L	V	E	R	
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Y	E	L	L	S	A	L	G	Y	O		

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1 (B). 2 (a). 3 (d). 4 (c). 5 (B). 6 (B)

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Length of tank to be fitted	Size of filter to fit	
16"	one size	"S"
18"	one size	"S"
36"	two size	"S"
24"	one size	"L"
30"	one size	"L"
48"	two size	"L"

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Hitchin

17th November, 1956

My dear Mr. Horeman,

I feel I must write to you about these new base filters. In all my years of trying all type of filters for my cold water tanks indoors, which I have four sizes, 38 x 18 x 15 inches in which has always been a lot of hard work in keeping them clean. After putting your new base filter in and giving them about three months trial the tanks have kept absolutely suspension free, always crystal clear water, I've never had set-up tanks look as they do, since putting in the filter. Also the plants seem to grow better than ever I've had them, I feel its my duty to write to you about this as the cold water Aquarist have never had such a chance to have crystal clear tanks. In my opinion you have done great service to the fishkeeping hobby. Many thanks, I remain,

Yours sincerely,
B. J. UPCHURCH

P.S. My tanks are open to inspection for confirmation if anyone wishes.

Letter available for inspection.