

The AQUARIST AND PONDKEEPER

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Photo: Valerie Lilley
Last month brought weather which will be remembered for its disastrous effects on ponds. Even the Thames froze over—this picture was taken at Hampton Court

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Editorial

IN January this year the Lord Chief Justice and two learned judges gave their opinion in the Divisional Court that the goldfish is not an article. To the aquarist this may not seem to be a pronouncement of great significance, but it means the perpetuation of a practice which most people agree results in some suffering for this fish and one which is contrary to the provisions made for the welfare of goldfish among other animals in the Pet Animals Act.

Because the Public Health Act (1936) prohibits only the sale or giving of *articles* to persons under the age of 14 years by dealers in rags and old clothes, goldfish can now be legally exchanged for rags by these dealers. The fish must not be in containers when given to children or, of course, articles would be involved; the poor fish may be transferred from a street barrow to whatever receptacles the children provide. The lure of a goldfish pet can, in the rush of the moment, easily cause a child to improvise hastily a home for it which is as likely as not to be quite unsuitable. Yet aquatic traders, ready with advice and supplying fish under the best conditions, are prohibited from selling to children by the Pet Animals Act's regulations. Nothing will be said here of the conditions under which the rag dealers themselves keep the fish before disposal, for again these operate beyond the reach of the Pet Animals Act; so do fair-ground stall-holders who give goldfish as prizes.

In the legal proceedings referred to above it was stated that if it was considered that goldfish could spread disease it "would be quite easy for Parliament to alter the law" to include them in the article embargo, for this is the aspect with which the Public Health Act concerns itself. Would it not be equally easy to alter the laws enforced under the Pet Animals Act to prohibit animals being given in exchange for rags, or as prizes, to children? Perhaps this is the best action in the matter to suit our correspondent whose letter is published on page 260 of this issue.

March, 1954

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Making a Plywood-Framed Aquarium

"NO matter what you do to it an angle-iron frame still looks like an angle-iron frame." This chance remark of a veteran aquarist started a train of thought which resulted in the plywood-framed aquarium described below. These are the advantages claimed for the plywood frame:—

1. It is aesthetically superior to the "traditional" frame and suitable for a variety of pleasing finishes.
2. It is relatively cheap and easy to construct.
3. As the frame is monolithic in each plane no irregularities exist to impede glazing.
4. The frame is a poor conductor of electricity and heat.

Method of Construction

The shape and size of the aquarium described is rather unusual as it was built to fit the breeding requirements of a certain kind of fish. Larger aquaria would demand thicker plywood. A 24 ins. by 12 ins. by 12 ins. tank should be built in $\frac{1}{2}$ -in. ply.

For my 24 ins. by 8 ins. by 8 ins. aquarium, $\frac{3}{8}$ -in. ply was used and has proved adequately strong. The dimensions given are internal. The base was cut exactly 24 ins. by 8 ins. The plywood was obtained cut to size, for which no extra charge was made. The ends were 10 ins. by 8 ins., allowing $1\frac{5}{8}$ ins. below the base. The sides were 10 ins. by (24 ins. plus 2 ins.) by $\frac{3}{8}$ in.; this allowed them to overlap the ends. The "windows" were cut with a fretsaw, as shown in the figures. The pieces cut out were saved and



Details of corner construction

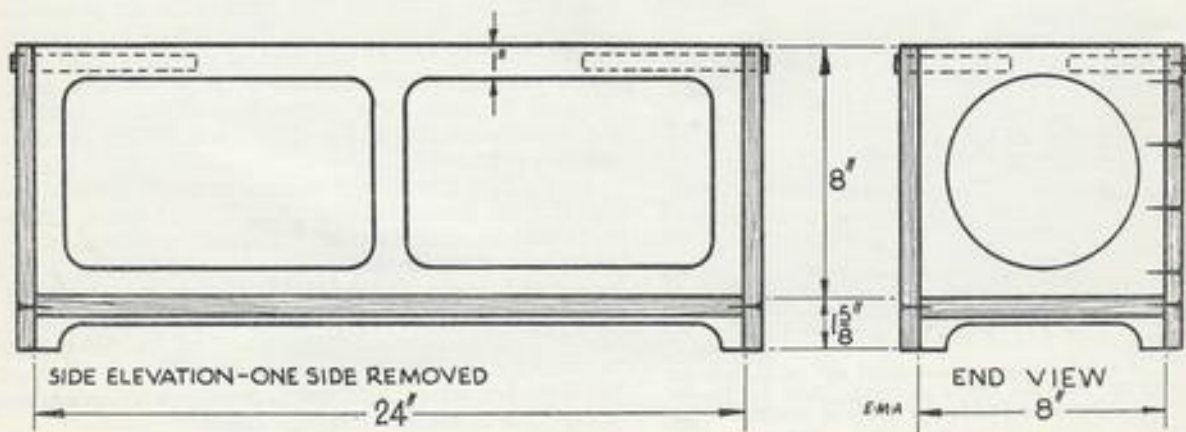
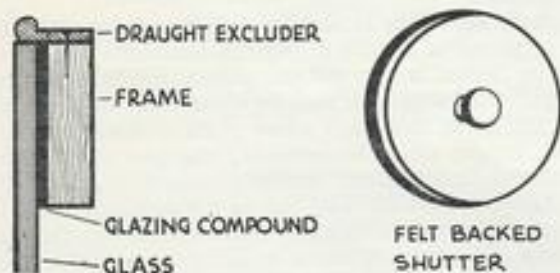
felt-backing was added so that they could be used as shutters.

The next operation was to drill the ends and sides to receive 1 in. No. 4 screws at 2 ins. intervals, the screw-holes being countersunk. After this the adjoining edges were glued and the frame assembled; 1 in. panel pins were used to tack it together. The screws were then driven home through the previously drilled holes. A little care in drilling ensures that the screws do not split the base or the ends. The ends were reinforced with $\frac{1}{2}$ in. by $\frac{1}{8}$ in. steel bar as shown.

Glazing the Frame

After three coats of paint, the frame was glazed in the usual way, particular care being taken to ensure a snug fitting base. Glazing is facilitated by the absence of the top angle of the normal frame. To finish the top edge, 1 in. wide rubber draught excluder was bedded on over the edge of glass and wood, as illustrated. For the purpose of controlling the light and also for controlling heat loss the felt-backed shutters were used with "button" handles. My next project is a larger plywood aquarium with a veneered front aspect.

M. H. Robinson



Epiplatys chaperi

ORDER:—Cyprinodontes—from Greek *kyprinos*—a kind of carp, and *odontos*—tooth.

FAMILY:—Cyprinodontidae—origin as above, plus *idae*-suffix to indicate a family.

SPECIES:—*Epiplatys chaperi*, from Greek *epi*—upon, and Greek *platys*, or *platos*—flat. *Chaperi*—after M. Chaper, who first discovered the fish.

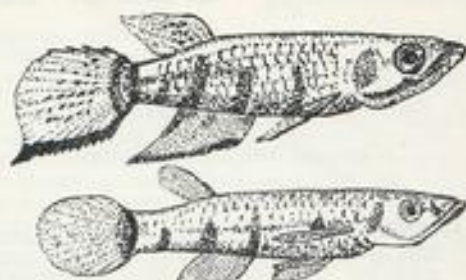
A TWO-INCH native of West Africa, this fish can be in an aquarium for weeks without anyone spotting it. It does absolutely nothing to attract attention. I remember the first specimen I saw. Near the surface of the water, it was so still that I really thought it to be a cleverly painted fish on the back glass of the tank. To convince me that it was not, it was necessary to insert the end of a fish-net in the water near the fish, whereupon it moved. Not a recommendation? Well, no, I suppose not, but notwithstanding, it possesses a few champions, and the male fish is certainly beautiful when in first-class condition.

The difference in the contours or profiles of mature specimens are illustrated in the sketch above. The throat of the male is intensely orange, and his fins generally are more pointed at the extremities than the female's. The edges of his caudal and anal are edged with brownish black, and the lower extremity of the caudal possesses a short extension which looks rather like the beginning of a sword. Four or five vertical dark bars start from the abdomen and make their way upwards to just above the middle body line.

Body markings on the female are similar, but the fins are unmarked and very transparent. Greenish and bluish hues are flashed back from the bodies of both sexes as light strikes them. The head is broad and very flat on top, and probably gives rise to the name *Epiplatys*. The usual docility and immobility of *chaperi* is deceptive. In this they are somewhat like the pike (*Esox lucius*) which they resemble in shape. Given an incentive they move fast, and jump high, clean out of an uncovered tank.

Breeding condition is hastened by a liberal feeding of live food. Being equipped with a quite efficient set of teeth, larger food than can be swallowed in one gulp is tackled. Temperature should be in the region of between 76° and 80° F., although normally the fishes are quite happy in 68° to 75° F.

Spawning is a leisurely procedure, and lasts a week or more. The female, closely followed by the male, drops



Epiplatys chaperi—male above, female below

single eggs at the surface of the water. A thick layer of floating plants will trap them. Normally the eggs are left alone by the parent fishes. The breeder, once he is sure spawning has begun, is faced with the problem of what to do with the daily batches of eggs. If he leaves them, the resultant fry will be of all ages and sizes, and as they may consume each other, a number will be lost. If he takes out the parents he may upset them so that they will not finish the spawning they have commenced.

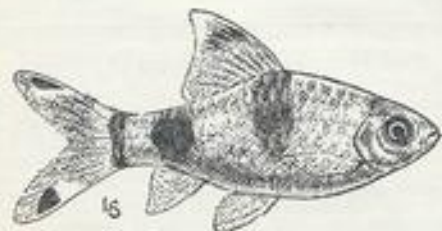
The best plan, in my opinion, is to remove the surface weed at the end of each day, replacing it with a fresh layer. Then each day's crop can be placed in a separate container to hatch out two to three weeks afterwards. There is ample time for even the most tardy aquarist to prepare a culture of Infusoria in anticipation of the arrival of the babies. One of the most convenient methods is to sprinkle a little powdered fish food or duckweed upon the surface of the water in which the eggs are being kept. When the fry emerge from the eggs, and have finished consuming their yolk sacs, breakfast is waiting for them.

Growth is rapid in favourable environment. The body bars begin to show in about six weeks, by which time the fry will be almost a third the size of their parents. At this age and size it is impossible to sex the babies, but at two to three months the characteristic dark edging of the male caudal and anal fins begin to develop, and the shapes to alter from those of the female fry.

For show purposes, these fishes are quite good, posing for judges and public to assess their finer points.

Occasionally, however, one will get below the bottom cross-bar of the frame and the tank appears empty—a good enough reason to put sufficient compost in the bottom of the tank to raise the fish into view.

A New Barb from CEYLON



Immature *Barbus filamentosus* (incorrectly known as *B. mohecola*)

MR. RODNEY JONKLASS, of the Zoological Gardens of Ceylon, has pointed out in the January issue of *The Aquarium* that fish recently imported into Britain and the U. S. A. as *Barbus mohecola* have been wrongly named. Specimens imported have been immature and are really the blackspot barb, "a popular light sporting fish of India and Ceylon" named *Barbus filamentosus*. When fully grown this species shows sexual dimorphism, i.e., the females are very different from the males in appearance and size, they do in fact resemble *B. mohecola*. Distinctive features shown by the mature male are eight to ten filaments arising from the reddish dorsal fin, each up to an inch in length. The fish grow to seven inches and take two to four years to mature. Breeding is similar to goldfish in ponds.

Making Sure that Fish Keep Alive

by W. L. MANDEVILLE

(Continued from last month's issue)

WHENEVER the responsibility of keeping something alive is accepted, the tendency is to concentrate too much on "food"—which places the emphasis on solids—instead of thinking in terms of "sustenance," which includes the gases, the fluids, and the solids necessary to sustain life, together with the periods of activity and of dormancy, necessary to maintain life.

The first solid requirement of newly hatched fry is protein, and this is available without our assistance from the contents of the attached yolk sac. Our responsibility is the temperature and light necessary to activate the fry. Constant light for about 72 hours is advisable, not of the intensity necessary to activate plants, but sufficient to keep the fry moving, and a gentle swing of temperature from 72° to 78°F. will ensure satisfactory development.

Quantity of water and temperature must always be considered together, for as temperatures increase, so the oxygen content decreases, and a sufficient quantity of water will ensure that sufficient oxygen remains. This is important, for until such time as the gills have formed and are functioning, the all important oxygen is absorbed through the skin and tissues of the fry.

This primitive respiration period must be borne in mind when the yolk sac has been absorbed, and further protein has to be provided in the form of algae-bearing water (green water) or in the form of Infusoria. Fry rarely starve to death, but they are frequently asphyxiated by overcharging the water with Protozoa—when the so-called Infusoria are introduced in too great a quantity. Even at this stage, the fish-feeding maxim "little and often" should be observed.

A Constant Supply of Food

Drip feeding is a satisfactory method, and the best arrangement is to place the Infusoria culture container higher than the rearing tank, and to put one end of a length of wetted two-inch bandage into the culture container, and the other end of the "wick" into the rearing tank; capillary attraction will do the rest, and should one "wick" be too slow, add another. This arrangement avoids stopped-up siphons, and the wet "wick" provides an easy path for a constant supply of Protozoa, without the addition of polluted matter.

Green water and pond Infusoria are the best first foods for any fry, and cultured Infusoria should only be resorted to if a suitable supply of pond Infusoria cannot be found. "Cultures" consist of a suitable food medium which has been seeded with desirable Protozoa. The simplest method of preparing the food medium is to simmer a tablespoonful of Bemax in a quart of water for ten minutes, strain off the resulting food solution, give the settlings to the white worm culture, and the fluid is sufficient to feed a gallon Infusoria culture for a fortnight.

The culture is "started" by boiling a gallon of water and, when cool, adding to it two or three cut-up earthworms. The culture should be kept in a glass or earthenware container, in moderate light, and at a temperature of 60-70°F. for maximum results; the culture should be fed with a tablespoonful of the food medium daily, will be ready for

use within ten days, and is sufficient to bring about 50 alevins through the fry stage.

The counting of fry is important, for when the early feeding stage has been successfully negotiated, and as soon as the alevins can be lifted, they should be "counted" into the next stage rearing tanks, so that the breeder knows how many fishes are to be fed, for only then will it be possible to estimate the room and the food necessary to ensure strong healthy fishes.

The diet continues to be protein throughout the early "free swimming" stage, and on into the "saleable fish" stage. First the sifted *Daphnia*, together with rotifers from the ponds, until full-sized *Daphnia*, larvae of midge and gnat, etc., can be taken, and these natural sources of protein can be augmented by shredding down earthworms, mussels, white worm, or the snails from your own aquaria, always bearing in mind that pollution of the rearing tank must be avoided. The most effective check to pollution is a good quality of light above the rearing tank; moderate daylight will serve, or 40 watts to the square foot of surface area, if artificial light is being used.

It is well known that only about one per cent. of the fry hatched by any society is raised to maturity. One aquarist will rear the quantity needed, or the quantity possible in the available tankage; another will hatch many and rear few; others have frequent spawnings and rear none, so, to conclude, the chief causes of failure could be recapitulated as follows: (1) Over-heated tanks with the consequent oxygen deficiency during the first week. (2) Plants which have served their purpose as egg traps, allowed to disintegrate in the fry tank through lack of light. (3) Over-generous use of Infusoria in the "free swimming" stage, without the constant light that will keep the fry feeding. (4) A general idea that foulness is a good quality in a culture of Infusoria. This results from polluting food material, that should not be in the culture at all. (5) Too early a resort to "foods" on which the young fish can "manage" but not flourish. (6) Trying to rear unknown "hundreds" at any stage of development instead of ascertaining the extent of one's responsibilities as early as possible.

No attempt has been made in these articles to separate the so-called "coldwater" fishes from the so-called "tropicals" and neither has any attempt been made to deal with special requirements and risk periods such as the forming of the labyrinth organ in Anabantidae, or the ultimate carbohydrate food requirements of the goldfish varieties. The intention is to leave the specialised information to the text books, realising that it is of little use to know the specialised technique if the fundamental technique is not fully understood. All that is hoped is that all items of information may be useful to someone, and some items of information may be useful to everyone, and if anyone knows it all—they should be writing the article and not reading it.

Post-Mortem Examination of Fishes:

W. Harold Cotton, F.R.M.S., F.Z.S., 39, Beek Lane, King's Heath, Birmingham, 14. (Phone: Highbury 1693)

Specimens should be sent direct to Mr. Cotton with full particulars of circumstances, and a fee of 3s.

It is important that the following method of packing fish be adopted:—Wrap fish, very wet, and loosely in grease proof paper and then in wet cloth. Re-wrap in grease proof or wax paper and pack around with cotton wool in tin box. Despatch as soon as possible after death, with brief history of aquarium or pond conditions.

Heating Failures and Aquarium Safeguards

by PETER WATTS

EVERY year after a spell of cold weather there is a letter from an aquarist who bewails the loss of a tankful or more of painfully acquired tropical fish, owing to the failure of heating arrangements. Some of the victims of these tragedies (the aquarists, not the fish) go so far as to give up keeping tropicals altogether, and sometimes even to give up all fish-keeping. To many of us this particular accident has happened and we do nothing about it except revile the maker of the thermostat or the heater concerned and hope to do better next time with one of a different make.

Letters have been written asking why the makers of thermostats don't fit them with alarm bells that will go off when the temperature falls below 70°F. The answer is that (a) if the thermostat develops a fault it is very likely that the alarm will fail as well, and (b) that such a system is best done by using another thermostat, and that the wiring to the bell and battery can be done best by the user. I will deal with this later.

Main Causes of Failure

Failure of the heating apparatus in a tropical tank may be due to: A. Heater; B. Thermostat; C. Associated wiring. Taking these in order, and dealing first with the heater, we find that the causes of heater failure most often encountered are (1) Burning out of the element; (2) Breakage of the glass.

Both these faults are nearly always the result of circumstances within the control of the aquarist. If the water seal of the heater is defective, and water enters the inside of the glass tube, it is liable to cause corrosion of the wire of the heater, and make a thin spot, which then overheats and breaks. Water can be seen in the tube often for weeks before any breakdown takes place and if steps are taken to remove the water and make good the seal, no harm may ensue.

Breakage of the glass tube may result from a drop of water trickling down inside the tube on a hot element and causing a sudden local change of temperature. More often, though, glasses are broken as a result of the heater getting covered by sand or gravel. This often happens in one of my tanks occupied by a pair of blue acaras, which are constantly shifting large quantities of gravel during breeding operations, and the heaters often have to be excavated every day in this case.

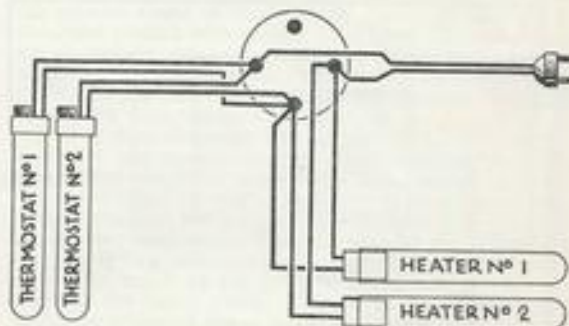
Failure of the thermostat is practically always due to the contacts not operating on one occasion with fall of temperature. Examination of the thermostat afterwards does not very often reveal any definite cause and the failure is put down to "dirty contacts." This emphasises one important point, and that is that a very small speck of dirt indeed if applied at the right place can easily stop adequate contact. What are the factors which produce "dirt" in a sealed tube? They are several.

1. The tube may not be sealed and dust or water can get in. This is a rare thing with modern immersion thermostats, although it is possibly more likely with those

for outside application. 2. *Contact burning*: this is the usual cause of the trouble.

Every time the contacts open there is a spark, and each spark causes a little of the contact to burn and form non-conducting oxides. If the sparks are too fierce, or go on too long each time, or are repeated too often, the life of the contacts is shortened. It is of great importance to avoid exceeding the makers' rating for the thermostat, which is given in watts. This is the maximum figure which is allowed when you add together the wattage of every heater and lamp which is controlled by it. Many people put more load on the thermostat than it is made for and think that, because it produces no immediate visible effect that it will be O.K. (some even get away with it for years!)

Another factor in contact life is the effect of the magnet which is fitted at the contact end of the bi-metal strip. This is there to make sure that the contacts open and close quickly. If it is removed or altered in position it may not fulfil this function. Some aquarists have discovered that this magnet has an effect on the differential of the thermo-



Using two heaters or two thermostats for safety

stat, and fiddle with it to alter the characteristics. I would advise anyone who is not familiar with the effect of this adjustment to learn on a spare thermostat in an uninhabited tank first before starting on the one in the community tank. Making the differential too close has the effect also of increasing the frequency of operation of the contacts, and so wearing them out quickly. To say nothing of the fish, which many authorities agree are healthier with a rather larger temperature range than it is customary to apply to them at present.

3. *Corrosion*: this can result from creeping of water into the thermostat, or spilling it in accidentally when topping up the tank, and is obviously more likely to occur in the open types than in the submersible ones.

Some Rules to Observe

The result of all this in plain language is the following rules:

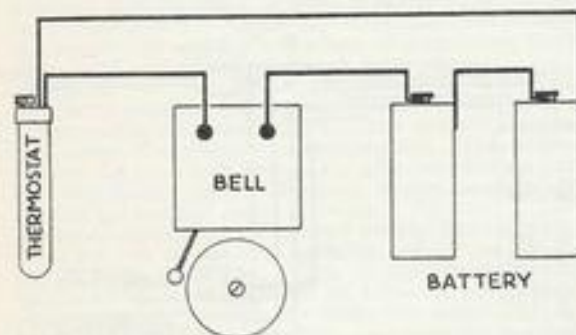
1. Don't use a heater that has water droplets inside the glass.
2. Don't let your heater get buried in the sand (unless it is a type made specially to be buried).
3. Don't overload the thermostat.
4. Don't interfere with the mechanism of the thermostat unless you are sure you know what effect it will have.

5. Don't use a thermostat that has water inside the glass.
6. Keep all wiring dry, all connections tight, and don't move the wires more than necessary.

If these rules are adhered to the modern thermostat and heater are reliable and cause very little trouble. There is, however, a chance that something unforeseen may go wrong. Unfortunately, the small risk that has to be covered calls for more expenditure and many may think it is not worth the outlay. This is a point that every man must decide for himself, and his decision, of course, will be influenced by the value of the fish in the tank.

The ideal cover for the risk is, of course, to have a spare heater and thermostat that will come into operation automatically if the first set fails. This can only be done, obviously, by having another heater and another thermostat, which immediately raises the question of cost. You may think that the thermostat is more likely to go wrong and economise by not having a spare heater; or *vice versa*. In the diagram overpage you can leave out one or other without affecting the operation of the safety precaution.

The thermostat which normally operates is the one set to the higher temperature. If they are set very near



Wiring diagram for a battery-operated bell to indicate heating failure

together they may both operate sometimes. Both of the heaters operate. A point of economy here is that in a large tank using this system the heaters may be such that one only will not be enough to maintain the tank at the set temperature, while both will do it easily. This gives a danger signal in the gradual fall of tank temperature if one heater fails, and if the heaters are of the right value the fall is not enough to do any real harm.

There are some who prefer to use an alarm bell to warn them of an accident to the tank heating. This can be quite easily put together, and requires a bell, a battery, and any kind of thermostat. If they are connected together as shown and the thermostat adjusted to a predetermined value such as 68°F., the owner will be warned. If, by the way, the warning thermostat is set too near the temperature of the heating thermostat, or is placed in a cold spot in the bottom of the tank where circulation is poor, he may be warned in vain!

It is as well to put both thermostats together when using this method, as it makes false alarms unlikely. When setting the alarm thermostat do remember to let it have time to settle down to the new temperature before altering the setting screw, or you may get your first alarm within a few minutes of installing it in the tank! Finally, a check up every couple of months isn't a bad idea with all these safety devices—even the spare set can go wrong.

IN THE Water Garden

by W. E. SHEWELL-COOPER

THIS month I want to describe a number of plants that can be grown in the pool, ones which are not really difficult. Let experts specialise in the difficult-to-grow plants, and let those of us who enjoy gardening for gardening's sake, be satisfied with beautiful plants that are happy and contented under even, say, unfortunate conditions.

Take for instance the marshwort. This has its leaves almost entirely submerged, and the flowers appear above the surface of the soil. The foliage is really very pretty indeed, for it is spread out like a fan in the water, and is finally dissected. It's a plant I always feel should be grown in shallow water, and is grand for quite a small pool for this reason. Incidentally, it gives very good protection to the fish in larger pools at the shallow end, and is a good oxygenator, especially the *Apium nudiflorum*. In this species the foliage is deep green and the flowers small white, while with the *Apium indatum* you get the leaves completely submerged in the winter and spring while later on in the year the slender stems and foliage may appear above the surface. The flowers are white also.

What about having a flowering rush? There is one called *Butonous umbellatus*. It produces clusters of rose-pink flowers which are very pretty indeed. The leaves are quite sword-like, and they start by being purply-bronze in colour, and then turn later on to green. This is a plant which I have had growing satisfactorily in only two inches of water, and which would probably prefer about six inches of water if it had its own way. In the south it will usually grow about four feet tall, but when I saw it north of Manchester, it was struggling to be more than two feet in height. This may be a question of soil or purely of climate.

From a plant which only needs two inches of water to another which is very beautiful indeed and just asks for a moist shady spot. We hear a lot about orchids, and how expensive they are, but it is possible for you to grow your own. The species concerned is a bog orchid known as *Calopogon pulchellus*. It will grow normally to a height of about 15 inches, but if you treat it well, the flowers may be borne on stems 18 inches long, and can actually be cut and used as a decoration in the house. The petals are a crimson-purple, but there are yellow, orange and purple hairs on the lip. In the south of England it should be out in June, and may last until the end of July. In the north you may not see any blooms until early July, and then there should be a display until the middle of August.

We started by dealing with the marshwort, but the marsh marigold is worth including also. It is one of the earliest of the water garden plants to flower, and if you grow the common marsh marigold, which delights in sodden soil by the water, then you will have a plant producing masses of flowers on stems 15 inches tall. This is the *Caltha palustris*. There is a variety *alba* which has white blooms. For double deep yellow flowers there is *Caltha monstrosa pleno*. This is a species which should be better known. It is absolutely first class, and when two

(Continued on opposite page)

Coldwater Fishes for Aquarium and Pond

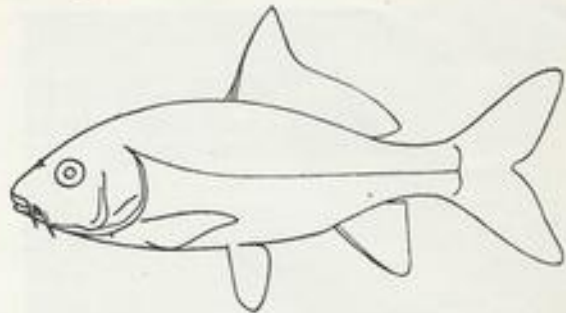
Hi-goï Carp

IN previous issues of *The Aquarist* I have described all the fancy goldfish for which standards have been made by the Federation of British Aquatic Societies. I will follow with some notes on the other coldwater fishes which have been included in the standards booklet, with details of how to keep and breed them.

The hi-goï carp is something similar to a large goldfish, but as it has two pairs of barbels it can be recognised quite easily. If these fish are kept in a large pond they can grow to large sizes. I have seen them about two feet long with a body depth of over six inches. From this it can be realised that it is not wise to try to keep such fish in small tanks, and I am of the opinion that except where very small specimens are concerned it is much better to keep hi-goï in outdoor ponds. They are quite hardy and can be left outdoors all the year round under the same conditions as are suitable for common goldfish, although they will not be as happy in a small pond. To be really successful with this fish I think that the pond needs to be at least ten feet square, and three feet deep at least in one place.

These fishes are rather slow swimming and are easily tamed. They are not fussy over food and will take all the usual goldfish foods. A friend of mine who used to live near me had several hi-goï in a large pond and he often fed them on chickens' entrails. If there are sufficient water plants the fish may breed and some young may be reared without any special care on the part of the pond-keeper. I have never found them dangerous to smaller fishes but of course I would not say that tiny fry might not be eaten by them, as is usual with other types of fishes.

The colours of the fish can be all red or yellow and some have been bred with varied shades. The standards call for an all red (brilliant) or all yellow without spots or patches, and as 30 points of a possible hundred are allotted for colour it can be seen how important this question is. The body must be evenly scaled and the depth is not to exceed one-third of the length. The back outline is a gradual rise and then a fall from the commencement of



Outline drawing of the hi-goï carp from "Show Standards for Cultivated Fishes" (F.B.A.S. 2s. 6d.)

the dorsal fin, but it does not go very high at any place. The bottom curve corresponds to that of the upper and the general shape of the body is similar to that of an elongated goldfish with a rather large head. Twenty points are allotted for the body, five for the barbels, six for the dorsal fin, five for the caudal and three each for the pectoral, pelvic and anal fins. Fifteen points are given for condition and ten for deportment.

Few of these fishes are seen in open competition as the minimum length, excluding the tail, for exhibition, is six inches, and the usual small show tanks would not be a very good home for one of these fish if of the large size. I have examined many hi-goï and find that as a rule they do not vary very much, but most keep to the recognised shape. This is undoubtedly because they have not been altered so much as the goldfish during the process of evolving the many types. I think that no large pond should be without a few of these fish, as they cruise around the pond like small submarines and during the warmer months of the year are rarely far from the surface.

A. Boarder

In the Water Garden

(Continued from opposite page)

or three plants are grouped together at the side of the pool, they give a magnificent display. *Caltha polypetalata* only grows three feet tall, but produces dark green leaves often 10 inches across; the flowers are large, say three inches across, and golden in colour. The thing I like about this species is that it spreads very quickly and from one plant you can soon get your money's worth.

Some have been able to make a little tiny rivulet running down to their pool. This has slow running water feeding it all the time. Under such conditions there is no plant that will grow better than the *Zizania*, which has been called giant wild rice. It is really one of the ornamental grasses, which grows very often to a height of eight feet. It has large, broad, flat leaves, and these reed-like stems bear quite large panicles of flowers in the autumn of each season. It can be grown in any marshy spot which is always under water. Don't try and plant it in an artificial stream which dries up during the summer, or in cases where the stream is merely "made to work" occasionally when visitors are coming. It won't grow in fast

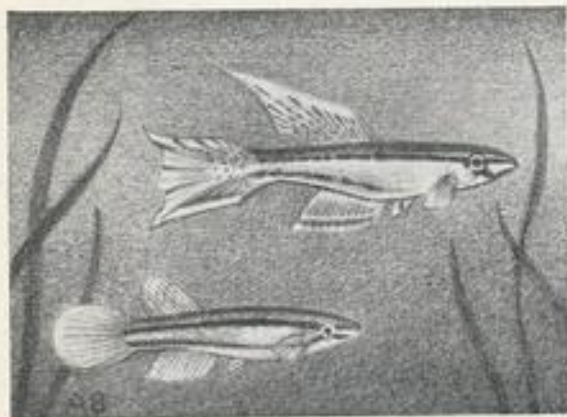
running water, and it will die unless there's water there all the time. A smaller member of the family some people prefer is *Zizania latifolia*.

Now that we are writing about reeds, what about the burr-reed? This grows in about 12 inches of water as a rule, but produces its leaves and flowers right above the surface. The leaves are sword-like. There are three species which I like, the beds sedge, which is really *Sparganium ramonow*, which has spikey heads of flowers and prickly fruit that follows; *Sparganium angustifolium* which grows about six feet tall with grassy, flat leaves; and the *Sparganium simplex* which is the smallest of them and whose spikes of flowers are not branched.

Let's end this month by mentioning one or two of the *Primula* which delight in rich, cool soil, that is never really sodden; *Primula aurantiaca* for instance, a Chinese species only nine inches tall, with dark green leaves, reddish stems, and orange-red flowers; or *Primula Beesiana* with its whorls of rosy-carmine fragrant flowers, produced in May and June. These both like partial shade, but the latter will grow two feet tall if it gets a chance. *Primula denticulata* is the Himalayan primrose and produces globular clusters of lilac flowers in April and May. This is a grand "two-footer."

Aphyosemion bivittatum—a Breeder's Record

by JOHNSON H. HOOD



Male *A. bivittatum* is the top fish

AS this member of the *Fundulopanchax* group of the Cyprinodontidae family is to be seen more frequently in the dealers than at any time since the war, especially in the North, a word or two about the keeping and breeding of this attractive *Aphyosemion* may not be out of season.

To give an accurate description of this fish certainly taxes one's powers of observation, and if the following does not tally exactly with any specimen obtained, I can only remind the reader that the colours of most of the *Aphyosemion* are extremely variable. The female is the easier of the sexes to describe and I will begin with her. The largest female I ever had was about two inches in length. Her most distinctive feature was two brown-black lines or stripes traversing the body horizontally; one extending from the nose through the eye almost to the caudal peduncle, and the other from the gill-plate slightly below the pectoral fins reaching to the base of the caudal fin. The back is olive-brown and a few red dots decorate the sides. The caudal is rounded, while the short dorsal and anal fins are slightly tinged with blue-green with a few odd spots of reddish brown. The red spots are occasionally entirely absent.

In the male the body shape is similar, but the horizontal lines are indistinct, often disappearing altogether, while the body has a sheen of blue-green markings that change to golden lights when approaching the dorsal contour. In finnage the male is richly endowed compared with his partner. The dorsal is splendid, broad at the base, then elongating triangularly to a point, and is frequently held erect, being coloured red-brown with blue and red markings. The anal is broad, tinged with blue and red (working from the body), margined with red and tipped with blue. The caudal is blue-green, spotted with red in the centre, and the outer rays elongated into extended points of a golden tinge. In length my male was two-and-a-quarter inches.

The first *Aphyosemion bivittatum* I obtained were imported from Germany and from the same source later came the very handsome *A. calabaracus*. Knowing how touchy *Aphyosemion* are about water I was surprised to receive them in ordinary tap water, but they appeared unconcerned. However, I took no chances and hastily prepared a tank for them. Outside my house a steady downpour of rain had filled a depression on the golf-course, so I collected a sufficient quantity of this water for my purpose, filtered

it through cotton wool, and added a level teaspoonful of sea-salt per gallon. As it was already acid I added a small quantity of well-washed peat to layer the bottom and to help to retain the acidity. Tested a few days later it showed a pH. of 6.5 and a hardness of 4°. It was in this water I bred the fish and successfully reared the fry.

I never separated the brood fish but fed them with a few *Daphnia* and many bloodworms, and after about ten days they were noticed spawning. The temperature was 74°F. The female nosed her way among the roots of Indian ferns which were trailing the bottom, the male, following with quick darts, poising momentarily with erect dorsal, and then positioning himself against the female, vents touching, trembled violently, and fertilised the single egg released by the female and deposited on the roots of the plants. Eggs were laid subsequently on the peat, on plants close to the surface and on roots near the bottom. In fact anywhere that took the female's fancy.

After spawning off and on for ten days the parents were removed to another tank which had been prepared, and there they continued to spawn. No protection from light was given except the shade created by the plants. On the twelfth day from spawning a fry was noticed. It was one-eighth inch long. Later more were seen. Condensed, not too finely sieved, pond Infusoria was added to the tank, and on this diet the fry progressed rapidly. At three weeks half-grown *Daphnia* and *Cyclops* were taken, the fry then being an average of five-eighths inch. Some were slightly larger and some smaller. When nine to ten weeks old the babies were one inch and had been taking ghost larva from five weeks old. A final count resulted in 56 fish, so the parents must have averaged about five to six eggs per day (there were three or four infertile eggs noticed). The other tank, where the fish had continued to spawn, yielded 61 fry, and a grand total of 117 was, I feel, a very satisfactory number and well worth the initial effort to provide suitable conditions.

Three Breeding Methods

When breeding *Aphyosemion* there appears to be three methods adopted. First to remove the parents after eight to ten days and leave the eggs to hatch. Secondly, to remove the eggs to be hatched in another container as they appear and allow the parents to spawn indefinitely. Thirdly, to dip the fry out as they hatch and are noticed. Of the three the first appeals as the more sensible and least troublesome; besides, it avoids as far as possible the cannibalistic tendencies of large fry to small fry when the hatching dates are too widely separated. I am, at the moment, experimenting with a fourth method, that of leaving parents, eggs, and fry together for a month and feeding to repletion. This idea is fraught with many perils, and whereas it is working out satisfactorily up to the end of the third week I would not recommend it but advise the first method as the safest and best.

For the benefit of people who find it hard to obtain *Daphnia* and insect larvae, I should mention that I have reared *bivittatum* on finely-chopped earthworm after the initial Infusoria stage was passed, and they grew just as well.

AQUARIST'S Notebook



by
RAYMOND YATES

PLANARIANS are a pest which, sooner or later, find their way into the tanks of most aquarists. They are of little consequence in tanks containing large fish and are rarely obvious for long in such tanks, although few fish are known to eat them. Guppies and dwarf gouramies are about the only two common varieties which will do this. It is in the small breeding tanks where planarians are a menace as they can and will make short work of any eggs or fry in the tank.

They resemble the leech in some ways but are really flatworms and allied to the Trematoda (flukes) and tapeworms. Those found in aquaria are usually about a quarter-of-an-inch long and of a greyish or white colour, although brown and black specimens are also encountered. There is no known chemical treatment of the tank water which will kill off the planarians without harming the fish, the animals being able to stand a great deal of ill-treatment and can regenerate a lost head or tail if severed in two. They are usually introduced with water plants from wild sources because they are very fond of hiding under aquatic leaves or under stones during daylight. They are unable to swim and therefore crawl along the gravel, plant stems, or the aquarium glass after dark, and it is when a light is switched on suddenly, after a period of darkness, that their presence is first seen. If dropped into the water they fall to the bottom, curling up on the way down.

They have no head, but one end of the flat body always moves forward so this may be considered as the head and the sense organs are situated in this portion. They are acutely sensitive to light and will retreat from its source. They glide in an alternate left and right movement so that a straight path is never traversed except when almost on top of suitable food. They are fairly active animals and require large supplies of oxygen, which they absorb through the entire surface of the body. Varied methods of reproduction are followed, some eggs hatching out into free-swimming larvae which later turns into adults, whereas in other cases the eggs develop directly into adults. They are never parasitic but free animals with strongly carnivorous tastes. The mouth is situated about halfway along the underside of the body and is also used for getting rid of waste products. Fish eggs or fry are enveloped by these creatures and if they are present in a tank eggs and fry are doomed.

Once established, planarians are hard to remove. Some can be trapped with bait in the form of pieces of meat placed on the gravel and removed later when the creatures have crawled on to it, but this is a very hit-and-miss method and some escape to cause further trouble later. Removing the fish and adding ammonia to the tank will exterminate them but it is very hard to remove traces of the chemical so that the fish are not affected when returned. The following method is foolproof in my experience and may be of use to those who are troubled with this nuisance.

First remove the fish, throw away the plants or use them in a tank (after sterilising them) where no breeding is undertaken and take out all the gravel. This should be boiled, left in the open for a day or two and then boiled again before putting back into the tank. The tank itself should be cleaned with a soft cloth and then stood on end and thoroughly cleaned with a high-pressure hose. No planarian in any crevice ever survives the force of a high-pressure jet. Gravel itself is easy to clean if subjected to this form of washing, particularly if it is put in a rather large-bottomed enamel bath which allows a greater surface area of gravel to be exposed. It has been suggested that clean water will kill off planarians. I have not found it so, and have heard of instances where they actually came through the tap with

drinking water, thereby discounting this theory. They can go long periods without food of any sort, living on their own tissue and shrinking somewhat as a result. They are allergic to light and perhaps some enthusiast will one day experiment with the effect of continuous light on these animals, allowing them no respite of darkness to come out to feed.

How lucky those aquarists are who possess a motor car compared with the unfortunate "have-nots." Carrying fish any distance is never a pleasant job and in crowded buses or trains it can be nightmarish. Public transport over even short distances seems terribly slow and the hobbyist is at the mercy of time-tables and must plan accordingly. Fog, frost, breakdowns and delays have tried all our tempers at one time or another and it is well known that all dealers have their establishments as far removed as possible from rail and bus termini. Yes, door-to-door travel when transporting fish saves a lot of worry, time and trouble, and here a car is most useful. Most members find it a rush to attend club meetings and a car solves the problem of last buses, whilst lecturers are very handicapped in visiting clubs if they have no car, as their major problem is getting home.

Cars are a great help for moving tanks or equipment for shows, in fact it is doubtful if any show could be staged without their use. The aquarist motorist is also able to get out into the country and collect rockery or specimens with a minimum of trouble compared with his suburban pedestrian counterpart and when it comes to collecting *Daphnia*, well—with a car it is easy, but without one the town dweller has a difficult task even if he doesn't care about appearing in the streets complete with collecting net and equipment. Taken all in all, a car is a near necessity even although there are cases of aquarists who sold their cars (to buy more tanks and fish) so that they could convert the garage into a fish-house!

Fish which were relatively rare six or seven years ago have now become so common and easily obtainable that aquarists are becoming more and more interested in the less common specimens of to-day. Looking through the rebuilt aquarium at the Belle Vue Zoological Gardens in Manchester recently, I was pleased to note that the accent was almost entirely on these less common specimens. This aquarium is not very large and it reflects credit on those concerned that so many out of the ordinary fish are on view. One looks in vain for swordtails, tiger barbs, zebra danios and the usual tropicals. Instead one can look at excellent specimens of electric eel (eight feet long), electric catfish, radar fish, razor and knife fish, Malayan angels, scats, butterfly fish, giant gouramies, climbing perch, *Anostomus*, puffers, archer fish, *Plecostomus*, *Leporinus* species, *Metymnis* species, wasp goby, and half-a-dozen mud skippers, to mention but a few. Is it a sign of the times that no cold-water fish or goldfish were on view?

There is a remarkable resemblance between the giant gourami (*Osphronemus goramy*) and the climbing perch (*Anabas testudineus*). The latter is not, of course, a perch at all but a close relative of the gouramies. The only major difference was the ventrals in the larger fish, which were



Photo:

Laurence E. Perkins

The puffer fish is sometimes a "fin-nipper"

typical elongated "feelers" some seven inches long, whereas the climbing perch has normal ventrals. African lung fish have unusually long and spiky pectorals and ventrals. A popular food at this establishment seems to be shrimp; this was being fed to quite a lot of the larger fish such as electric catfish, cichlids, *Metyrnis* and mud skippers. The electric eel eats a considerable number of rudd and can dispose of a hundred a week if given the opportunity. I observed that Amazon sword plants were potted in small glass jars. A large and very unusual specimen on view was a sail-finned fish (*Polypterus senegalus*).

Looking at the puffers I was reminded of the fact that these fish are very fond of biting the fins of other fish, and even other puffers. However, after a few bad experiences the other fish wake up to their danger and give the puffers a wide berth. I saw an instance of this some time ago where black-banded sunfish had been put in with puffers. The

sunfish had suffered but had learned their lesson. It was remarkable to see the spurt they put on when a puffer came up behind.

In the past the great difficulty with coldwater aquaria has been the fact that tanks could not be illuminated from the cover as in the case of tropical tanks, owing to the heat from the lamps increasing the temperature of the water and adversely affecting the fish. In summer any form of illumination was well nigh impossible. The modern strip lights make light of this difficulty as there is little or no heat from them and, although they are expensive in the first instance, they cost very little to run. Well-lighted cold-water tanks can look very beautiful indeed and enthusiasts should consider the possibilities of using strip light illumination for them.

One or two disgruntled fanciers have complained to me in the past that their club is not regularly mentioned in "News from Aquarist Societies." No doubt it is very vexing to read notes from clubs as far apart as John o' Groats and Lands End with nothing about the club in which you yourself are particularly interested, but there is more to it than that. There are now upwards of four hundred clubs and if each were to be given one inch of column space per month this would need 16 pages without any photographs or illustrations. Apart from the increased cost, is this information really wanted by the average purchaser of the magazine? The answer must, of course, be in the negative.

Readers are interested only in news of their own club; the other chap's club is of no interest to them and these items have little general news value. What the average reader is interested in are details of forthcoming shows and, to a lesser extent, changes in secretaries' addresses or the formation of new clubs. Then again, many reports give practically no information—a mere statement of a talk given by Mr. So-and-So. If details of hints or tips given by lecturers could be included, of interest to all aquarists, then the news item would be worth publishing. Those aquarists who are not members of any club, estimated at about six in every seven hobbyists, never complain about lack of club news. Representing as they do something like 85 per cent. of the readers of aquarist literature they could quite justifiably complain at so much space being given to a minority.

FRIENDS & FOES No. 22

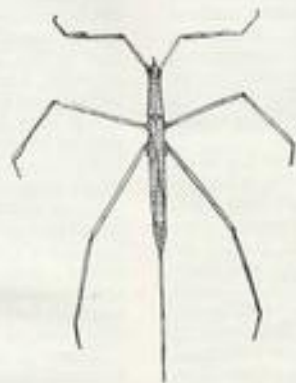
RANATRA

PHYLUM:—Arthropoda, from Greek *arthron*—joint, and *podos*—foot.
CLASS:—Hexapoda, from Greek *hex*—six, and *podos*—foot.

RANATRA belongs to the same family as *Nepa*—discussed last month, and has only one European representative—*Ranatra linearis*.

Less common than *Nepa*, it frequents vegetation in still waters, and owing to its extremely attenuated body, is very difficult to see. It seldom exceeds two inches in length, and almost half this length consists of the breathing tube extending from the end of its abdomen. Again the first pair of legs are modified into an offensive weapon for seizing prey, which consists of other aquatic creatures.

The female lays eggs, attached singly



The water "stick insect" approximately life size, seen from above

Water "Stick Insect"

to floating plants. They can be distinguished from the eggs of *Nepa* by the number of appendages fringing one end. With *Nepa* there are seven to nine, but in *Ranatra* only two.

I have no experience of keeping these creatures in captivity, so cannot state definitely whether or not they would destroy young fishes. They certainly rob fishes of a proportion of live food, however, and being carnivorous, are best kept out of cold or tropical aquaria as a precautionary measure. I would be pleased to hear of any aquarist who has indisputable evidence that fishes suffer from their attentions, or that they ignore our finny pets.

C. E. C. Cole

THE AQUARIST

Aquarium Thermostat Design and Function

by B. HEALEY

NO doubt many budding aquarists have given the keeping of tropicals a miss because of the high cost of the requisite electrical equipment for controlling and heating the tanks, this high cost being mainly due to purchase tax. Many old hands have relied on one thermostat in a master tank, controlling the heat of several tanks, for the very same reason.

This idea is perfectly all right and does well until the heater happens to "pass out" on the main tank. Then the

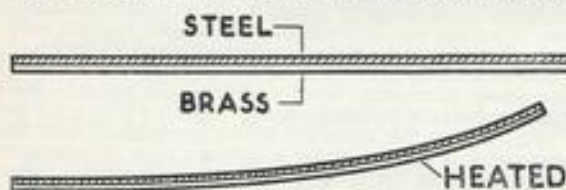


Fig. 1

main tank grows cold whilst the rest of the tanks are slowly roasting their inmates. I myself have had this trouble, much to my regret! The only remedy is to have each tank separately controlled by individual thermostats, and this can be done quite cheaply by constructing your own equipment, as later described, which will give satisfactory service over long periods without any attention.

How a Thermostat Works

To begin with, it is advisable to understand how a thermostat works. Now, the heart of the type of thermostat used for controlling aquariums is a bi-metallic strip, and it is, as its name suggests, two metals bonded together in one piece, these usually being brass and steel; because the coefficient of linear expansion of brass is twice that of steel, heating will cause it to distort, as shown in Fig. 1.

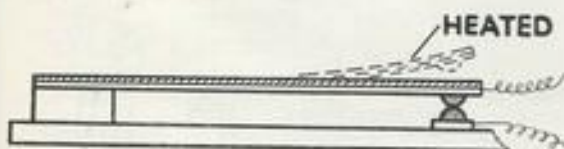


Fig. 2

From Fig. 2 it can be seen that if we clamp one end of the strip, and fit a contact at the other end which rests on another fixed contact, heating the strip would open the contacts, and cooling the strip would close them. So here we have a device that will switch on and off a heater by opening and closing a switch as the temperature increases or decreases about a certain point—but there are one or two snags. First we have to have a means of setting the temperature at the value required and secondly, the contacts

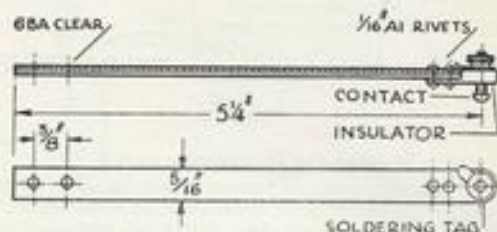


Fig. 3A

would soon "pit," and sparking and radio interference would result.

To overcome the first difficulty, all we do is bend the strip away from the contact so it bears on an adjustable screw; by adjustment of this screw we can adjust the temperature at which the contacts operate.

The second difficulty is a little harder to overcome, for here we need something to cause the contacts to "snap" open and shut and, on opening, to leave a fair gap between so that no sparking can occur. Now, if we place a small bar magnet underneath the strip and a small soft iron "armature" on the strip, as the contacts come together, the magnet will affect it more and more the nearer they get, until a point is reached where the strip can no longer overcome the magnetic force and "snap" the contacts close. At opening, the magnet will hold the contacts together until the strip has built up sufficient torque, through temperature increase, to overcome the magnet's influence, and then the contacts will snap open, with no sparking, which means no pitting or interference.

That is what is required. Now to get down to the job of making the article:—Materials required will be: two strips of 15/1000 in. shim, brass and steel, respectively about 5/16 in. wide and 6 ins. long; a small piece of hard solder; a soldering iron and some soldering fluid. For the base, a piece of 14-gauge aluminium, 7 ins. by 2 ins., a small screw-type lampholder, and one or two scraps of brass, normally found in the "junk" box.

The contacts can be taken from an old micro switch bought from a war surplus store for 1s. 6d., and sufficient screws can be "rescued" from this to do the necessary fixing of parts, as well as providing the small pieces of insulating material.

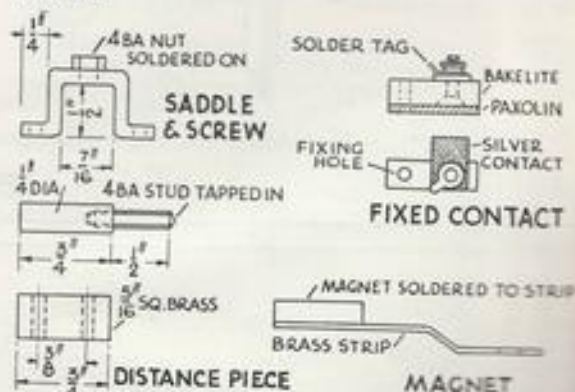


Fig. 3B

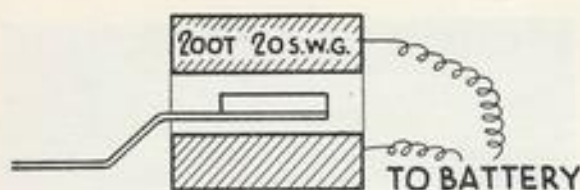


Fig. 4

Making the Bi-metallic Strip

The bi-metallic strip, as you can guess, must be a first-class job; "skimping" here would ruin the whole effort, so be warned. First obtain two pieces of planed wood, approximately 8 ins. by 1½ ins. by ½ in. and lay them handy. Then take the strips of brass and steel, clean thoroughly, and tin one side of each, using hard solder and fluid, and place them together on a piece of sheet iron; heat until the solder runs, brush with a spot of fluid, place one strip on top of the other, tinned sides together, then carefully and quickly lay them on one of the blocks of wood, placing the other block on top. Clamp them in a vice, or place a heavy weight on top.

Leave this for a few minutes until the solder is hardened and then remove the strip. You will find that when this is cool it will be bent into an arc, and this can be straightened by carefully "stretching" the brass side with a light hammer; start at one end and gradually work to the other until the strip is level at normal temperature.

Trim up the ends and sides to remove the surplus solder that will have been forced out, cut to length and drill holes (as shown in Fig. 3a) for contact insulator and fixing block. Polish with emery and apply a coat of matt black paint to finish the strip.

The contacts removed from the switch are taken and one is soldered to the head of a 6 BA cheese-headed bolt that has been filed to approximately 1/32 in. thickness; the other flat contact is fitted on a piece of bakelite, which can be cut from the old micro-switch case. Both contacts are polished by applying a small amount of metal polish on a soft rag and rubbing the contact on it, or better still, the round "top" contact could be mounted in a hand brace and burnished with a highly polished piece of steel; I used a new penknife blade and this gave a polished surface, resistant to pitting from the small arc when the contacts open.

The base was cut from 1/8 in. thick aluminium, and

carefully flattened, as this has to make good contact with the glass side of the tank, so the heat will be conveyed to the bi-metallic strip satisfactorily.

When flat, the various fixing holes are drilled and counter-sunk, and burrs removed with a fine file, finally finishing off with a piece of fine emery cloth.

Proceeding, we make up the saddle piece, fixing block and adjusting screw, full details being given in Fig. 3b.

For the small magnet we require an old flat file, preferably smooth, about 6 ins. long and 3/8 in. wide by 1/8 in. thick; from this we break off a piece 3/4 in. long, this piece being ground up square on all faces, mounted on a piece of brass strip and given a coat of aluminium paint.

The magnetisation of the steel can be carried out by "stroking" it along the pole piece of an old magneto magnet, taking care to move in one direction only and lifting it clear at the end of each successive stroke. An alternate method would be to wind up a coil of about 200 turns of 20 swg D.C.C. wire on a suitable former and with the ends of the coil connected to a 6 volt car battery, place the steel piece inside the central former as shown in Fig. 4. The finished magnet should be capable of lifting a 2-inch wire nail, this being about the strength we require.

Assembly of the parts is simple and straightforward and can be carried out from details given in Fig. 5. The only point I want to stress is that the mounting and insulation of contacts must be perfect; a shoddy job here would render the whole thermostat "live," and this could be fatal—it is much better to be safe than sorry!

Fig. 6 gives the necessary wiring connections, and an alternative is also given for a different type of indicator lamp, (a) being for the normal 3.5 watt flashlamp bulb and (b) for a neon lamp.

A cover for the thermostat can be made from the wood rescued from a cigar box, ornamented to suit your own taste, and given two coats of enamel.

The final step is calibration, this being carried out in the following manner.

Calibrating the Thermostat

First mount the thermostat on the side of the tank with Bostick B. adhesive. When this is done, the "bias" must be adjusted by screwing in or out the top contact until a point is reached where you can make and break the contact with approximately one-tenth of a turn on the adjusting screw; this should give a differential between opening and closure of contacts of about 3° F.

Next put on the thermostat cover, screw in the indicator

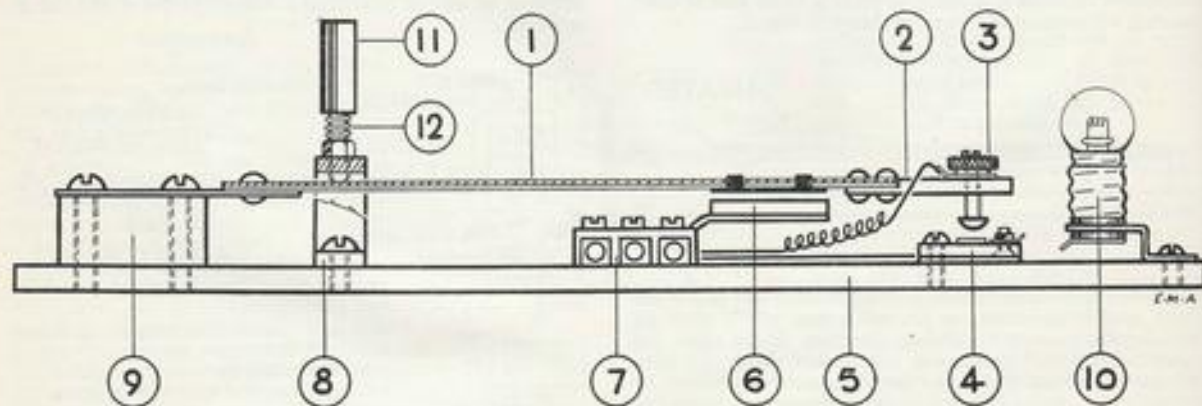


Fig. 5. Details of thermostat assembly: 1, bi-metal strip; 2, insulator; 3, adjustable contact; 4, fixed contact; 5, base plate; 6, magnet; 7, terminal block; 8, bracket; 9, distance piece; 10, bulb holder; 11, adjusting screw; 12, spring

bulb and fix a pointer knob on the adjusting screw. Connect up the heater and mains supply, switch on and allow temperature of the tank to reach 75° F. The lamp will indicate if the heater is on; if it is not, or if the lamp extinguishes before the required temperature is reached, the contacts can be closed by turning the knob clockwise.

When the temperature is reached, slowly turn the knob anti-clockwise until the lamp extinguishes, and without disturbing this setting, unscrew the grub screw in the knob, set it in a vertical position and retighten the grub screw. Mark this point with a pencil on the case. Close the contacts again and allow the temperature to increase to 80° F; repeat the "backing off" and mark the point again. The distance between these points is equal to a temperature change of 5° F., and this can be "stepped off" on either side of 75° F. from 60° F. to 90° F., and a scale drawn in by a piece of pointed stick and white paint.

This completes the job, and if you have carried out the instructions given, you should have no further trouble. For those who prefer the immersion thermostat, the strip could be mounted on bakelite and enclosed inside a large test tube. The reason I have not worried about this type is that the present trend seems to be towards outside-fitting thermostats.

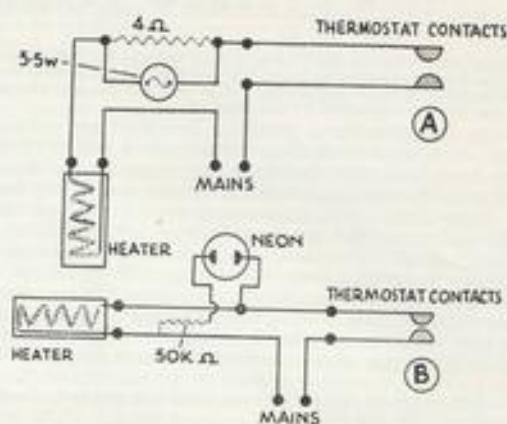


Fig. 6

Biology Lesson—Chapter One *by* EDWARD ELKAN

A FASCINATION for plants and animals goes like a red thread through my life. When I was six it was the fashion for children to take their sandwiches to school in a tin slung round the neck by a leather strap. How often did my mother tell me that I left home every morning well provided with the necessary calories and how I always brought something home in exchange—beetles, butterflies, slugs or snails, anything I could pick up on the



"The doctor was only mildly interested in my ear, but very interested in the jar on the window-sill"

way back from school. Need I say that my mother disapproved strongly? And my father, alas, was not a whit more sympathetic.

My father was a lawyer, highly respected in his profession, but I doubt if he knew a bug from a bear. He was, however, a doting father and realising that my thirst for the chase could not be quenched he did, after much hesitation, give me a butterfly net. All his knowledge of the law could not have helped him to foresee the consequences of this act. My secret dreams did not circle around butterflies at all but around fish. Fish, I knew, could be caught in the moors, less than half an hour from

where we lived. Mother being a hopeless proposition, it was now a question of getting father to take me there and to let me use the net for fish instead of butterflies.

Dotting fathers must have been as obedient in those days as they are now; one Sunday morning we really set out to the moors together, armed with the net and a jam jar, and not only that, no sooner had we arrived at the happy hunting grounds, we caught fish after fish, so many fish that even my father became infected with the excitement of the chase. We soon had as many as the jar could hold and returned home in triumph, transferred the fish to a larger jar and put them on the window sill for everybody to admire.

How pretty they were, coal black, swimming with graceful undulating movements, resting awhile and then swimming again. The only food in those days, known to appeal to fish, was "ants eggs." A supply of these was accordingly obtained from the pet shop and all would have been well if, a week later, I had not got an ear-ache which made my mother ring for the doctor. The doctor was only mildly interested in my ear, but very interested in the jar on the window-sill.

"Whatever have you got those for?" he said, with a voice so severe that I got quite frightened. "Those?" I said, "are my fish—we caught them last Sunday on the moors." The devil take all doctors!

"Fish?" he sneered, "Fish indeed! These are leeches and you'd better be careful with them."

A deadly hush fell on the company. I don't think I have ever again been so near crying. I knew the battle was lost and my fish doomed.

"Cook," said my mother the moment the doctor had gone, "take the jar with these dangerous things and empty it out at the bottom of the garden."

Out went cook with my lovely fish, but by that time she was already as afraid of them, knowing they were leeches, as she had been pleased with them when they were still "fish." To empty the jar out in the garden was more than she could do.

She got the spade out instead, dug a deep hole and buried the unfortunate leeches, jam jar and all. End of biology lesson number one.

OUR EXPERTS' ANSWERS TO READERS' QUERIES

About eight months ago I bought four baby angel fish. Three of them have grown quite large, but one has hardly grown at all since I placed it in the aquarium. Can you tell me why this one fish has been outstripped by the others?

Some fish, even those given the best food and environment, never attain full size. Sometimes a fish is chased away from food with the result that it becomes a skinny, undeveloped weakling. Sometimes it is a weakling from the start. Sometimes it is strong enough to look after itself and mate and produce healthy offspring, but is naturally small. For there are undersized fishes just as there are undersized beggars and kings. Keep an eye on your small fish and see whether it is getting its proper share of food. If it is being bullied by the other fish, your best plan would be to isolate it for a time and give it special care in the matter of food and temperature.

Could you please tell me why my baby fish suddenly develop tapered tail-fins and die?

There are several reasons why fry close up their tail-fins and die like the proverbial flies. A sudden drop in the temperature of the water will cause it; so too will insufficient food, wrong sort of food, unhygienic conditions or bacterial disease. An oily film or scum covering the surface of the water will play havoc with most young fish, especially the fry of paradise fish, gouramies and the like. And so will cold air blowing across the top of the water. Check up on the conditions obtaining in your aquarium, and see whether any improvements can be made.

Could I use mirror glass to glaze the back and ends of an aquarium?

Mirror glass is quite suitable for glazing an aquarium; that is, back, base and ends, but unless you have plenty of plant life growing just in front of it you will find the fish may spend a lot of time swimming up and down it as though trying to make personal contact with the reflections they can see in it. Some fishes seem to lose their sense of balance when they swim up to a mirror and turn slightly on one side or swim in a slightly head-downward position. In time, algae will form on the glass; and then things will look much more natural—but the purpose of the mirror will be lost.

I bought a pair of mollies about a week ago. The night I got them home they were both very active, but the next day the male spent most of the time on the bottom. When he did move it was in a jerky manner, and it seemed a great effort to reach the surface of the water. In fact, after reaching the surface he would sink like a stone. In about two days he was dead. Now the female has developed the same symptoms. Can you tell me what is wrong?

Your fish was killed by a chill. Perhaps the dealer kept his fish in warmer water than you had in your aquarium. Perhaps the chill was contracted during the journey home. The best way to treat chill is to keep the fish in slightly warmer water than they have been used to, and reduce the depth of the water to about six or seven inches. A teaspoonful of rough household salt to every gallon of water in the aquarium often aids full recovery. But a fish which is badly chilled seldom recovers, and is best put out of its misery.

A few days ago I bought a very fine male fighting fish. But since it has been in my possession, I have noticed what appears to be a wisp of excreta trailing from the vent. Do you think there is anything wrong with the fish?

No. The fish might be slightly constipated which would result in excreta hanging from the vent instead of being dropped straight away. The remedy for constipation is to leave off feeding dried food, but provide plenty of live food or scraped lean meat. Sometimes, when a fighting fish is in breeding condition, a tiny nipple protrudes from the vent.

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.

But this is usually more noticeable in the female than in the male.

Are the fumes given off by a paraffin heater harmful to tropical fish life?

We do not think they can be for many years ago we kept and bred several species of fishes in aquaria heated by paraffin lamps. But we always took care to see that the wicks were kept clean and low to prevent smoking, and that the tops of the aquariums were kept covered by tight-fitting cover glasses. Another point to remember is to keep the surface of the water free from oily scum by drawing a sheet of paper across it every other day.

A few days ago I bought two black widow fish. When I bought them they were very black in the fins. Now one of them has lost a lot of colour and looks quite grey. Does this indicate illness or disease?

You have nothing to worry about. Black widow fish can make their dark markings appear and disappear at will. Sometimes too much side light will cause colour changes; that is, from intense black to grey-black or silvery-grey. But in a well-planted tank lit by a good top light, most black widow fish will wear their most attractive markings. We must point out, however, that young black widow fish are always darker in the body and fins than fully grown adults.

Please could you tell me how to keep *Tubifex* worms alive for a week or two? I have found they soon die when left in a jar.

The only way you can keep *Tubifex* worms alive for a long time is to place them in a large shallow dish or bowl with the bottom just covered with water. An old sink or bath with mud on the bottom makes a good receptacle for storing the worms. But you will have to clean them of mud before you feed them to fish.

One of my fish has developed tail-rot. How should I treat this disease?

Net the affected fish, and, while holding it in a net, dab the diseased part with a piece of cotton wool soaked in salt water. Common paraffin oil will also help to bring about a cure; but do not let paraffin or strong salt solution enter the gills or eyes. A temperature a degree or two above normal, and plenty of live food, hurries on recovery.

Soon after introducing fish into my newly glazed and painted aquarium I had nothing but trouble. First the fish died, then the plants started to die down. Can you tell me what went wrong?

All newly-painted aquariums should be soaked in several changes of water before being set up and used to accommodate fish. Some glazing compounds and paints contain a lot of white lead and other things inimical to fish and plant life.

For several months I have been trying to breed platys but up till now all my efforts have not met with much success. Can you give me any hints on breeding these attractively coloured fish?

Platys like clear water heated to about 72°F. High temperatures do not suit them. They also need plenty of bright light, a diet of live food, and green food such as

mossy algae to browse on or a substitute green food such as tiny scraps of cooked spinach or chopped lettuce. Bemax is a good food to give them. Plenty of bushy foliated plants should be arranged along the side of the aquarium facing the light, and at both ends and in the centre. For as the babies are born they will make for the plant life nearest the source of light. It is best to remove the parent fish after the babies are born.

Please can you tell me what is the matter with my male fighting fish? His body looks all puffed out, and his scales are standing up from the body.

Your fighting fish has "dropsy." As the disease seems to have reached an advanced stage, we think the best thing you can do is to put the fish out of its misery.

I should like to build up interesting rock formations in my aquarium, but people have told me that some "rocks" have a bad effect on the water and soon kill the fish. Is this true?

Certainly. Lumps of marble, unsoaked cement work, limestone and the like will soon make the water too hard for the health of the fish. And even cement "rocks" must be soaked in several changes of water over a period of a week to a fortnight before they should be placed in the

aquarium. In fact, it is a good idea to "kill" the lime in them by pouring hydrochloric acid over them, then soak them in fresh water to remove all traces of acid. Granite, soaked coal, slate, smooth-edged flints, tufa and Westmoreland stone can be used with every confidence. But always give such ornaments a good scrubbing before introducing them into the aquarium.

How should I go about breeding the bronze catfish?

The best thing you can do is to give a pair a good-sized aquarium to themselves and leave them there for some time to settle down. The aquarium should be filled with water of an alkaline nature, the bottom should be layered with fine sand just covered with brown sediment, and several flat topped pebbles or slabs of slate should be dotted about the floor. Do not give too much heat. Seventy-two degrees is about right. Feed the fish on chopped earthworms, *Tubifex*, whiteworms and similar foods. Do not illuminate the aquarium with too much bright light—just enough to keep the plants healthy. *Sagittaria* and *Cryptocoryne* are the most suitable plants to use. You will soon know if the female is ready to spawn, for her sides will fill out and the underparts of her body will assume a pinkish tinge.

COLDWATER FISHKEEPING QUERIES answered by A. BOARDER

I am considering planting an outdoor pond for coldwater fish and would be grateful if you could suggest a number of dwarf plants which would quickly spread over the bottom of the pond, and method of planting.

I am not at all happy at your idea of having plants growing all over the bottom of your pond. If you are considering breeding fish in the pond I am sure that you will find that it is a good plan to thoroughly clean out the pond every year. If you have such a lush growth of plant life it may be very difficult to do this. If you want a pond to be the home of water plants including water lilies and no fish, then you can put a foot of soil at the bottom and plant straight into this. The pond may go for years without the need for a clean out and the plants will grow until they become so rampant that you will not be able to see the water, at least during the summer. After a number of years, what with falling leaves and dead vegetation, you will find that your pond is gradually filling up with mud or muck and the depth of water has decreased considerably. *Elodea canadensis* would soon cover the base of such a pond, and I dare to prophesy that within four years the pond would be so crowded with plant life that a goldfish would have difficulty in swimming through it. I recommend that you plant a few water plants in small containers and place them on the bottom of the pond. Roots will soon stray outside the pots and so help to keep the water pure, but you will still be able to remove the containers with plants for the annual clearance.

Can you please advise me as to which coldwater plants requiring little light can be kept in a nine inches deep tank?

You can try *Sagittaria natans* var. *pusilla*, and *Vallisneria spiralis* var. *torta*. Another small growing plant is *Eleocharis acicularis* (hairgrass), which will do fairly well in such quarters.

Recently one of my shubunkins died. It became quite listless and floated side upwards at the surface. I tried it with a Dettol bath but it became quite frantic and when I put it back in the tank it burrowed down into a bunch of water weed and died. What was wrong with it?

Why did you give the fish a Dettol bath? Your fish may have had some slight trouble such as indigestion or a chill. Dettol is only a cure for external pests such as flukes and lice; no remedy is a cure-all for all troubles. If one had a headache one wouldn't take a dose of cough mixture!

Unless you know that the fish has external pests do not give Dettol or any other disinfectant bath. If a fish is sick and you can see no cause for its distress you can always try a fairly mild salt bath. This will often bring about an improvement and unless overdone rarely has any bad results. I think that a fairly safe treatment for sick fish is to place it in a gallon of tap water in which is dissolved a heaped tablespoonful of sea salt. Allow this to dissolve slowly without stirring and the fish can be left for at least a day without coming to harm. After this add fresh water gradually until the water reduces its salt content.

I have had difficulty with blanket weed in my tank, which gets on the top of vallis leaves. I have a large tank and use two 60 watt bulbs to light it. How can I clear it up?

You may be using too much light—all depends on how much daylight reaches the tank; you should graduate the lamps accordingly so that they are not on for too long during bright days. The trouble with blanket weed is that it is a plant like the desirable ones, and what would kill it would also kill all the others in the tank. You can draw off some of it by using a tooth brush and twisting it around the leaves. It is a fact that this weed thrives in tanks where the conditions are rather foul, so keep the feeding down.

There are some small egg-like things on the sides of my tank which appear to move. What are they?

They can be *Hydra* or planarians. The former do not move much but the latter are able to swim about over the surface of the water, which they usually do at night time. The former can eat tiny fry, which they catch with their tentacles, and the latter could eat small fry as well.

It is said that the water snails, *Limnaea stagnalis*, will eat *Hydra*. Planarians can be caught at night, when on the move, with a fine net.

On the surface of my pond are patches of coloured oily matter. What is this?

The oily matter is likely to be the result of decaying vegetation. If a water lily leaf is left to decay it will cause this oily substance to form very quickly. Once lily leaves turn brown it is better to remove them before they decay too much and pollute the water.

Can goldfish go blind?

Yes, they can do so like other animals. A temporary blindness is often caused by a form of fungus which seems to put a white film over the eye. This trouble often comes in the early months of the year, usually on fishes which have wintered out of doors. I had a spot of this bother some years ago and found that it helped the fish to bathe the eye with some glycerine to which had been added a little iodine. I have since heard that castor oil is good for this purpose too, but I have not tried it myself. Of course, a fish can go blind through other causes, such as a cyst forming over the eye or a cancerous growth. If a fish was so blind that it could not see its way about and did not respond to treatment it would be better to destroy it.

I am about to buy unpainted aquarium frames unglazed, and would be very glad if you could give me precise instructions as to painting them, such as how many coats to use, what primer, undercoat and finishing which are not likely to be toxic. Should I paint before glazing or after?

In the first place you must realise that whatever you use for painting the frames will not have much effect on the fish. In a correctly glazed tank there is only one surface of the framework from which any poisons can get to the fish; this is the underside of the top frame. The rest of the inside of the frame is completely sealed off from the water by the glass and the glazing compound. There are several types of paint on the market which have a galvanising effect on the metal, and one of these could be used first. A good aluminium paint on a thoroughly clean surface will also help to prevent the frame from rusting. This can be covered with a good coat of flat or undercoating paint and when all is dry you can glaze the tank. After glazing, paint with your finishing coat and all should be well. The part of the frame which I mentioned should have the most careful treatment as this will receive all the condensation on it, will rust first, and can allow contaminated water drops to fall into the tank. Concentrate then on the under side of the top frame, see that it is well covered and many worries will be saved for ever more.

My husband is driven nearly mad by things like shrimps in the pond which eat the young fish. What can be done about them?

The things like shrimps can be fresh water shrimps (*Gammarus*), which will be eaten by large fish. They may be the larvae of the water beetle (*Dytiscus marginalis*), or of one of the dragon flies. These larvae are very voracious and can eat fish up to an inch long. The larvae of the water beetle has a small head with a pair of jaws, a short thorax with three pairs of legs and a long body which it often raises upright. The bodies of the dragon fly larvae are much thicker and flatter. The one from the short-bodied dragonfly is to me the most horrible creature in the water world. These pests can sometimes be trapped by placing a piece of fish or meat in a wire cage and lowering it into the water, especially at nights. In the morning some of the pests may still be feeding and can be killed. The wire cage is to prevent the fishes from eating the bait. Some of these pests come to the surface of the water at night and it is a good plan to hunt for them with the aid of a strong torch.

Through an advert in *The Aquarist* I bought some seven-day-old fry. I managed to rear about 24 out of 40 and by last September some had coloured up. I put 12 of the best in a three feet tank indoors and, on 30th November, they spawned. Is it unusual for coldwater fish to mature and spawn in six months?

I have known young veiltails to spawn at five and a half months of age, although it is generally much longer before they do so. It all depends on the way they have been fed and the amount of space they have had. The temperature of the water in which they have been reared also makes a great deal of difference. I think that fish reared in water

at a temperature of 65° to 70°F., would grow three times as fast as young reared in water at 45° to 50°F., providing they were fed well. You say the fish arrived in May, but they may have been somewhat older than seven days by the time you got them. Some weeks may have elapsed before the advertisement was published. In any case you have done quite well, but it is not a record. I find that veils are one of the fastest maturing fancy goldfish, if they get almost tropical treatment during the first three months of their lives.

I have some peacock-eye bass in a 24 ins. by 12 ins. by 12 ins. tank. Can I breed them in this and how many fish of this kind will it hold?

When the fish grow and mature you may only be able to keep two fish in your tank. They can get quite big. I do not think that you are likely to succeed in breeding them in such a tank although it might be possible. They can be bred in an outdoor pond in this country during warm weather and would require plenty of live foods to bring them into breeding condition.

My scaled fantails have not changed colour yet and they were hatched in May last year. Will they change now?

There is every possibility of the fish changing colour. Many of these scaled types do not change until the spring following the year of hatching. I often find that those which change very early, say within three months, do not always have such a deep red colour as some of those which change when about a year old. As long as they start to change by May, they will be all right. Although this quick colour change can be bred for, a lot depends on the sunshine available and the warmth of the water.

I am hoping to rear some young of fancy goldfish in tanks in an unheated greenhouse. Should I shade the glass of the greenhouse?

There may be no need to shade the glass, as you may lose a lot of heat if you do so. As sure as you shade the glass with some semi-permanent material the weather will change and there may be no sunshine for days. On the other hand I do not think that it is a good policy to expose fry to direct rays of the sun through greenhouse glass. I think that the fry need some shelter at times and I find that the best method is to have some duck-weed (*Lemna*), floating on, say, half the surface area of the tank. This gives some protection and the fish can go into the sun or out of it at will. To place small fry in an all-glass tank in full sun is just asking for trouble. I think they do better when in tanks with opaque or shaded sides and also some cover such as suggested.



Photo

Lawrence E. Perkins

Duck-weed on water surface provides good shade for aquarium or pond fish



*A page for
the beginner
contributed
by
A. BOARDER*

THIS is the month when preparations for breeding should be made. There is plenty of time yet but it is well to start in good time so that you are quite ready for the first spawning and hatching tanks should be all cleaned up and ready. No definite time can be given for when goldfish will spawn and I have only just had a letter from a reader to say that his goldfish spawned in a tank on 27th January.

As the weather at the time was very cold indeed it comes as a bit of a shock to hear of fish spawning. Of course, goldfish will start spawning when under cover much earlier in the year than if they were in an out-door pond. Some seasons they will commence to breed in the pond in April, but in my district I rarely get a spawning before May. The district does make a difference, as in the south-west of England fish could be expected to spawn some time before those kept farther north. However, fishes from a pond can be induced to spawn if they are taken from the pond into a fish-house or similar place and given a fair-sized tank to a pair. This method should only be resorted to by experienced aquarists, as many good pairs of fish have been lost by taking them from a pond and placing them in a small tank with warmer water. Many plants are placed in the tank for spawning and the effect of the warmer water plus the carbon dioxide given off by the plants during the night have killed the fish before morning.

If this controlled breeding is required it must be done with great care. The tank in which the spawning is to take place must be not less than 24 ins. by 12 ins. in surface area, and larger will be safer. The tank should have been thoroughly cleaned and sterilised with a disinfectant. The water should be fresh and the water plants should also have been sterilised. As a matter of fact the artificial fern (sea moss) which is sold for decoration purposes is a very good material for a spawning medium. This gives off no oxygen of course, as it does not grow, but holds eggs very well. If this is used the tank can be aerated, unless it is fairly large. It is a fact that most goldfish will only spawn in water which has a good amount of oxygen in it. Some part of the spawning tank should be shallow but if this cannot be arranged it is all right as long as plenty of spawning material floats on the surface. Goldfish do like to lay their eggs on water plants which are at the surface.

Where this method is adopted it is a good plan to remove the breeders as soon as plenty of eggs are laid. To encourage the fish to spawn it is a good plan to separate the sexes for a few days and then, if the fish are placed together over-night, spawning may take place first thing in the morning. One great advantage of this method is that in the restricted area of the tank most of the eggs laid will be found to be fertile. As is known, the sperms of the male are able to swim in the water, and the smaller the volume of water the better chance is there of them finding access to an egg.

The treatment for the ordinary pond-breeders is to start as soon as possible, feeding with as much and varied

types of live foods as possible. Do not be tempted to feed when the temperature of the water is below 40°F. Although the fish may eat a little they take a long time to digest the food and so very little should be given. Once the water begins to warm up a bit the fish will become more active. Their hearts beat quicker with warmth and they become more hungry. Watch how they feed and you will soon learn when to give any more and when to stop. If fish do not want to take the food readily there is no sense in giving it.

No fish which is not healthy can be expected to breed so wait until the fish are in the best of condition. You can do a good deal towards getting the right conditions for them. See that the pond water is fresh. Should it be of a bad colour due to frosts and icing over, it is well to remove a large amount and refill with fresh tap water. Only when the water is in good heart can you expect the best from the fish. Then, as to the fish themselves. They require a certain amount of food to make up for the daily losses but if you expect them to spawn well they must have a surplus of food to build up the eggs and milt. Any well fed healthy goldfish in the right conditions cannot help spawning, for it is a natural function.

The temperature of the water does not appear to have a great effect on the spawnings, as I have had them when the water has been as low as 50.5°F., and as high as 76°F. Sometimes the fact that the morning sunshine strikes the pond has a beneficial effect on the spawners, but this is not always so.

Although the breeding of goldfish in an open pond appears to be affected somewhat by the weather, this has little effect on fish kept indoors in tanks. As an example, I can quote that the spawnings in my pond usually take place early in the mornings, often at the commencement of a warm, settled spell. They are usually over by about 9 a.m. In an aquarium, however, the fish may not commence to spawn until the evening and even if they start early they sometimes continue spawning throughout the day.

I shall be dealing with all the methods of hatching and rearing young in my following articles, but meantime make sure that everything possible is done to ensure that your prospective breeders are in the pink of condition. At this time of the year and next month you must watch for signs of fungus, that woolly-like substance which attacks the fish at this time of the year in some ponds. The fish are in a low state because of the winter severities and it is then that they are liable to be attacked by this disease.

The fish have a good protective coating of mucus, or slime, which is a protective from such complaints as fungus, but if the fish is below par, the mucus covering can be weakened and so the disease can take a hold. If a fish has been damaged in any way the sore spot can also be attacked. Goldfish generally keep together fairly well in a pond, and if one fish is continually seen by itself away

(Please turn to page 261)

OUR READERS

Write—

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.



Goldfish—Public Health Act, 1936

LORD Justice Goddard, giving judgment recently in the Queen's Bench Divisional Court in the appeal of Ilford Council against the Becontree magistrates' dismissal of a summons against a rag and bone merchant for giving a boy under 14 a goldfish in return for rags, dismissed the appeal. The Public Health Act of 1936 forbids handing over "any article whatsoever" to a person under 14 in return for rags.

In his judgment Lord Goddard said that fish were an inducement to small boys. If the fish were given in bottles these would be articles, and had the Act said article or thing there would be no doubt that a goldfish is a thing. An unfortunate verdict for that beautiful "thing" the common goldfish! What steps can be taken to have these two tiny words added to the appropriate section of the Act in order that countless little things can be saved from torture?

V. H. LEWIN, *Secretary,*
Oxford Aquaria Society.

The "Bennett Cure"

I WOULD like to pass on to readers of *The Aquarist* a sure cure for swim bladder trouble, first tried by Mr. Bennett of Lye, near Stourbridge, and I hope you will call it the "Bennett Cure." All fish treated are now well and swimming with other fish.

For coldwater fish place the fish in a tank or jar and bring the temperature down as low as possible (to 35° or 40°F.). Prepare a tank with water 12 inches deep at a temperature 80°—90°F. Transfer the cooled fish quickly to this water by net. It will be seen to breathe very quickly and try to rise in the water, perhaps about four inches at first, and it falls again to the bottom; then with its remaining strength it will dart to the surface and there give one big gasp. The fish is then cured and will be able to swim normally again.

For affected tropical fish the treatment is the same but the cool temperature used is 60°F., and the high level 95°F. We have not yet tried fighting fish with this treatment but all other fish so treated are recovered and perhaps other readers will report on their results. It will be noted that the behaviour of the fish in heated water is the same as that of newly hatched or newborn fry.

F. A. WOLFE, *Vice-chairman,*
Lichfield & District Aquarist Society.

Unusual Fighter Behaviour

I MATED two Siamese fighters, both previously unmated, recently and observed the following unusual

behaviour, which I have never seen before in numerous spawnings from these fish.

Practically no nest was built, just a few scattered bubbles. The female continually sought out the male, inviting the connubial embrace, but when the male grasped her he held her sideways, not upside down. The eggs were squeezed from her and remained on her side in a group. She then floated without body movement on her side to the surface and remained there a minute or so.

Most of the grouped eggs floated when she moved off and the few that sank were collected by the male and blown back into the "nest." The procedure was repeated several times. After removal of the female to another tank the male commenced to build up the nest into the normal form.

C. B. GRIFFIN,
Ewell, Surrey.

Fish in their True Colours

I WAS extremely interested in Mr. Harcourt Ellis's article on "Seeing Fish in their True Colours" (*The Aquarist*, January). The difficult question of lighting fish houses and aquaria has recently occupied the attention of an increasing number of enthusiasts, and as Mr. Ellis points out, only those with the necessary technical knowledge can make a success of the subject.

I sincerely trust, therefore, that Mr. Ellis's article will be responsible for starting in your columns a valuable discussion on this intriguing question, and with this end in view, it would be helpful if you would kindly publish this letter.

D. DUBARRY-JONES,
Birmingham, 5.

Zebras and Minnows

IN the latest issue of *The Aquarist* to reach me here I have seen the letter from a reader concerning keeping zebra fish and white cloud mountain minnows together. I have kept these two species together for some considerable time and I have always been able to select suitable pairs for breeding. My fishes are in a 36 ins. by 15 ins. by 18 ins. aquarium with plenty of plant growth and I have veiltail guppies and blue gouramies in the same tank. Many thanks for the valuable information received from your wonderful magazine.

J. R. NEWTON,
Melbourne, Australia.

Mr. L. Cura



One of the early pioneers of the aquarium hobby in Britain and a man whose name was known to thousands as the proprietor of a long-established aquarium suppliers and water plant nurseries, was Mr. L. Cura, whose death on 23rd January, at the age of 69 years, we report with regret. Mr. Cura had a life-long interest in natural history and the good reputation enjoyed by his firm was largely due to this. He leaves no family but his two nephews, Mr. C. Campominosi and Mr. N. Ermini, who have worked all their lives in "L. Cura & Sons," are to carry on the business under the name it has borne since 1859.

Our Readers Write

(Continued from opposite page)

Cabomba in Flower

I WAS interested to read the letter on *Cabomba* in *The Aquarist* (February) because the same day I had noticed some in flower in my 30 ins. by 12 ins. by 12 ins. aquarium. What took my notice most was the fact your correspondent stated that to flower, the branch must be at least three feet long. Mine is about 12 inches long, including the flower, and it is the only piece of this plant I have. The water is about 75 per cent. distilled water and the rest tap water, and is maintained at 76°F.

D. BROOKS,
Farnworth, Lancs.

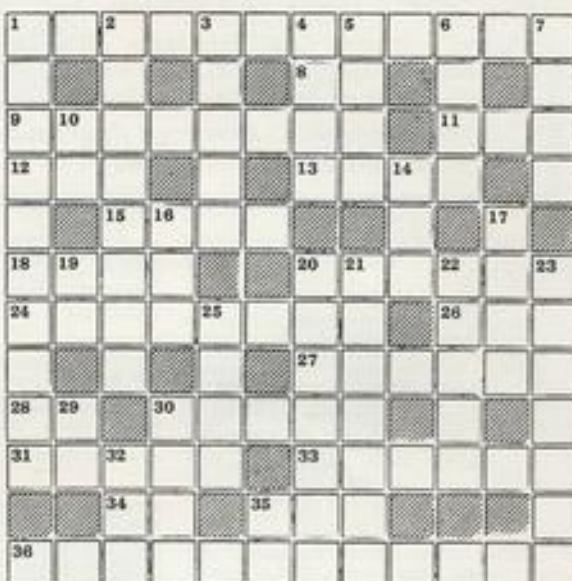
Fish in the Ward

A LETTER from a medical man who asks to remain anonymous tells us of an interesting remark made by a children's specialist at a large hospital in south-west England. He said: "We no longer admit children to a cot in the children's ward—we now admit them to a chair in front of the aquarium, and by the time the other children have shown it to them and told them the names of the fishes they are quite happy and friendly with everyone!"

March, 1954

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- 1 Betta (8, 4)
- 9 No air rate? Readjust (8)
- 11 The sepia of cuttlefish (3)
- 12 Drink of late amphibians (3)
- 13 Catches in a mesh (4)
- 15 Oddly enough, 12 may be one of these (4)
- 18 No snakes here, thanks to St. Patrick (4)
- 20 If human, on ice; if an insect, on water (6)
- 24 Commonly, and incorrectly, known as bulrush (8)
- 26 Tetra from — (3)
- 27 Register, perhaps (6)
- 28 In the same place, briefly (2)
- 30 Muddled sprat (5)
- 31 Pupa of an insect (5)
- 33 No trap for the sea fish (6)
- 34 Motoring body (1, 1)
- 35 Army Council Instruction largely starts acidity (1, 1, 1)
- 36 Parents of dried fish food (5, 7)

CLUES DOWN

- 1 Sounds like a flying fish (10)
- 2 Dwarfs, pearls or blues? (8)
- 3 Neon, perhaps (5)
- 4 — and tetra certainly (4)
- 5 Heredity factor (4)
- 6 Flagflower (4)
- 7 A fish caught in a brace of shakes (4)
- 10 Common Lancashire sound of many meanings (2)
- 14 Most of the team (3)
- 15 Tail (3)
- 17 Artificial barrier in a river (4)
- 19 The Sappers (1, 1)
- 20 Show symptoms of itch, perhaps (7)
- 21 What water spiders do in their nests (4, 3)
- 22 Body of water soldier? (5)
- 23 Water voles, for instance (7)
- 25 Night flying insect (4)
- 29 Near to (2)
- 30 Naps back (4)
- 32 Suitable name for penniless maid (3)
- 35 As a salmon begins (2)

(Solutions on page 263)

Stepping Stones

(continued from page 259)

from the others and lying very quiet, it should be caught and examined in case it is suffering from any complaint. The wish to be alone is noticeable in many other animals which are off colour.

The salt treatment so often described will cure a fish as long as it has not been suffering too long. Once the disease reaches the pills it is usually fatal. The addition of a small amount of sea salt to the pond at this time of the year does no harm but do not overdo it as the salt remains in the pond almost indefinitely. A tablespoonful to about twenty gallons of water will not be too much as long as no more is added before the pond is emptied.

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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.

OWING to lack of support it has been decided to disband the **Barnsley and District Aquarist Society**.

IN spite of severe weather many members of the **Beshill and District Aquatic Society** entered their fish for the society's table show of labyrinths. Heating plates provided ensured that the fish were not adversely affected by the extreme cold. A Siamese fighter fish by Mr. J. Walker. Following the show the colour film from the Harrow Aquatic Society was shown. Last month the society presented its fifth aquarium to a local children's home.

THE April meeting of the **Bristol Tropical Fish Club** will be held on Wednesday, 14th April—an alteration to the date previously announced. The speaker will be Mr. W. L. Mandeville and the meeting place is the Old Duke, King Street, Bristol.

FUTURE meetings of the **Chelsea Aquarium Society** are to be held on the second and fourth Tuesdays of each month, 8 p.m., at the Chelsea Community Centre, 385, Kings Road, Chelsea, S.W.3.

FIRST table show held by the **Dukeries Aquarists Society** (late Worktop and District Society) was held at the new headquarters—Royal Oak Inn, Bakestone Moor, last month. A nigger barb entered by Mr. W. Kirk was the winning fish. Secretary Mr. J. Marlow is arranging for a show in April.

AT last month's meeting of the **Gainsborough and District Aquarist Society** Mr. T. W. Dobbs from the Lincoln A.S. gave a talk on breeding tropical fishes. A quiz between the two societies is to be staged in the near future.

THE **Harrow Aquarists Club** reports a successful year with a steady though not large membership. The secretary is hoping to hear from new members and novices wishing to attend this year's meetings (Mr. W. J. Humphries, 65, Capthorne Avenue, Harrow).

A MONTHLY bulletin issued by the **Hounslow and District Aquarist Society** contains helpful articles on pond construction, white spot cures and the guppy, in addition to the society's news.

MR. J. A. Mackintosh stressed the dangers of an un-earthed tropical aquarium in a lecture on electricity in the aquarium given to members of the **Inverness and District Aquarist Society**.

FISH and reptile recognition was tested for members at an evening meeting of the **King's**

Lynn and District Aquatic Society when photographs of various species were projected on to a screen by means of an epidiascope. A number of young aquarists from local schools attended.

SCIENTIFIC work on fishes carried out in Arctic regions was described in a talk to **Lowestoft Aquarist Society** members by Mr. R. W. Blacker of the Ministry of Fisheries. The talk was supplemented by a film taken aboard the research vessel "Ernest Holt" during an Arctic survey. The society has taken over the maintenance of tropical aquaria in their local hospital.



Photo: K. Japson
Aquarium in the William Shephard Ward of Belgrave Hospital for Children, Kennington, presented and maintained by the **Brixton Aquarist Society**

NORTHFIELD and District Aquarists' Society holds meetings on the first Friday of each month at Allens Cross Community Hall. Secretary is Mr. E. J. Druce, 174, Shenley Fields Road, Birmingham 29.

A CALL for volunteers to experiment with Perspex or horticultural glass to determine the effect on water plant growth is made by the secretary of the **Breeders' Section of the Nottingham and District Aquarists' Society** in a recent bulletin.

THIS month's meeting of the **Peterborough and District Aquarists' Society** at the Rose and Crown, Bridge Street, Peterborough, 7.30 p.m. on 15th March will include a table show of danios and a talk on British reptiles.

MR. Raymond Yates, contributor to *The Aquarist*, was speaker at last month's meeting of the **Rochdale and District Aquarist Society**.

FIRST birthday of **Staeford and District Aquarist Society** was celebrated with a birthday cake presented by a lady member and cut by the chairman Mr. A. Ralphs at the annual general meeting recently.

THE **Sheffield Schools Aquarist Society** has been discontinued because of lack of support but is replaced by the **Pirs Hill Aquarist Society** which has a large and enthusiastic membership in the Pirs Hill School. Past pupils of the school will be welcomed as members by the secretary Miss Mary Bell, Pirs Hill School (Junior Orphanage Road, Sheffield 4).

SINCE last year meetings of the **Staines and District Aquarist Society** have been held at the Phoenix, Bridge Street, Staines on second and fourth Thursdays of each month. The first big public show held on Coronation Day last year and the society's successful outings and lecture meetings made 1953 a satisfying one for the club. It is hoped to expand activities in coldwater spheres of the hobby as a result of showing achievements by members.

MEETING place of the **Wembley and District Aquarium and Pool Association** is now Terry Watson's Restaurant, 763, Harrow Road, Sudbury, Wembley on the first and third Monday evenings of each month.

AT a table show for characins, swordtails and *Rasbora* species staged by the **Willesden and District Aquarists' Club** firsts in each section were gained by fish entered by Messrs. Game, Atkins and Smith.

WITHIN three months of formation **Yeovil and District Aquarist Society** staged a successful three day exhibition of furnished aquaria in a vacant shop in Yeovil. Over 30 aquaria were displayed and visitors numbered 1,300. Outstanding on the tropical stand were plants and fish shown by Mr. S. Langdon. Although only 18 years of age Mr. Langdon has had several years' experience as a successful tropical fish breeder.

Fish in Respect

FISH breeders in the mountain village of San Giovanni are to send Sir Winston Churchill a gift of four varieties of rare goldfish "as a token of respect and admiration."—*Yorkshire Evening Post*.

Aquatic Traders Association

AS usual, the annual dinner and dance of the **Aquatic Traders' Association**, which was held at the Windsor Castle Hotel, provided an excellent evening's entertainment for the 150 members and guests who attended. Mr. and Mrs. R. Fairbairn, who were the organisers, have certainly set a high standard for this function and are to be congratulated on all the arrangements made. This year, Mr. T. Horeman (Windmill Products) was in the chair, and received ample support from toastmaster Mr. John Humphreys. The toast of the Association was proposed by Mr. C. W. Brown, suitable response being made by Mr. F. Jordan (Aquifers Products). Among the guests was Mr. G. Canadale, who responded to the Visitors' toast, which had been proposed by Capt. L. C. Brits, M.B.E. A good cabaret show added to a really first-class evening's enjoyment.

New Volume

THIS issue completes Volume XVIII of *The Aquarist*. Did you know that for only 12 shillings (plus postage) you can have your copies bound in full cloth with lettered spine? This attractive price is offered by the Sir Robert Jones Memorial Workshops (74, Upper Parliament Street, Liverpool 8), and if you join the many readers who send their volumes there for binding you can share in their satisfaction with the work and the knowledge that you are helping disabled craftsmen and trainees.

New Societies

Basingstoke Aquarist Society. Secretary: Mr. W. H. G. Smart, 94, Western Way, Basingstoke, Hants. Meetings: Second and fourth Fridays each month at the Cricketer's Inn, Basingstoke (7.30 p.m.).

Hull and East Riding Guppy Breeders' Society (affiliated to F.G.B.S.). Secretary: Mr. P. A. Thompson, 56, Hotham Road, Hull. Meetings: Second Monday each month, 7.30 p.m., at Argyle House, Anlaby Road, Hull.

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The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue substantial metal emblem for the aquarist can now be obtained at cost price by all readers of *The Aquarist*. The design is pictured above (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 1s. 9d. together with the **Aquarist's Badge Token cut from page 263**, to Aquarist's Badge, *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies:

Bedford and District Aquarists' Society (Mr. R. R. Pope, 51, Aylesbury Road, Bedford); **Blackpool and Fylde Aquatic Society** (Mrs. V. Fletcher, 13, King Edward Avenue, Blackpool); **Bolton and District Aquarist Pond and Marine Society** (Mrs. E. Rushton, 551, Flodder Lane, Farnworth, Lancs.); **Bristol Aquarists' Society** (Mr. D. S. Paul, 1, Bower Walk, Bedminster, Bristol 3); **Cambridge and District Aquarists' Society** (Mr. E. A. Phillips, 10, Cockburn Street, Cambridge); **Chester and District Aquarist Society** (Mr. J. Bowyer, 27, Chichester Street, Chester); **City of Salford Aquarist Society** (Mr. W. Wainman, 249, Eccles New Road, Salford 5, Lancs.); **Corby and District Aquarists' Society** (Mr. D. J. Atkins, 363, Willowbrook Road, Corby, Northants); **Dunstable and District Aquarists' Society** (Mr. B. C. Flatman, 71, West Parade, Dunstable, Beds.);

Erith and District Aquarists' Society (Mr. G. W. Baker, 12, Berkeley Avenue, Bealeys Heath, Kent); **Great Yarmouth and District Aquarists' Society** (Mr. J. Dye, 64, Wellisle Road, Great Yarmouth); **Hereford and District Aquarists' Society** (Mr. D. T. D. Cooke, 19, Hourwithy Road, Hereford); **Lambeth Aquarist Society** (Mr. R. F. Griffin, 231, Gipsy Road, West Norwood, London, S.E.27); **Lancaster, Morecambe and District Aquarists' Society** (Miss A. Rogers, 2a, Langley Road, Lancaster); **Lichfield Aquarist Society** (Mr. T. A. Baker, 2, Botany Bay, nr. Lichfield, Staffs.); **Loughborough and District Aquarist Society** (Mr. T. A. Smith, 97, Blackbrook Road, Loughborough, Leics.); **March and District Water Life Club** (Mr. H. W. Edwards, 52, St. Peter's Road, March, Cambs.); **Portsmouth Aquarists' Club** (Mr. J. Stillwell, 262, Allaway Avenue, Paulsgrove, Portsmouth, Hants.); **Rotherham and District Aquarist Society** (Mrs. F. Tomlinson, 33, Renishaw Avenue, Broom, Rotherham); **Sheffield and District Aquarist Society** (Mr. F. Knaggs, 8, Burngreave Road, Sheffield, 3); **South Glasgow Aquarium Society** (Mr. E. Readings, 22, Gladsmuir Road, Glasgow, S.W.2); **Southall Aquarist Society** (Mr. A. N. Shilstone, 3, Howard Road, Southall, Middlesex); **Southport Aquarist Society** (Mr. J. Taylor, 29, Church Street, Southport, Lancs.); **Sunderland and District Aquarists' Club** (Mr. K. Rosekilly, 6, Beechwood Street, Sunderland); **Walthamstow and District Aquarists' Society** (Mr. W. J. Chesneau, 44, Capworth Street, Leyton, E.10); **Workington and District Aquarist Society** (Mr. M. Ward, 18, Milburn Street, Workington, Cumb.).

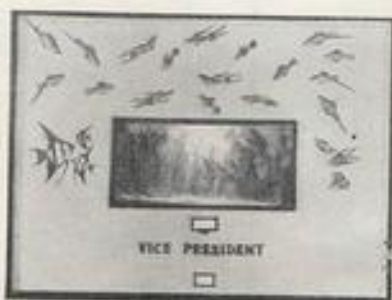
Aquarist's Calendar

20th March: **Midland Aquarium and Pool Society Annual Dinner and Dance.**

12th April: **British Herpetological Society (London Group) meeting, "Snakes and Lizards," 7 p.m., at the Linnern Society's Rooms, Burlington House, Piccadilly, London, W.1.**

4th-8th May: **Bury and District Aquarists' Society Show.** Show secretary: Mr. G. D. Grimshaw, 1, Garston Street, Bury, Lancs.

29th May: **Rochdale and District Aquarist Society open show of furnished aquaria, tropical and coldwater fishes at the Fire Station Hall, Rochdale.** Show schedules from Mr. N. Gott, Crossways, Kendal Avenue, Norden, Rochdale.



Show stand of the Dewsbury and District A.S. has been made in five sections, two of which are shown above containing 24 in. tanks. The other three sections each display four small aquaria showing pairs of fishes; the stand has been used at a local cinema and at a flower show

Crossword Solution

F	I	G	H	T	I	N	G	F	I	S	H
E	O	E	E	E	R	A					
A	E	R	A	T	I	O	N	I	N	K	
T	E	A	R	N	E	T	S	E			
H	M	E	A	L	E	W					
E	R	I	N		S	K	A	T	E	R	
R	E	E	D	M	A	C	E	R	I	O	
F	S	O	R	E	C	O	R	D			
I	B	S	T	R	A	P	O	E			
N	Y	M	P	H	T	A	R	P	O	N	
		A	A	A	C	I					
B	R	I	N	E	S	H	R	I	M	P	S

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... 15/-
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Green Tree Frogs (<i>Hyla arborea</i>)	2/6
Ocellated Skinks (<i>Chalcides ocellata</i>)	15/-
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ARTHUR DERHAM

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Only plants this month—Red Myriophyllum in fine colour 15/- doz. Macuillamia R. six cuttings for 12/-, three rooted plants for 9/-. Floridan Myriophyllum 6/- doz., Sagittaria Microfolia 5/- doz., Elodea Gran. 2/6 doz. A few, very few, Saururus, a beautiful little plant, 2-3 ins., bright green, heart-shaped leaves, fully rooted underwater plants 3/- each. Dear? Yes! But you try to cultivate a crowd of 'em!

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	24" x 15" x 12"	46/10

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